Project Manager's Quarterly Progress Report – 1st Quarter FY 2001
U.S. Large Hadron Collider Construction Project

1. PROJECT IDENTIFIERS

Reporting Period:	Through **December 31, 2000**
Program Sponsors:	DOE High Energy Physics Division/NSF Physics Division
DOE/NSF Program Manager:	T. Toohig, (301) 903-4115, timothy.toohig@science.doe.gov
DOE/NSF Associate Program Manager:	M. Goldberg, (703) 306-1894, mgoldber@nsf.gov
Operations Office:	Chicago Operations Office/Fermi Area Office
DOE/NSF Project Manager:	J. Yeck, (630) 840-2530, jim.yeck@ch.doe.gov

2. PROJECT DESCRIPTION

The Department of Energy (DOE) and the National Science Foundation (NSF) have signed agreements committing to collaboration in the construction of the Large Hadron Collider (LHC) at CERN (European Laboratory for Particle Physics) and two of its associated detectors. The U.S. fabrication effort will be carried out at, or under the supervision of, U.S. universities and national laboratories under the terms and conditions described in the International Collaboration Agreement (Agreement) and its Accelerator and Experiments Protocols. The U.S. LHC Construction Project is defined by the goods and services to be provided to CERN under the terms of the Agreement between DOE, NSF, and CERN. These goods and services include DOE contributions to the LHC accelerator, and DOE and NSF contributions to the ATLAS (A Toroidal LHC Apparatus) and CMS (Compact Muon Solenoid) experiments.

The DOE contribution to the LHC accelerator consists of items provided by DOE National Laboratories and CERN direct purchases from U.S. industrial firms. The scope of these contributions is addressed in the Accelerator Protocol and described in detail in an Implementing Arrangement between the collaborating DOE National Laboratories and CERN. The DOE and NSF contributions to the ATLAS and CMS detectors consist of items supplied by the collaborating U.S. universities and DOE National Laboratories. The scope of these contributions is addressed in the Experiments Protocol and described in detail in Memoranda of Understanding for collaboration on construction of each experiment.

The U.S. LHC Construction Project includes the U.S. ATLAS, U.S. CMS, and U.S. LHC Accelerator projects. This report summarizes the overall status of the U.S. LHC Construction Project effort and includes more detailed status information on each sub-project. Additional information can be accessed at the following web sites:

U.S. LHC Project - http://www.hep.net/doe-hep/lhc.html

LHC Project - http://wwwlhc.cern.ch/	U.S. LHC Accelerator - http://www-td.fnal.gov/
ATLAS - http://atlasinfo.cern.ch/Atlas/Welcome.html	U.S. ATLAS - http://www.usatlas.bnl.gov/
CMS - http://cmsinfo.cern.ch/Welcome.html	U.S. CMS - http://uscms.fnal.gov/

3. PROJECT MANAGER'S NARRATIVE HIGHLIGHTS

The current list of DOE/NSF project reviews and status meetings is provided below:

U.S. LHC Construction Project	Event	Date
U.S. CMS Detector	DOE/NSF Review	October 11, 2000
U.S. LHC Accelerator	DOE/NSF Review	November 28-30, 2000
U.S. LHC Project	DOE/NSF JOG Meeting	December 5, 2000
U.S. ATLAS Detector	Quarterly Status Meeting	December 12, 2000
U.S. CMS Detector	Quarterly Status Meeting	January 25, 2001
U.S. LHC Accelerator	Quarterly Status Meeting	February 12, 2001
U.S. ATLAS Detector	DOE/NSF Review	March 20-22, 2001

The results of these activities are documented in formal reports and meeting notes. The U.S. CMS and ATLAS projects submit monthly reports and the U.S. LHC Accelerator project submits a quarterly report. Current performance data is summarized in the following tables:

Table 3.1, Schedule Performance Indices

	Planned Complete (BCWS/BAC)	Actual Complete (BCWP/BAC)	Schedule Performance (BCWP/BCWS)
U.S. ATLAS	40%	38%	96%
U.S. CMS	59%	52%	88%
U.S. LHC Accelerator	60%	55%	92%

Table 3.2, Contingency Status (in thousands of dollars)

	Total Project Cost (TPC)	Budget at Completion (BAC)	Contingency	Budgeted Cost of Work Performed (BCWP)	Remaining Work to be Performed (BAC-BCWP)	Contingency/ (BAC-BCWP)
US ATLAS	163,750	129,002	34,748	49,287	79,715	44%
US CMS	167,250	135,368	31,882	69,869	65,499	49%
US Accelerator	110,000	96,655	13,345	53,123	43,532	31%

Table 3.3, Cost & Schedule Performance (in thousands of dollars)

	Cumulative Costs to Date					Costs at Completion		
	Budgeted Cost			Variance			Revised	
	Work Scheduled	Work Performed	Actual Cost	Schedule	Cost	Budgeted	Estimate	Variance
U.S. ATLAS	51,296	49,287	48,303	-2,009	984	163,750	163,750	0
U.S. CMS	79,283	69,869	60,353	-9,414	9,516	167,250	167,250	0
U.S. LHC Accelerator	57,648	53,123	57,232	-4,525	-4,109	110,000	110,000	0
CERN Invoices	20,693	20,693	20,693	0	0	90,000	90,000	0
U.S. LHC Total	208,920	192,972	200,781	-15,948	-7,809	531,000	531,000	0

4. PROJECT MANAGER'S ASSESSMENT

The U.S. projects continue to meet their goals and are reliable and influential partners in the construction of the ATLAS and CMS detectors and the LHC machine.

Cost - Cost performance is good as material contracts are typically below estimates and labor costs continue to track close to plans. Project reviews and reports confirm that each project has adequate contingency available. The detector projects are in the production phase and cost experience on production labor will be an important future indicator of cost performance.

Schedule - Schedule performance is measured through milestone completion and by earned value. These measurements indicate that schedule progress is behind plans averaging about ninety-two percent of the baseline plan. CERN expects to complete construction of the LHC in 2005 and initiate collider commissioning. The U.S. schedules are consistent with this goal.

Technical - We remain confident that the U.S. deliverables to CERN can be realized with the planned funding. The U.S. LHC Construction Project deliverables are accepted by CERN and approved by the DOE/NSF Joint Oversight Group. We hope to provide additional items to CERN, within the approved funding, should cost performance be favorable.

ISSUES

LHC Schedules - CERN is discussing a new commissioning scenario for the LHC machine. This scenario calls for first collisions in 2006. The period from February-March 2006 would now be used for one-beam commissioning, followed by a four week Pilot Run with first collisions starting in April, 2006. This would be followed by a three month shutdown and then start of a physics run in August 2006. The implications of this commissioning scenario on the ATLAS and CMS experiments will be addressed at the April 2006 Resource Review Board meetings. DOE and NSF staff continue to closely monitoring this planning activity.

ATLAS and CMS Resources– Estimates of the resources required to complete the experiments exceed the funding currently identified. Funding shortfalls are driven by two factors: various institutes not meeting their original commitments and improved estimates of the funding required to complete the detectors. ATLAS and CMS management continue to address shortfalls when schedules dictate but at some point we should expect that CERN and the collaborations' management will attempt to address this issue in a comprehensive way.

ATLAS Technical Staffing – ATLAS technical integration staffing has been less than necessary. CERN provided additional positions but a shortfall remains that is currently expected to be addressed by the ATLAS collaboration. Recently ATLAS has revised and strengthened the Technical Coordination function, an activity that continues to be strongly supported by U.S. ATLAS.

Radiation Hard Electronics - Significant challenges remain in the development of radiation hard electronics for the ATLAS and CMS experiments including production yields and limited vendor options. Export license and dual-use technology issues are additional complications.

