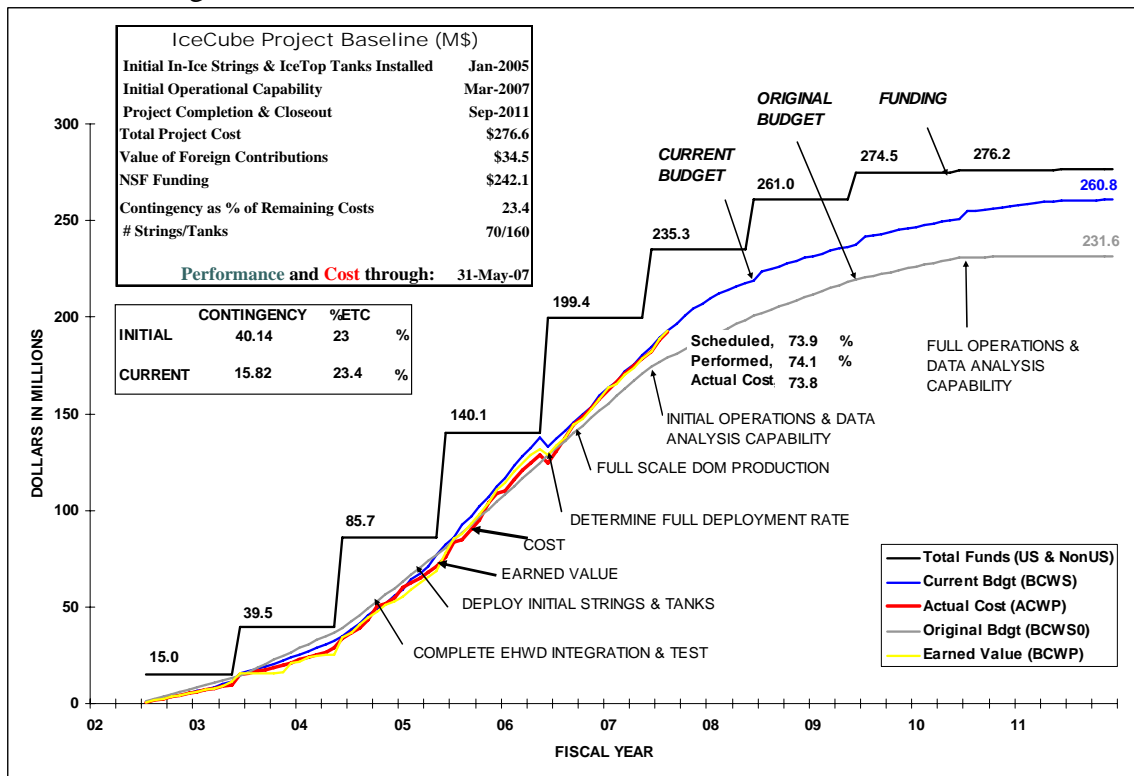


IceCube Project Monthly Report June 2007

Accomplishments

- During the period of June 1 to June 30, 1.4 billion events were registered by the IceCube data acquisition system (DAQ) which had an overall uptime of 95.4%.
- Ninety-seven percent of the DOMs deployed in the 2006/2007 season have been fully high-level commissioned with flashers and/or muons. This means the measured mean time with flashers or the mean time residual with muons is within 6 ns of the expected value, the sigma of flasher time distribution is within 3 ns, and the muon time residual error is under 10 ns.
- Additional disk space has been ordered for increasing the Data Warehouse capacity to accommodate IC-22 data from satellite transmission.
- The Project Execution Plan (PEP) for PY6-10 was submitted on June 25th.
- The EHWD test bed was commissioned this month. This facility is located at the UW Physical Sciences Lab. The test bed will be used for drill subsystem testing, training, simulations, and software testing.