5. NARRATIVE SUMMARY

5.1 U.S. ATLAS CONSTRUCTION PROJECT

ATLAS International – ATLAS continues the effort to develop viable working detector/staging scenarios, supported in part by realistic assessments of U.S. ATLAS goals vs. baseline deliverables. Proposals of many options and solutions addressing this were presented to the ATLAS Executive Board in December. Other ATLAS highlights are summarized below:

- The new organization of ATLAS Technical Coordination is underway, with active U.S. participation, to support detector Integration and Installation interface and activity task management.
- ATLAS civil construction delays will result in the ATLAS Experimental Hall being delivered ~70 days later than expected, while the CMS Hall will be ~120 days later, due to technical difficulties in the CMS Hall.
- Testing of a full-scale prototype superconducting toroid coil cryostat proceeds.
- Good progress continues on the Liquid Argon Hadronic End Cap module construction, and other barrel, endcap electromagnetic and forward calorimeter module construction is proceeding.

U.S. ATLAS - The overall project, as of December 31, 2000 was actually 43.4 percent complete versus the 45.2 percent planned. A DOE/NSF Quarterly Status Review meeting was held at the University of Arizona on December 12, 2000. The meeting addressed general project status, and emphasized progress on the Liquid Argon Calorimeter. General ATLAS integration/coordination issues were also discussed. A Project Advisory Panel meeting was held at BNL on January 25-26, 2001. Listed below are project highlights:

- The mechanical support of the Silicon Pixel system has changed to allow independent installation decoupling it with the rest of the inner detector. Also the Honeywell option for the front-end electronics has been dropped and deep sub-micron has become the baseline.
- The Transition Radiation Tracker module production has started at Hampton, Indiana and Duke Universities.
- A problem with steel pin carriers in the Liquid Argon Calorimeter system has been isolated to low inclusion steel, and a reliable source has been found which should allow signal feedthrough production to continue.
- A Production Readiness Review was completed at BNL for the Cathode Strip Chamber production, resulting in several action items.

- The Muon Monitored Drift Tubes (MDT) started production in Boston, Michigan, and Seattle. Chambers from Michigan and Seattle are scheduled for x-ray tomography quality assurance measurements at CERN in early 2001.
- All parts have been received for the Tilecal electronics motherboard production (Hadron Calorimeter system), and pre-production runs on all types have been comple

Shown far left, a Muon Monitored Drift Tube (MDT) chamber from Amsterdam undergoing quality assurance measurements at the CERN Tomography facility. X-Ray tomography facility shown near left, with Steve Mulhall, right, of BNL, and CERN physicists. The crate shown below left contains recently arrived MDT chamber from Boston University awaiting similar quality assurance measurements, to be followed by additional MDT chambers from University of Michigan and Seattle.

Shown right, installation of the Omega seals onto the Liquid Argon Calorimeter Barrel Cryostat, at Kawasaki Heavy Industries, Japan.

5.2 U.S. CMS CONSTRUCTION PROJECT

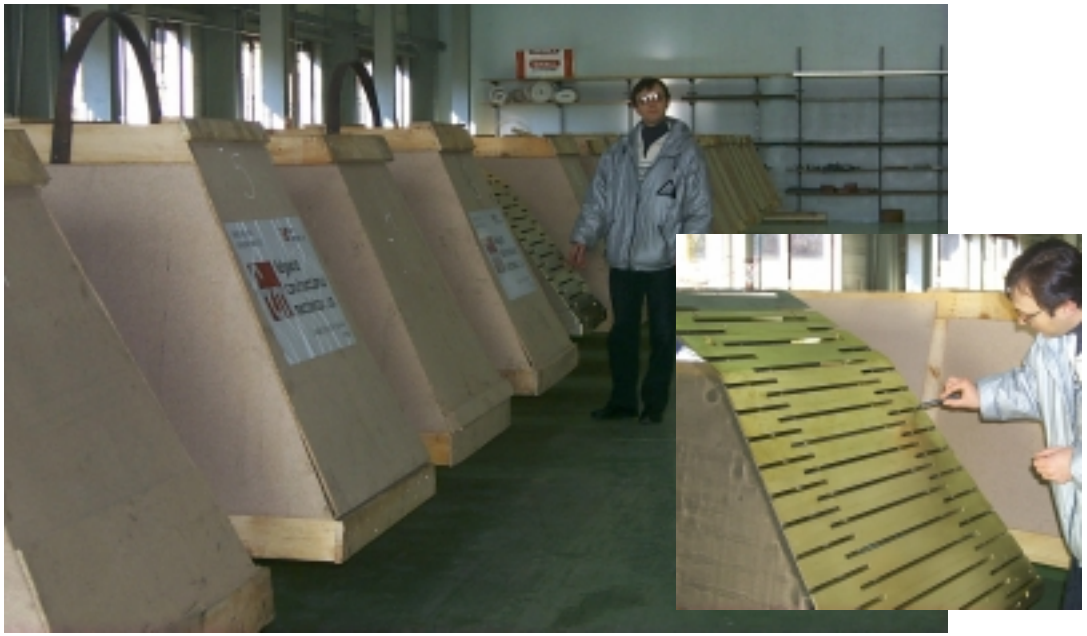
CMS International - CMS continues to work towards a completed detector for April, 2006, and a working detector by October, 2005 , although the LHC machine schedule is moving away from the possibility of beam in 2005. This planning maintains flexibility for further possible schedule changes and preserves capability to carry on debugging or exploit the earliest first physics opportunity after October 2005, and is viewed as a necessary step toward the complete detector. Some CMS highlights are summarized below:

- After completing Engineering Design Reviews, most detector sub-systems are in production, while Electronic System Reviews for most sub-systems are still to be done.
- CMS civil construction is now ~ nine months delayed, due to slower than anticipated excavation of the "pillar" region between the main collision hall and the adjacent gallery. CMS management continues to monitor progress to evaluate any impact on infrastructure installation into experiment and service caverns.
- CMS magnet yoke is proceeding on schedule, or better, and the coil is progressing well on a tight schedule.

U.S. CMS - As of December 31, 2000, the overall U.S. CMS Construction Project was 52% complete vs. the scheduled 59% complete. A DOE/NSF review was conducted on October 11, 2000 at the University of Florida. U.S. CMS is performing well with respect to technical and cost goals, while schedule remains a closely monitored issue, particularly for calorimeter and muon system electronics on the critical path affecting further production of some items. A Project Management Group meeting was held at Fermilab on December 22, 2000, and a DOE/NSF Quarterly Status meeting was held on January 25, 2001 at the University of Minnesota to focus on the electromagnetic calorimeter system. The next DOE/NSF review is scheduled for early May, 2001. Listed below are project highlights:

- Production of Muon system Cathode Strip Chamber (CSC) panels is proceeding at the desired rate and cost. Preliminary data on rate and unit costs of the chamber is encouraging, and continues to be closely watched.
- The first half Hadron Barrel brass absorber has been shipped to CERN from Felguera, Spain; production of Hadron Barrel scintillator tiles is on schedule and over half complete.
- A major advance concerning speed of data acquisition event tracking, driven by technological progress in industry, has validated the CMS concept of "level 2" trigger cycle performed entirely in software.
- The U.S. is monitoring potential critical path issues for the electromagnetic calorimeter system, namely the Lead-Tungstate crystal delivery from Russia, and radiation-induced failures involving an Avalanche Photo Diode component.
- The Silicon Tracker subsystem has been fully integrated into U.S. CMS management as an approved change request, with statements of work and MOU's being drafted to support work and procurements.

Project Manager's Quarterly Progress Report – 1st Quarter FY 2001
U.S. Large Hadron Collider Construction Project



Left- Crates at CERN from Felguera, Spain containing the individual sectors (see inset) of the brass absorber for the Hadron Barrel calorimeter. The entire CMS Hadron Calorimeter subsystem is managed by the U.S. through Fermilab. The Hadron Calorimeter is scheduled to go into the CMS surface hall (SX5) near the end of 2001.

Right- The Hadron Barrel Calorimeter "Megatile Transporter" shown at CERN in front of crates of megatile (scintillator tile) from Fermilab. The transporter was built by Florida State University. Megatiles are installed into the spaces of the brass absorber shown above. A pre-production proto-type tile from Fermilab is shown at far right in a CERN test-beam area, where previous beam tests were run.

Project Manager's Quarterly Progress Report – 1st Quarter FY 2001
U.S. Large Hadron Collider Construction Project

5.3 U.S LHC ACCELERATOR CONSTRUCTION PROJECT

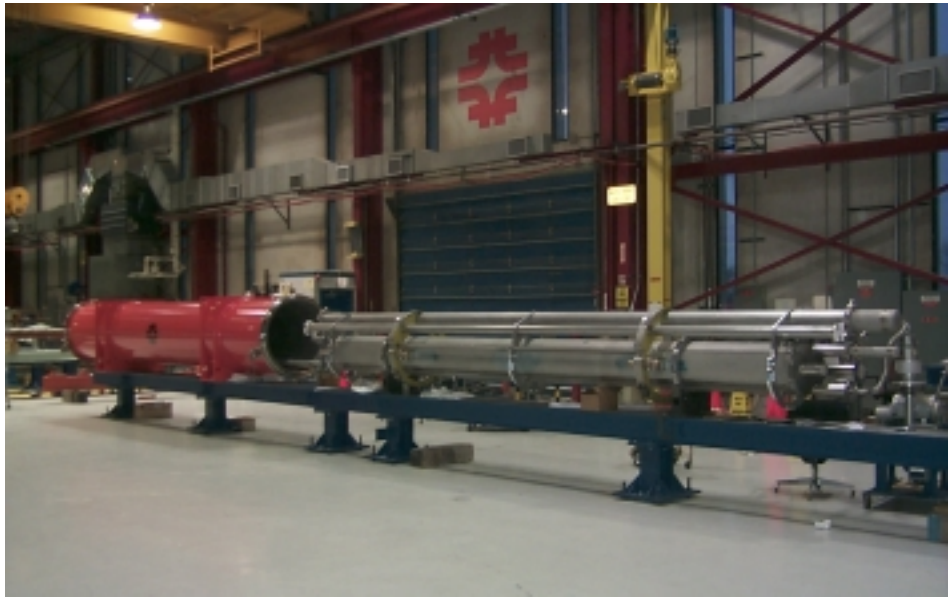
LHC – The LHC machine schedule is evolving away from a July 2005 turn-on toward a scenario with machine commissioning starting in January 2006, followed by one beam commissioning in February 2006 and first collisions in April 2006 for a Pilot run. A Physics run may then proceed in late Summer 2006, following a three-month shutdown. The expected delays in LHC are not expected to change plans for completing U.S. deliverables. An octant test requiring U.S. delivered Interaction Region components may in fact be moved earlier, so it remains important for the U.S. to follow its own schedule, while monitoring the overall LHC plans. Other highlights from the LHC construction project are listed below:

- Contracts for all main components of dipoles are now placed and series production has started, but slow progress by superconducting cable vendors continues to pace the dipole program.
- Cryogenic equipment has been delivered (first refrigerator), and tests of cold compressors and prototype cryolines is proceeding.
- CERN and the U.S. are working together as necessary to achieve tighter configuration management, as final designs are translated into production of components.

U.S. LHC Accelerator - As of December 31, 2000, the overall project was 55 percent complete versus the scheduled plan of 60 percent complete. The schedule of deliverables remains well in advance of CERN requirements. Contingency is adequate to address the existing cost variance and the remaining cost risk. A DOE/NSF review was held November 29-30 at LBNL. A Project Advisory Group meeting was held on January 25, 2001 at BNL, followed by a DOE/NSF Quarterly Status meeting at BNL on February 12, 2001. The next DOE/NSF review is scheduled for May 14-15, 2001, at Fermilab. Project highlights are listed below:

- [Fermilab] The cold mass for the first of two planned full-scale prototype interaction region quadrupoles was welded into its skin. All of the parts for the cryostat have been received.
- [BNL] The Production Readiness Review for the D1 and D2 dipoles was conducted on 19 October, reaching a recommendation to proceed with production of the complete series. Coils for the lead D2 magnet were collared and the cold mass assembly was completed. The large tooling built for this task functioned as anticipated, with only minor problems. The prototype magnet program was completed with the final cryogenic measurements of field quality. An order was placed for the D1 cryostat vacuum vessels. Superconductor testing continues at a low rate, awaiting more deliveries from CERN.
- [LBNL] The Production Readiness Review of the interaction region absorbers was conducted on 2 November, reaching a recommendation to proceed to fabrication and hold a pre-assembly review after the major pieces have been fabricated. Orders were placed for the large steel components for the TAN absorber.

Project Manager's Quarterly Progress Report – 1st Quarter FY 2001
U.S. Large Hadron Collider Construction Project



Right- First prototype interaction region quadrupole at Fermilab. Cold mass has been completed and is being prepared for cryostating and insertion into the vacuum vessel.

Below- Collared coils for twin aperture separation dipoles (D2), placed in lower half of yoke at BNL.

Left- Tack welding of upper and lower cold mass skins on D2 dipole at BNL.

CERN Direct Purchases - DOE reimburses CERN for their payments to qualified U.S. vendors [Reference U.S.-CERN Agreement and Accelerator Protocol]. The status is shown in Table 5.1.

Table 5.1, Status of DOE Payments (in $000)

Contract Item	Company (U.S. supplier)	Amount Paid	Contract Price	w/ options & escalation
Niobium-Titanium Alloy Bars	Wah Chang	16,688	38,677	48,127
Niobium Sheets	Wah Chang	2,160	5,633	6,915
Polyamide Insulation Film	Kaneka High Tech Materials	583	3,837	4887
Superconducting Cable	IGC Advanced Superconductors	1,151	16,491	20,911
LHC BPMS Button Feedthroughs	Ceramaseal	0	898	1,003
Cryogenic Temperature Sensor	Lakeshore	111	695	695
Cryogenic Helium Mass Flowmeters	(tbd-contract in process)	0	1,200	1,200
(tbd-contract in process)	(tbd-contract in process)	0	(tbd)	3,134
Totals		20,693	67,431	86,872

6. FINANCIAL/COST STATUS AND PLANS

TOTAL PROJECT FUNDING PLAN (then year millions of dollars)*

Fiscal Year	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	Total
Machine Funding Profiles (DOE)											
US LHC	2.00	6.67	14.00	15.40	24.92	9.38	14.20	11.20	8.33	3.90	110.00
CERN Direct	0.00	0.00	0.00	8.09	8.29	17.92	15.00	14.90	15.00	10.80	90
Machine Total	2.00	6.67	14.00	23.49	33.21	27.30	29.20	26.10	23.33	14.70	200.00
Detector Funding Profiles (DOE and NSF)											
US ATLAS	1.70	3.71	10.05	25.63	28.43	26.80	25.85	21.89	14.69	5.00	163.75
DOE	1.70	3.71	10.05	9.00	16.49	14.51	13.20	14.60	14.69	5.00	102.95
NSF	0.00	0.00	0.00	16.63	11.94	12.29	12.65	7.29	0.00	0.00	60.80
US CMS	2.30	4.62	10.95	38.03	24.26	21.27	21.81	21.73	15.98	6.30	167.25
DOE	2.30	4.62	10.95	32.51	20.30	17.19	17.60	19.30	15.98	6.30	147.05
NSF	0.00	0.00	0.00	5.52	3.96	4.08	4.21	2.43	0.00	0.00	20.20
Detectors Total	4.00	8.33	21.00	63.66	52.69	50.07	55.66	45.72	29.87	0.00	331.00

TOTAL DOE & NSF FUNDS, COSTS, & COMMITMENTS (cumulative $000)†

U.S. LHC Construction Project	A = Funds Allocated	B = Estimate Actual Costs	C = Open Commitments	D= B+C Total	A–D = Funds Available
U.S. ATLAS	96,320	48,303	7,770	56,073	40,247
U.S. CMS	101,430	60,353	14,200	74,553	26,877
U.S. LHC Accelerator	67,550	54,372	2,860	57,232	10,318
CERN Direct Purchases	34,300	20,693	0	20,693	13,607
Total	299,600	183,721	24,830	208,551	91,049

* This report includes a revision to the funding profile for the U.S. LHC Construction Project that is addressed in the FY 2001 budget planning for DOE. The revision to the original profile was made in order to better match the needs of the construction projects. This report also includes a change in the distribution of funds between the U.S. LHC Accelerator project and the CERN direct project to address delays in CERN invoices.