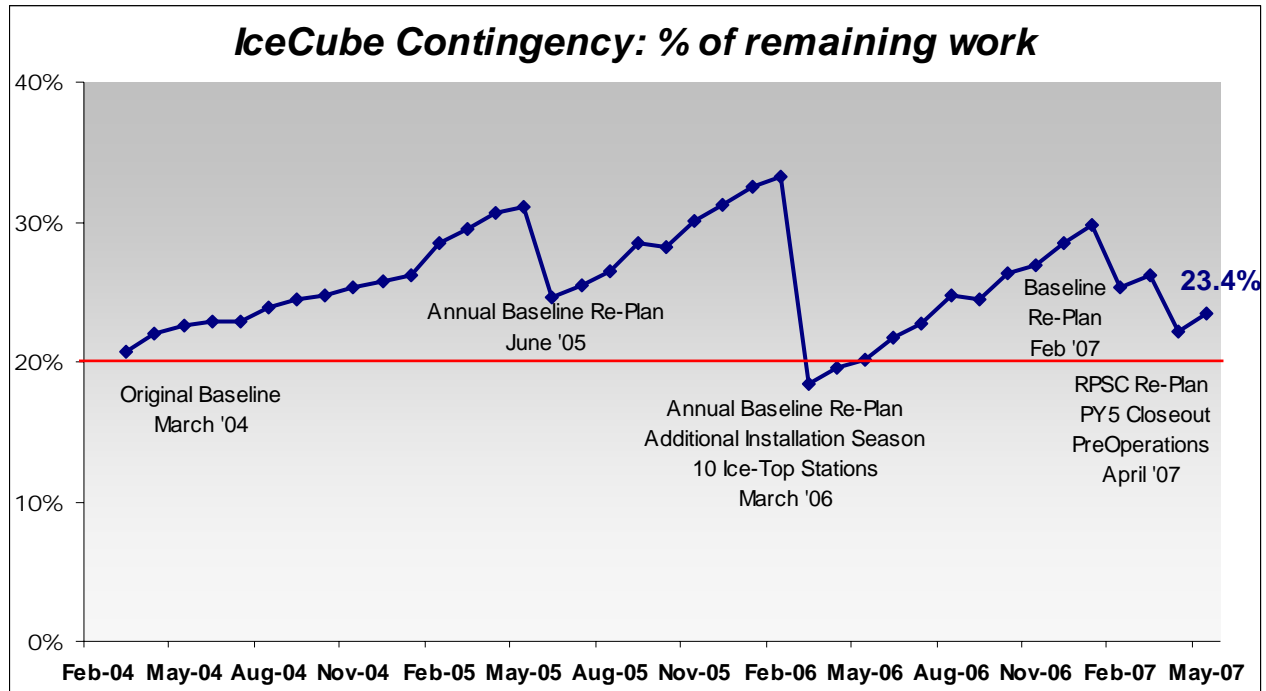


Cost and Schedule Performance – The project is 74.1% complete versus the plan of 73.9% complete, as measured using earned value techniques. The earned value measurement includes all tasks completed to date including design, development, procured materials, and the

construction of the infrastructure that supports the seasonal installation plan, e.g., the hot water drill, cargo shipments, etc.