† Based on financial reports from the U.S. LHC construction projects. NSF funding is provided after the beginning of the fiscal year and therefore it is necessary to carry-over funding into the subsequent fiscal years.

7. DOE/NSF COST BASELINES AT LEVEL 2 (in $000)

U.S. ATLAS Cost Baseline

WBS	Description	Previous	Change	Current
1.1	Silicon System	18,569	149	18,718
1.2	Transition Radiation Tracker	9,079		9,079
1.3	Liquid Argon Calorimeter	40,972		40,972
1.4	Tile Calorimeter	7,929		7,929
1.5	Muon Spectrometer	24,103		24,103
1.6	Trigger/Data Acquisition System	10,957		10,957
1.7	Common Projects	9,179		9,179
1.8	Education	286		286
1.9	Project Management	7,779		7,779
	Contingency	34,897	-149	34,748
	U.S. ATLAS Total Project Cost Baseline	163,750	0	163,750

U.S. CMS Cost Baseline

WBS	Description	Previous	Change	Current
1.1	Endcap Muon	34,984	30	35,014
1.2	Hadron Calorimeter	37,655	235	37,890
1.3	Trigger and Data Acquisition	12,987	444	13,431
1.4	Electromagnetic Calorimeter	9,178	136	9,314
1.5	Forward Pixels	6,378	57	6,435
1.6	Common Projects	23,000		23,000
1.7	Project Office	6,125	1,118	7,243
1.8	Silicon	0	3,041	3,041
	Contingency	36,943	-5,061	31,882
	U.S. CMS Total Project Cost Baseline	167,250	0	167,250

U.S. LHC Accelerator Cost Baseline

WBS	Description	Previous	Change	Current
1.1	Interaction Region Components	50,328		50,328
1.2	Radio Frequency Straight Section	15,714		15,714
1.3	Superconducting Wire and Cable	11,868		11,868
1.4	Accelerator Physics	5,133		5,133
1.5	Project Management	13,612		13,612
	Contingency	13,345		13,345
	U.S. LHC Accelerator Total Project Cost Baseline	110,000	0	110,000

8. SCHEDULE STATUS AND PLANS

8.1 U.S. ATLAS Construction Project Milestones

The milestones have been updated with the new ETC baseline dates.

Table 8.1.1 U.S. ATLAS Major Project Milestones (Level 1)

Description	Baseline Schedule	Forecast (F) Date	Actual (A) Date
Project Start	01-Oct-95	01-Oct-95 (F)	01-Oct-95 (A)
Project Completion	30-Sep-05	30-Sep-05 (F)	

Table 8.1.2 U.S. ATLAS Major Project Milestones (Level 2)

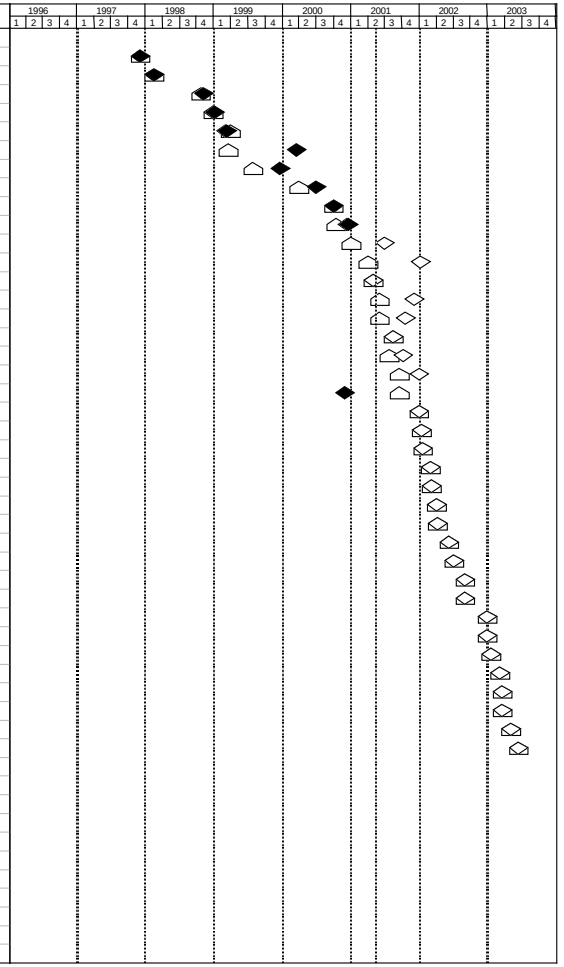
Subsystem	**Schedule Designator**	**Description**	**Baseline Schedule**	**Forecast (F) / Actual (A) Date**
Silicon (1.1)	SIL L2/1	Start Full Silicon Strip Electronics Production	23-Apr-01	23-Apr-01 (F)
	SIL L2/2	Start Full Strip Module Production	26-Nov-01	26-Nov-01 (F)
	SIL L2/3	ROD Design Complete	14-Jun-01	14-Jun-01 (F)
	SIL L2/4	Complete Shipment of Silicon Strip Module Production	13-Oct-03	13-Oct-03 (F)
	SIL L2/5	ROD Production/Testing Complete	13-Mar-03	13-Mar-03 (F)
TRT (1.2) Mechanical	TRT L2/1	Final Design Complete	31-Dec-98	07-Dec-98 (A)
	TRT L2/2	Module Production Complete	03-Feb-03	03-Feb-03 (F)
	TRT L2/3	Barrel Construction Complete	16-Sep-03	16-Sep-03 (F)
Electrical	TRT L2/4	Select Final Elec Design	15-Jun-01	**30-Aug-00 (A)**
	TRT L2/5	Start Production of ASICS	06-Dec-01	06-Dec-01 (F)
	TRT L2/6	Installation Complete	04-Jan-05	04-Jan-05 (F)
LAr Cal (1.3)	LAr L2/1	Cryostat Contract Award	24-Jul-98	05-Aug-98 (A)
	LAr L2/2	Barrel Feedthroughs Final Design Review	30-Sep-98	02-Oct-98 (A)
	LAr L2/3	Start Electronics Production (Preamps)	30-Jun-00	30-Jun-00 (A)
	LAr L2/4	FCAL Mechanical Design Complete	14-Dec-98	15-Dec-99 (A)
	LAr L2/5	FEB SCA Prod. Chip Submission/Contract Award	02-Mar-01	02-Mar-01 (F)
	LAr L2/6	Level 1 Trigger Final Design Complete	02-Jan-01	02-Jan-01 (F)
	LAr L2/7	ROD Final Design Complete	01-Jun-02	01-Jun-02 (F)
	LAr L2/8	Motherboard System Production Complete	01-Jun-02	01-Jun-02 (F)
	LAr L2/9	Cryostat Arrives at CERN	15-May-01	15-May-01 (F)
	LAr L2/10	Barrel Feedthroughs Production Complete	15-Oct-01	15-Oct-01 (F)
	LAr L2/11	FCAL-C Delivered to EC	17-Oct-02	17-Oct-02 (F)
	LAr L2/12	FCAL-A Delivered to EC	08-Dec-03	08-Dec-03 (F)

Table 8.1.2 U.S. ATLAS Major Project Milestones (Level 2) (Continued)

Subsystem	Schedule Designator	Description	Baseline Schedule	Forecast (F) / Actual (A) Date
Tile Cal (1.4)	Tile L2/1	Start Submodule Procurement	01-Sep-97	01-Sep-97 (A)
	Tile L2/2	Technology Choice for F/E Electronics	15-Nov-97	15-Nov-97 (A)
	Tile L2/3	Start Module Construction	01-May-99	20-Sep-99 (A)
	Tile L2/4	Start Production of Motherboards	01-Oct-00	**02-Jan-01 (F)**
	Tile L2/5	All Electronic Components Delivered to CERN	01-Oct-02	01-Oct-02 (F)
	Tile L2/6	Module Construction Complete	30-Sept-02	30-Sep-02 (F)
	Tile L2/7	All Modules Delivered to CERN	20-Dec-02	20-Dec-02 (F)
Muon (1.5)	Muon L2/1	Start MDT Chambers Lines 1 and 3	17-Jul-00	15-Sep-00 (A)
	Muon L2/2	Start CSC Chamber Production	01-Mar-01	**01-Sep-01 (F)**
	Muon L2/3	MDT Electronics ASD PRR	19-Oct-01	01-Oct-01 (F)
	Muon L2/4	Final Design of Global Alignment Devices Complete	01-Apr-02	01-Apr-02 (F)
	Muon L2/5	CSC IC Production Complete	18-Dec-02	18-Dec-02 (F)
	Muon L2/6	Kinematic Mount Design Complete	30-Jan-01	30-Jan-01 (F)
	Muon L2/7	MDT Chambers (U.S.) Production Complete	14-Sep-04	14-Sep-04 (F)
	Muon L2/8	Kinematic Mount Production Complete	22-May-04	22-May-04 (F)
	Muon L2/9	CSC ROD Production Complete	05-Nov-03	04-Nov-03 (F)
	Muon L2/10	MDT Elec.'s Mezzanine Production Complete	06-Dec-02	06-Dec-02 (F)
	Muon L2/11	CSC Assembly/Testing at CERN Complete	17-Dec-04	17-Dec-04 (F)
	Muon L2/12	Global Alignment System Final Delivery	30-Sep-04	30-Sep-04 (F)
Trigger/ DAQ (1.6)	TDAQ L2/1	Select Final LVL2 Architecture	31-Dec-99	31-Mar-00 (A)
	TDAQ L2/2	LVL2 Trigger Design Complete	31-Dec-01	31-Dec-01 (F)
	TDAQ L2/3	LVL2 Trigger Prototype Complete	30-Sep-01	30-Sep-01 (F)
	TDAQ L2/4	Start Production	08-Jan-02	08-Jan-02 (F)
	TDAQ L2/5	Start Installation & Commissioning	05-Mar-02	05-Mar-02 (F)
	TDAQ L2/6	Production Complete	29-Oct-04	29-Oct-04 (F)
	TDAQ L2/7	LVL2 Installation & Commissioning Complete	31-Dec-04	31-Dec-04 (F)

Figure 8.1.1 U.S. ATLAS Milestone Schedule Status Report

ID	Subsystem ID	Milestone	ETC Baseline	Forecast	Actual	Variance
1		Project Start (10/1/95)	10/1/95	10/1/95	10/1/95	0 days
2	Tile L2/1	Start Submodule Procurement	9/1/97	9/1/97	9/1/97	0 days
3	Tile L2/2	Technology Choice for F/E Electronics	11/15/97	11/15/97	11/15/97	0 days
4	LAr L2/1	Cryostat Contract Award	7/24/98	8/5/98	8/5/98	8 days
5	LAr L2/2	Barrel FTs Final Design Review	9/30/98	10/2/98	10/2/98	2 days
6	TRT L2/1	Final Design Complete	12/31/98	12/7/98	12/7/98	-18 days
7	LAr L2/4	FCAL Mech Design Complete	12/14/98	12/15/99	12/15/99	262 days
8	Tile L2/3	Start Module Construction	5/1/99	9/20/99	9/20/99	100 days
9	TDAQ L2/1	Select Final LVL2 Architecture	12/31/99	3/31/00	3/31/00	65 days
10	LAr L2/3	Start Elec.'s Production (Preamps)	6/30/00	6/30/00	6/30/00	0 days
11	Muon L2/1	Start MDT Chambers Lines 1 & 3	7/17/00	9/15/00	9/15/00	44 days
12	Tile L2/4	Start Production of MBs	10/1/00	**4/1/01**	NA	130 days
13	LAr L2/6	Level 1 Trigger Final Design Complete	1/2/01	**10/4/01**	NA	197 days
14	Muon L2/6	Kinematic Mount Design Complete	1/30/01	1/30/01	NA	0 days
15	Muon L2/2	Start CSC Chamber Production	3/1/01	9/1/01	NA	132 days
16	LAr L2/5	FEB SCA Prod Chip Submission/CA	3/2/01	**7/19/01**	NA	99 days
17	LAr L2/9	Cryostat Arrives at CERN	5/15/01	5/15/01	NA	0 days
18	Sil L2/1	Start Full Silicon Strip Elec Production	4/23/01	**7/6/01**	NA	54 days
19	Sil L2/3	ROD Design Complete	6/14/01	**10/1/01**	NA	77 days
20	TRT L2/4	Select Final Elec Design	6/15/01	8/30/00	8/30/00	-207 days
21	TDAQ L2/3	LVL2 Trigger Prototype Complete	9/30/01	9/30/01	NA	0 days
22	LAr L2/10	Barrel FTs Production Complete	10/15/01	10/15/01	NA	0 days
23	Muon L2/3	MDT Electronics ASD PRR	10/19/01	10/19/01	NA	0 days
24	Sil L2/2	Start Full Strip Module Production	11/26/01	11/26/01	NA	0 days
25	TRT L2/5	Start Production of ASICS	12/6/01	12/6/01	NA	0 days
26	TDAQ L2/2	LVL2 Trigger Design Complete	12/31/01	12/31/01	NA	0 days
27	TDAQ L2/4	Start Production	1/8/02	1/8/02	NA	0 days
28	TDAQ L2/5	Start Installation & Commissioning	3/5/02	3/5/02	NA	0 days
29	Muon L2/4	Final Design of Global Align Devices	4/1/02	4/1/02	NA	0 days
30	LAr L2/7	ROD Final Design Complete	6/1/02	6/1/02	NA	0 days
31	LAr L2/8	MB System Production Complete	6/1/02	6/1/02	NA	0 days
32	Tile L2/5	All Elec.'s Components Delivered to ATLAS	10/1/02	10/1/02	NA	0 days
33	Tile L2/6	Module Construction Complete	9/30/02	9/30/02	NA	0 days
34	LAr L2/11	FCAL-C Delivered to EC	10/17/02	10/17/02	NA	0 days
35	Muon L2/10	MDT Elec.'s Mezz Production Complete	12/6/02	12/6/02	NA	0 days
36	Muon L2/5	CSC IC Production Complete	12/18/02	12/18/02	NA	0 days
37	Tile L2/7	All Modules Delivered to CERN	12/20/02	12/20/02	NA	0 days
38	TRT L2/2	Module Production Complete	2/3/03	2/3/03	NA	0 days
39	Sil L2/5	ROD Production/Testing Complete	3/13/03	3/13/03	NA	0 days
40	TRT L2/3	Barrel Construction Complete	9/16/03	9/16/03	NA	0 days
41	Sil L2/4	Compl Shipment of Silicon Strip Modules Prod	10/13/03	10/13/03	NA	0 days
42	Muon L2/9	CSC ROD Production Complete	11/5/03	11/5/03	NA	0 days
43	LAr L2/12	FCAL-A Delivered to EC	12/8/03	12/8/03	NA	0 days
44	Muon L2/8	Kinematic Mount Production Complete	5/22/04	5/22/04	NA	0 days
45	Muon L2/7	MDT Chambers (U.S.) Production Complete	9/14/04	9/14/04	NA	0 days
46	Muon L2/12	Global Align System Final Delivery	9/30/04	9/30/04	NA	0 days
47	TDAQ L2/6	Production Complete	10/29/04	10/29/04	NA	0 days
48	Muon L2/11	CSC Assembly/Test at CERN Complete	12/17/04	12/17/04	NA	0 days
49	TDAQ L2/7	Installation & Commissioning Complete	12/31/04	12/31/04	NA	0 days
50	TRT L2/6	Installation Complete	1/4/05	1/4/05	NA	0 days