IceCube Neutrino Observatory Cost Schedule Status Report Reporting Period Ending: 5/31/2007 ^{Note 1}													
OBS Structure L2	Cumulative To Date (AY K\$)						At Completion (AY K\$) ^{Note 5}			Complete (%)			
	Budgeted Cost ²		Actual Cost of Work Performed	Variance		Contingency		Budgeted AY \$s	Latest Revised Estimate	Variance	Sched	Perf	Actl Cost
	Work Scheduled	Work Performed		Schedule	Cost	Assigned	% ETC						
Project Support	20,775.3	20,775.3	20,762.3	0.0	12.9	319.7	5.5%	27,333.9	26,583.7	750.2	76.0%	76.0%	76.0%
Implementation	29,229.6	29,291.1	29,344.0	61.5	-52.9	3,480.3	20.0%	44,298.4	46,784.1	-2,485.7	66.0%	66.1%	66.2%
Instrumentation	54,983.1	54,954.0	54,866.3	-29.1	87.7	1,173.2	7.8%	69,983.7	69,983.7	0.0	78.6%	78.5%	78.4%
Data Acquisition	30,357.5	30,587.2	30,633.6	229.7	-46.4	278.7	9.1%	33,693.2	33,693.2	0.0	90.1%	90.8%	90.9%
Data Systems	20,262.3	20,224.4	20,286.4	-37.8	-62.0	258.3	4.2%	26,403.9	26,403.9	0.0	76.7%	76.6%	76.8%
Detector Comm. & Verification	15,362.3	15,368.9	15,496.7	6.6	-127.7	572.1	8.8%	21,967.9	21,967.9	0.0	69.9%	70.0%	70.5%
Pre Operations	75.1	75.1	0.0	0.0	75.1	0.0	0.0%	525.0	525.0	0.0	14.3%	14.3%	0.0%
Subtotal	171,045.2	171,276.0	171,389.3	230.8	-113.3	6,082.4	11.1%	224,206.0	225,941.5	-1,735.5	76.3%	76.4%	76.4%
RPSC SUPPORT	21,056.3	21,232.7	20,425.4	176.4	807.3	1,572.5	11.1%	35,339.9	34,532.5	807.3	59.6%	60.1%	57.8%
NSF	712.2	712.2	712.2	0.0	0.0	33.1	6.0%	1,263.0	1,263.0	0.0	56.4%	56.4%	56.4%
Total	192,813.7	193,220.9	192,526.9	407.2	694.0	7,687.9	11.1%	260,808.9	261,737.1	-928.2	73.9%	74.1%	73.8%
CONTINGENCY ^{Notes 3,4}								15,818.6	14,890.5	928.2			
IceCube Total ^{Note 2}	192,813.7	193,220.9	192,526.9	407.2	694.0	7,687.9	11.1%	276,627.5	276,627.5	0.0	73.9%	74.1%	73.8%

Notes: 1 Incorporates approved baseline changes.
2 Total Budget at Completion includes non-US contributions 4,857 K over the amount in the post Hartill III baseline of: \$29,698 K
3 Budgeted contingency is: 23.4% of the Budgeted cost of work remaining.
4 Budgeted contingency is: 23.1% of the Estimated Cost to Complete (ETC)
5 All latest revised estimates detailed planning for PY6-10
6 Contingency is assigned to each L-2 element based on the ETC, a bottom-up risk assessment model, management judgement, and cost constraints.



Risk Assessment & Potential Contingency Adjustments		
Item	Potential Contingency Adjustments	Notes
Assign contingency to mitigate technical, cost and schedule risks associated with the defined scope of work.	\$7,688K	Risk model applied at WBS-Level 4 to assess appropriate contingency as a percent of the cost of work remaining.
The cost to retro IceCube equipment/materials from the South Pole at the end of the project was not included in the baseline budget	\$1,500K	This number represents a worst case scenario.
LBNL Indirect Rates higher than expected	\$285K	LBNL provided incorrect indirect rate for use in PY6-10 planning.
Slow ramp up in M&O funding	\$667K	Assign 100 % of \$667K to mitigate the risk that initial M&O funding will be less and/or latter than planned over the second & third years of Operations.
Restore 80-string configuration	\$5,578K	Assign 100 % of \$5578.1K needed to increase endstate configuration to 80-strings. (based on conservative yield assumptions and planned support for 70 strings)

5/31/2007

Change Log – IceCube Total Project Budget Baseline (\$K)

No.	Description	Date Approved	Total Baseline	Allocated Budget	Allocated Budget Change	Contingency Budget	Estimate To Complete (ETC)	Budgeted Cost of Work Remaining	Contingency % of Remaining Work
NA	Status as of Apr 2007		276,628	260,732	0	15,895	75,328	71,680	22.2%
CR103	CR 0103 Adding UAA Alaska to 1.4.3.4	06/20/07	276,628	260,809	77	15,819			
NA	Status as of May 2007		276,628	260,809	0	15,819	68,516	67,588	23.4%