8.2 U.S. CMS Construction Project Milestones

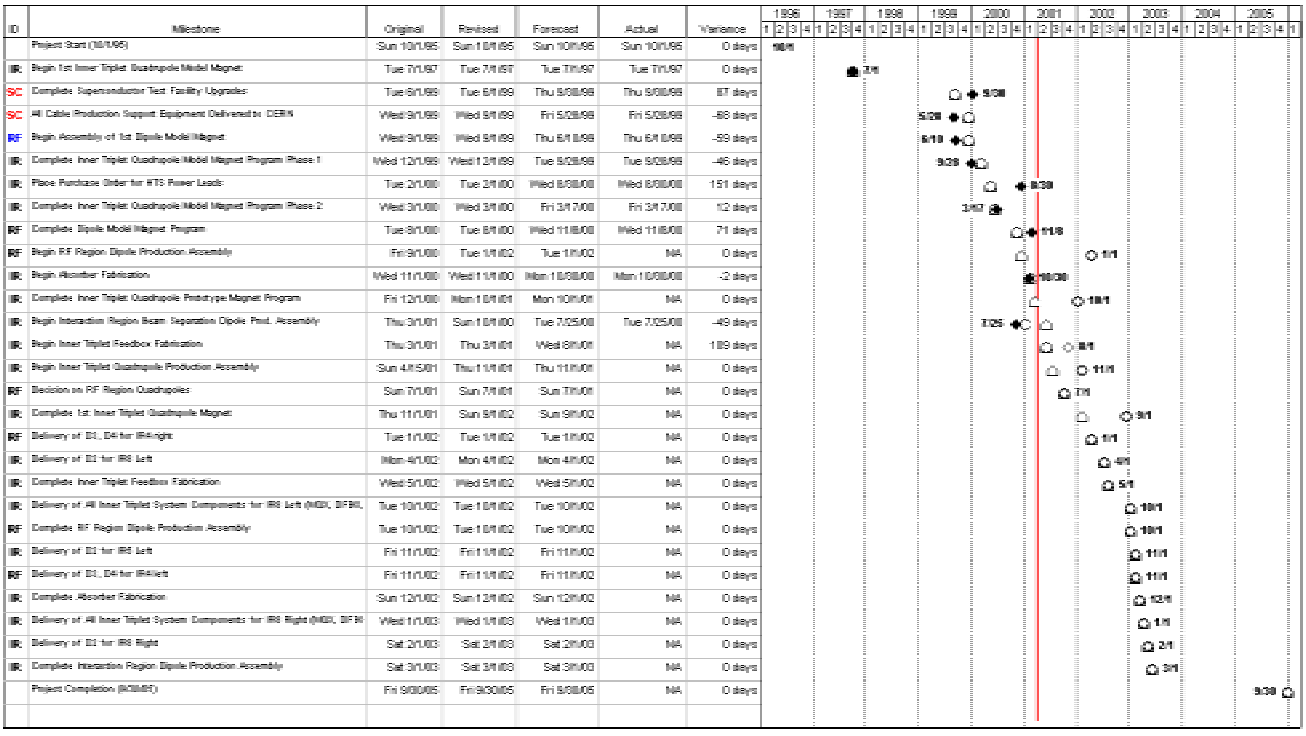
Figure 8.2.1 U.S. CMS Level 1 and Level 2 Milestones