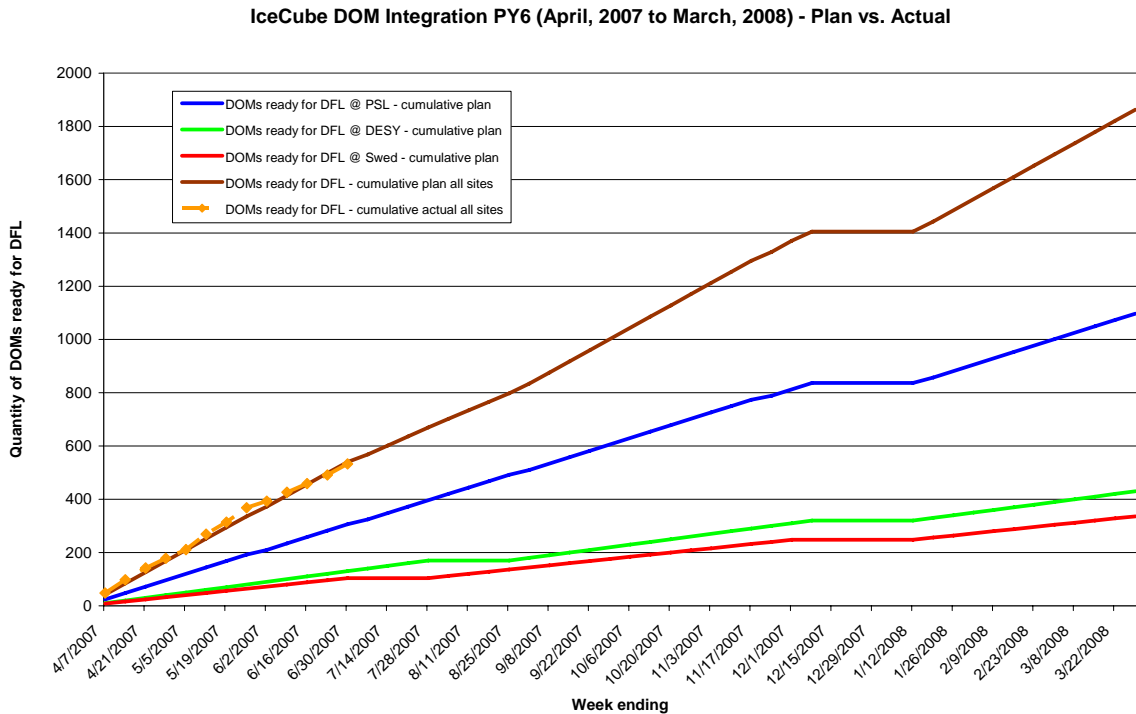
Drill Operation and String Installation – The replacement main drill hose order has been revised based on recent test findings that the yellow-striped hose exhibits undulations (very slight deformation on the outer surface) when operating under maximum pressure, and increased

hose twisting is observed. While the yellow-stripe hose meets all specifications and requirements, the engineering confidence was higher with the green-striped hose, and it was selected for the remainder of manufacturing.

The EHWD test bed was commissioned this month and is located at UW’s Physical Sciences Lab. This test bed will be used for drill subsystem testing, training, simulations and software testing.

A plan to insulate and heat the main hose while on the reel, over the winter has been drafted in coordination with RPSC. Specific details are being finalized for power consumption estimates, cost estimates, and product selection.

Digital Optical Module and Cable Production Status and Plans - There are no major issues with instrumentation production. The plans provide instrumentation well in advance of the installation dates and support the use of the least expensive shipping methods. The actual status of DOM integration is provided in the following chart.



Detector Commissioning and Verification – Ninety-seven percent of the DOMs deployed in the 2006/2007 season have been fully high-level commissioned with flashers and/or muons. This means the measured mean time with flashers or the mean time residual with muons is within 6 ns of the expected value, the one sigma flasher time distribution is within 3 ns, and the muon time residual error is under 10 ns. Of the remaining DOMs, most have been commissioned with muons but completion of commissioning with flashers is delayed as PDAQ gets underway. A few DOMs are still showing minor discrepancies, mostly at the top and bottom of strings.

Plans are progressing for the completion of the hole-ice measurement runs. These measurements, now that string 48 is frozen in, will complete the January measurements taken in water with

AMANDA string 4 laser/diffuser ball light being read out by string 48. In order to avoid any systematic changes, we will take this data with testDAQ, as it was taken in January prior to pDAQ installation.