System	Level?	CMS ID	Milestone	Variance	Baseline Start	Start
			CMS L1 Milestones	**0 days**	**NA**	**Oct 31 '95**
CMS1	ML1		Project Start (10/31/95)	0 days	Oct 31 '95	Oct 31 '95
CMS1	ML1	D-004	Submit Trigger Technical Design Report (TDR)	0 days	Nov 30 '00	Nov 30 '00
CMS1	ML1	D-014	Submit DAQ Technical Design Report (TDR)	0 days	Dec 31 '01	Dec 31 '01
CMS1	ML1	HB-017	End Assembly of HB (Barrel) in Surface Hall (SX5)	0 days	Jul 31 '02	Jul 31 '02
CMS1	ML1	HE-012	End Assembly of HE (Endcap) in SX5	0 days	Mar 31 '03	Mar 31 '03
CMS1	ML1	HB-018	End Total Insertion of HB in Vacuum Tank	65 days	May 01 '03	Jul 31 '03
CMS1	ML1	E-013	Trial Mounting of HB Supermodule on HB Complet	0 days	Aug 31 '03	Aug 31 '03
CMS1	ML1	S-022	Close Yoke and Start Magnet Test in SX5	0 days	Sep 30 '03	Sep 30 '03
CMS1	ML1	HB-023	End Installation and Test of HB in UX5	0 days	May 31 '04	May 31 '04
CMS1	ML1	HE-013	End Installation and Test of HE in UX5	0 days	Jul 31 '04	Jul 31 '04
CMS1	ML1	E-019	End Instl., Testing, & Debug. of HB (barrel) in UX5	0 days	Oct 31 '04	Oct 31 '04
CMS1	ML1	M-019	End Instull. of ME (Endcap) Stations in YE in UX5	0 days	Mar 31 '03	Mar 31 '05
CMS1	ML1	T-014	End Installation and Test of Tracker in UX5	0 days	Jun 30 '03	Jun 30 '05
CMS1	ML1	HF-023	End Installation and Test of HF in UX5	0 days	Jun 30 '03	Jun 30 '05
CMS1	ML1		Project Completion (9/30/05)	0 days	Sep 30 '03	Sep 30 '05
			Muon System (WBS 1.1)	**0 days**	**NA**	**Dec 02 '98**
MUON	ML2	M-008	Mechanical Engineering Design Review	-14 days	Dec 31 '98	Dec 02 '98
MUON	ML2	M-018	Begin Mass Production of CSC Parts (panels)	21 days	Apr 30 '99	May 31 '99
MUON	ML2	M-011	Begin Assembly of Cathode Strip Chambers at FSI.	173 days	Oct 31 '99	Jul 14 '00
MUON	ML2	M-012	Pre-Production ASIC's Ready	164 days	Nov 30 '99	Aug 11 '00
MUON	ML2	M-013	Begin Mass Production of Electronics Boards	88 days	Aug 31 '00	Jan 04 '01
MUON	ML2	M-014	Begin Mounting Electronics and Testing at UCLA.	97 days	Sep 30 '00	Feb 28 '01
MUON	ML2	M-013	Begin CSC Assembly-FNPL/St. Petersburg & BIEF.	43 days	Jan 31 '01	Mar 31 '01
MUON	ML2	M-016	30% of the Chambers Installed	0 days	Jul 31 '03	Jul 31 '03
MUON	ML2	M-017	All Large Chambers Assembled and Tested	0 days	Oct 31 '03	Oct 31 '03
MUON	ML2	M-018	All Chambers Installed	0 days	Mar 31 '04	Mar 31 '04
			HCAL System (WBS 1.2)	**0 days**	**NA**	**Oct 02 '98**
HCAL	ML2	HB-058	HB: PP1 Absorber Delivered to CERN	-21 days	Oct 31 '98	Oct 02 '98
HCAL	ML2	HB-001	HB: Mechanical Engineering Design Review	-19 days	Nov 30 '98	Nov 03 '98
HCAL	ML2	HB-052	HB: PPF2 Absorber Delivered to CERN	-9 days	Apr 28 '99	Apr 15 '99
HCAL	ML2	HO-001	HO Engineering Design Review	-4 days	Jun 08 '99	Jun 02 '99
HCAL	ML2	HE-001	HE Mechanical Engineering Design Review	-71 days	Sep 30 '99	Jun 12 '99
HCAL	ML2	HE-001	HE Mechanical Engineering Design Review	-71 days	Sep 30 '99	Jun 12 '99
HCAL	ML2	HF-006	HF Engineering Design Review Complete	99 days	Oct 31 '00	Mar 16 '01
HCAL	ML2	HB-030	HB-1 Absorber Delivered to CERN	0 days	Nov 30 '00	Nov 30 '00
HCAL	ML2	HF-028	HF: Define Fiber Diameter	0 days	Jan 31 '01	Jan 31 '01
HCAL	ML2	HB-039	Complete Front-end Electronics Production	337 days	Jan 30 '01	Oct 16 '02
HCAL	ML2	HB-034	HB+1 Absorber Delivered to CERN	0 days	Dec 31 '01	Dec 31 '01
HCAL	ML2	HO-003	HO Optics Installation on YB Completed	0 days	Jan 30 '03	Jan 30 '03
HCAL	ML2	HB-031	HB End Installation in Solenoid in UX5	75 days	Dec 01 '03	Mar 16 '04
HCAL	ML2	HO-007	HO End Installation and Tests in UX5	0 days	Apr 30 '05	Apr 30 '05
			Trigger System (WBS 1.3)	**0 days**	**NA**	**Nov 03 '98**
TRIG	ML2	D-001	Complete Initial Muon, Calorimeter, & Global Trigg	-19 days	Nov 30 '98	Nov 03 '98
DAQ	ML2	D-005	Readout Unit Prototype 2 (Design of)	0 days	May 18 '99	May 18 '99
DAQ	ML2	D-006	Event Builder Prototype 1 Complete	-19 days	May 31 '99	May 04 '99
TRIG	ML2	D-002	Complete Phase 1 Prototype Design	-20 days	Nov 30 '99	Nov 02 '99
DAQ	ML2	D-007	Readout Unit Prototype 2 Complete	-20 days	Nov 30 '99	Nov 02 '99
DAQ	ML2	D-008	Filter Unit Prototype 1 Complete	-20 days	Nov 30 '99	Nov 02 '99
DAQ	ML2	D-009	Vertical DAQ Chain Prototype Complete	-20 days	Nov 30 '99	Nov 02 '99
DAQ	ML2	D-010	High Level Trigger Prototype 1 Complete	-20 days	Nov 30 '99	Nov 02 '99
DAQ	ML2	D-011	Full DAQ Prototype Tests Complete	44 days	May 01 '00	Jun 30 '00
DAQ	ML2	D-013	Technologies Choice Preparation: real 1 H DAQ	21 days	Nov 01 '00	Nov 30 '00
			ECAL system (WBS 1.4)	**0 days**	**NA**	**Jun 01 '98**
ECAL	ML2	E-001	Choice of Avalanche Photodiodes	-21 days	Jun 30 '98	Jun 01 '98
ECAL	ML2	E-004	500 Electronics Channels Test	300 days	Dec 31 '99	Dec 31 '01
ECAL	ML2	E-006	Module 0 (400 channels) Prototype Complete	332 days	Dec 31 '99	Apr 30 '01
ECAL	ML2	E-008	Supermodule 1 Completed	435 days	Jan 30 '00	Mar 16 '02
ECAL	ML2	E-011	Supermodule 1 Calibration and Testing Complete	140 days	Aug 31 '01	Mar 16 '02
ECAL	ML2	E-013	Half Barrel (18 Supermodules) Calibrated	0 days	Sep 30 '02	Sep 30 '02
ECAL	ML2	E-017	Full Barrel (36 Supermodules) Completed	0 days	Jun 30 '04	Jun 30 '04
			FPIX System (WBS 1.5)	**0 days**	**NA**	**Dec 01 '98**
FPIX	ML2	T-012	Define construction milestones up to 2005	301 days	Jul 01 '99	Jun 30 '01
FPIX	ML2	T-001	Final Full Size Sensor - Submission	0 days	Jan 31 '01	Jan 31 '01
FPIX	ML2	T-002	Final Full Size Readout Chip - Submission	0 days	Feb 28 '01	Feb 28 '01

8.3 U.S. LHC Accelerator Construction Project Milestones

Table 8.3 Level 2 U.S. LHC Accelerator Baseline Milestones through FY2001

WBS Identifiers	Milestone Description	Baseline Date	Forecast(F) or Actual(A)
Int Region	Begin 1st inner triplet quadrupole model magnet	1 Jul 97	1 Jul 97 (A)
Int Region	Complete inner triplet quadrupole model magnet program phase 1	1 Dec 99	28 Sep 99 (A)
Int Region	Complete inner triplet quadrupole model magnet program phase 2	1 Mar 00	17 Mar 00 (A)
Int Region	Place purchase order for HTS power leads	1 Feb 00	30 Aug 00 (A)
Int Region	Begin absorber fabrication	1 Nov 00	**30 Oct 00 (A)**
Int Region	Complete inner triplet quadrupole prototype magnet program	1 Oct 01	1 Oct 01 (F)
Int Region	Begin interaction region beam separation dipole production assembly	1 Oct 00	25 Jul 00 (A)
Int Region	Begin inner triplet feedbox fabrication	1 Mar 01	1 Mar 01 (F)
RF Region	Begin assembly of 1st dipole model magnet	1 Sep 99	10 Jun 99 (A)
RF Region	Complete dipole model magnet program	1 Aug 00	**8 Nov 00 (A)**
RF Region	Begin RF region beam separation dipole production assembly	1 Jan 02	8 Oct 01 (F)
SC Cable	All cable production support equipment delivered to CERN	1 Sep 99	28 May 99 (A)
SC Cable	Complete SC testing facility upgrades	1 Jun 99	30 Sep 99 (A)



9. TECHNICAL BASELINE STATUS

U.S. ATLAS Construction Project - No change. The U.S. ATLAS collaboration defined a list of initial deliverables representing the U.S. contribution to ATLAS. This list was approved by the JOG in March 1998. Deliverables are listed in the U.S. ATLAS Construction Project Management Plan, Appendix 3.

U.S. CMS Construction Project – Change to incorporate expanded U.S. CMS participation in the CMS Silicon Tracker Outer Barrel, per approved Level 2 Change Request defining additional associated deliverables, milestones, cost and schedule. The U.S. CMS collaboration defined a list of deliverables representing the U.S. contribution to CMS. This list was approved by the JOG in October 1998. The scope of U.S. CMS contribution is described in the U.S. CMS Management Plan, Appendix 2.

U.S. LHC Accelerator Construction Project - No change. U.S. LHC Accelerator Project - The U.S. deliverables to CERN are defined in the Implementing Arrangement to the Accelerator Protocol. The Implementing Arrangement was signed by the CERN and U.S. signatories in July 1998. Reference the U.S. LHC Accelerator Project Management Plan, Annex II, (Approved 6/15/98).

CERN Direct Purchases - No change. CERN will procure from U.S. industrial firms supplies required to construct the LHC accelerator. These supplies will include superconducting alloy, cable, insulation, and other materials.

10. BASELINE CHANGE ACTIVITY

Baseline Control Level	Baseline Changes
Level 1, DOE/NSF Joint Oversight Group	No changes this quarter.
Level 2, DOE/NSF Project Office	
U.S. ATLAS	Changes to the Level 2 cost and schedule baseline.
U.S. CMS	Changes to the Level 2 cost, scope and schedule baseline.
U.S. LHC Accelerator	No changes this quarter.

Project Manager's Quarterly Progress Report – 1st Quarter FY 2001
U.S. Large Hadron Collider Construction Project

APPENDIX A - FUNDING BY INSTITUTION (in thousands of dollars)

U.S. CMS Construction Project

	FY 1998				FY 1999				FY 2000				
	DOE				DOE				DOE				Grand
Institution	Grant	Contract	NSF	Total	Grant	Contract	NSF	Total	Grant	Contract	NSF	Total	Total
FNAL	0	5,517	0	5,517	0	10,817	40	10,857	0	5,981	0	5,981	22,355
Fairfield	0	29	0	29	0	0	0	0	0	10	0	10	39
Maryland	90	65	0	155	0	132	131	263	0	250	0	250	668
Boston U.	0	32	0	32	31	111	0	142	0	132	0	132	306
Florida State	60	54	0	114	71	118	0	189	80	54	0	134	437
U. of Minnesota	60	95	0	155	161	452	0	613	141	202	0	343	1,111
U. of Iowa	77	62	0	139	20	5	0	25	0	453	0	453	617
U. of Rochester	127	1,159	0	1,286	262	485	0	747	441	253	0	694	2,727
Notre Dame	0	52	0	52	0	44	184	228	0	14	193	207	487
Purdue	38	135	0	173	49	166	0	215	0	175	0	175	563
U. of Miss.	46	100	0	146	68	91	0	159	69	108	0	236	541
U. of Florida	44	95	0	139	184	412	0	596	333	853	0	1,186	1,921
Ohio State U.	140	64	0	204	275	212	0	487	196	732	0	928	1,619
Carnegie Mellon	0	113	0	113	0	291	0	291	0	312	0	312	716
Rice	138	19	0	157	102	56	0	158	132	16	0	148	463
U. of Wisconsin	533	1,052	0	1,585	471	3,598	0	4,069	459	3,197	0	3,656	9,310
U.C. Davis	34	100	0	134	0	78	0	78	263	502	0	765	977
UCLA	150	87	0	237	249	173	0	422	244	391	0	635	1,294
U.C. Riverside	20	10	0	30	0	164	0	164	0	70	0	70	264
John Hopkins	0	29	0	29	0	0	70	70	0	0	40	40	139
Northwestern	0	59	0	59	5	26	0	31	0	114	0	114	204
Rutgers	0	13	0	13	0	0	34	34	0	2	140	142	189
Princeton	0	256	0	256	0	626	0	626	0	667	0	667	1,549
Caltech	0	148	0	148	0	458	0	458	0	367	0	367	973
U.C. San Diego	11	0	0	11	11	90	24	125	36	0	0	36	172
Northeastern	0	0	0	0	0	0	3,370	3,370	0	0	1,741	1,741	5,111
U. Ill.-Chicago	0	0	0	0	0	0	124	124	0	0	309	309	433
U. of Nebraska	0	0	0	0	0	0	24	24	0	0	2	2	26
MIT	0	37	0	37	15	67	0	82	0	78	0	78	197
Iowa State	0	0	0	0	0	0	19	19	0	356	0	356	375
Subtotal	1,568	9,382	0	10,950	1,974	18,672	4,020	24,666	2,394	15,289	2,425	20,167	55,783
Reserve	0	0	0	0	0	3,401	1,524	4,925	0	0	0	0	0
Total	1,568	9,382	0	10,950	1,974	22,073	5,544	29,591	2,394	15,289	2,425	20,167	55,783

U.S. ATLAS Construction Project

	FY 1998				FY 1999				FY 2000				
	DOE				DOE				DOE				Grand
Institution	Grant	Contract	NSF	Total	Grant	Contract	NSF	Total	Grant	Contract	NSF	Total	Total
ANL	0	1,098	0	1,098	0	967	0	967	0	922	0	922	2,987
BNL	0	3,903	0	3,903	0	2,581	0	2,581	0	6,429	0	6,429	12,913
LBNL	0	633	0	633	0	715	0	715	0	420	0	420	1,768
SUNY/Albany	20	0	0	20	48	0	0	48	50	0	0	50	118
U. of Arizona	320	100	0	420	634	0	0	634	557	0	0	557	1,611
Boston U.	224	0	0	224	298	0	0	298	287	0	0	287	809
Brandeis U.	265	45	0	310	0	0	593	593	0	0	478	478	1,381
U.C.Irvine	193	0	0	193	0	0	93	93	0	0	0	0	286
U.C. SantaCruz	404	0	0	404	63	0	0	63	0	0	568	568	1,035
U. of Chicago	0	54	0	54	0	0	1,069	1,069	0	0	264	264	1,387
Duke U.	190	0	0	190	601	0	0	601	417	0	0	417	1,208
Hampton U.	0	0	0	0	0	0	538	538	0	0	293	293	831
Harvard	234	0	0	234	0	0	654	654	0	0	390	390	1,278
U. of Illinois	50	159	0	209	347	0	0	347	294	0	0	294	850
Indiana U.	190	0	0	190	765	0	0	765	460	0	0	460	1,415
MIT	50	0	0	50	105	0	0	105	177	0	0	177	332
Michigan State	0	35	0	35	0	0	178	178	0	0	293	293	506
Nevis/Columbia	0	675	0	675	0	0	2,680	2,680	0	0	1,422	1,422	4,777
U. of New Mex.	20	0	0	20	30	0	0	30	24	0	0	24	74
Northern Illinois	0	0	0	0	0	0	0	0	0	0	0	0	0
Ohio State U.	0	0	0	0	100	0	0	100	45	0	0	45	145
U. of Michigan	62	254	0	316	716	0	0	716	518	0	0	518	1,550
U. of Oklahoma	30	0	0	30	0	0	41	41	0	0	51	51	122
U. of Penn.	250	0	0	250	300	0	0	300	265	0	0	265	815
U. of Pittsburg	110	0	0	110	0	0	150	150	0	0	210	210	470
U. of Rochester	0	0	0	0	0	0	3,587	3,587	0	0	1,664	1,664	5,251
U.T. Arlington	50	82	0	132	0	0	474	474	0	0	230	230	836
S. Methodist	40	0	0	40	124	0	0	124	30	0	0	30	194
SUNY/Stony B.	27	0	0	27	0	0	1,045	1,045	0	0	1,037	1,037	2,109
Tufts University	50	0	0	50	20	0	0	20	20	0	0	20	90
U. Washington	0	0	0	0	0	0	240	240	0	0	318	318	558
U. of Wisconsin	230	0	0	230	429	0	0	429	665	0	0	665	1,324
Subtotal	3,009	7,038	0	10,047	4,580	4,263	11,342	20,185	3,809	7,771	7,218	18,798	49,030
Reserve	0	3	0	3	157	0	5,289	5,446	327	1,936	1,795	4,058	4,058
									0	2,602	2,928	5,530	
Total	3,009	7,041	0	10,050	4,737	4,263	16,631	25,631	4,136	12,309	11,941	28,386	53,088