Data Acquisition System Hardware - The remaining primary deliverables for the DAQ hardware group at LBNL for this project year are DOM Main Board Assemblies, and final design documentation for the DOM Hub Industrial Computers.

DOM Main Board production continues to progress smoothly and without any major issues. The vendor has been able to meet all of their quality and shipping commitments to date. The assembly and test vendor has delivered 2494 tested DOM Main Boards to LBNL and has completed shipments on the current purchase order quantity. LBNL has delivered 2346 fully tested and inspected MBs, on schedule, to the DOM integration sites, 1290 to PSL, 648 to DESY Zeuthen, and 408 to Stockholm. The LBNL delivery goal for this portion of production is 2388 MB Assemblies to all integration sites by the end of September. LBNL will continue to ship fully tested, deployment quality Main Boards from current and past production cycles until the stock on hand is fully depleted. The final production run of DOM Main Boards is now in the baseline plan and a continuation of the fabrication contract with Sanmina will be initiated when funding is available.

The Rev3 DOM Hub design documentation is 100% complete, and all documents have been released to UW. All DOM Hub spare parts have been shipped to UW Madison.

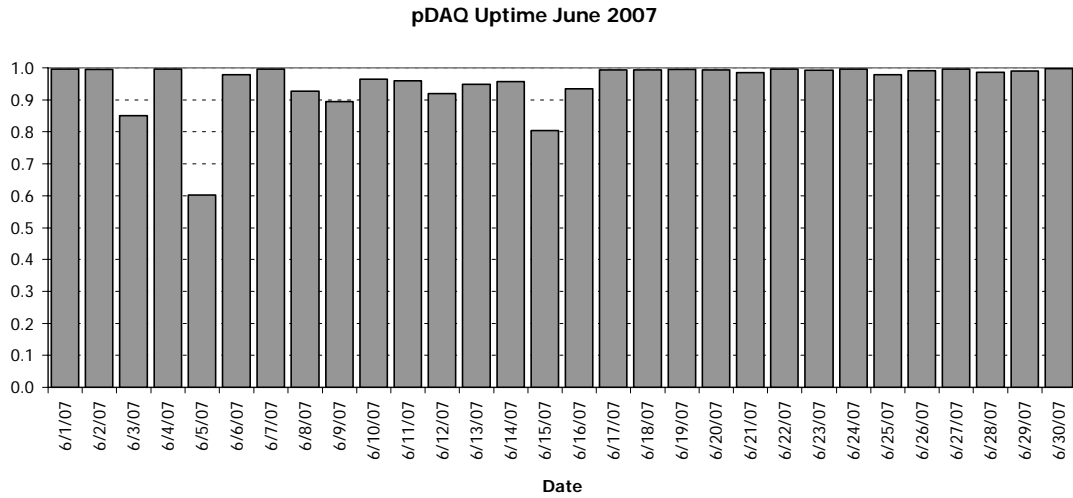
Data Acquisition Software - The PONY release of IceCube data acquisition software (DAQ software) was delivered late May 2007. This release included support for waveform compression in the digital data stream from the IceCube In-Ice and IceTop arrays (1400 active channels) and integrated hardware and software signals from the AMANDA array which are used for event merging by the online reconstruction and filtering system. During the period of June 1 to June 30 1.4 billion events were registered by the DAQ which enjoyed an overall uptime of 95.4%. The daily plot of the DAQ uptime is shown in the following plot.

The data is undergoing active scrutiny by several groups in the collaboration: the online monitor examines low-level DAQ performance such as channel availability, data rates, and system timing performance; online data verification has been investigating higher-level quantities such as tracking quality. While a handful of anomalous channels are under further study, no serious issues have been uncovered.

Four bug-fix releases were issued in June. The major bugs addressed were:

- Highland-07 (6/14)
 - AMANDA trigger component not stopping properly.
 - Repair broken unit tests
- Highland-08 (6/25)
 - Fix problem with run crashes for every other run.
- Highland-09 (6/28)
 - Every run starts with new DAQ component process

- Reduce number of channels which fail to properly initialize and therefore are dropped run the run.



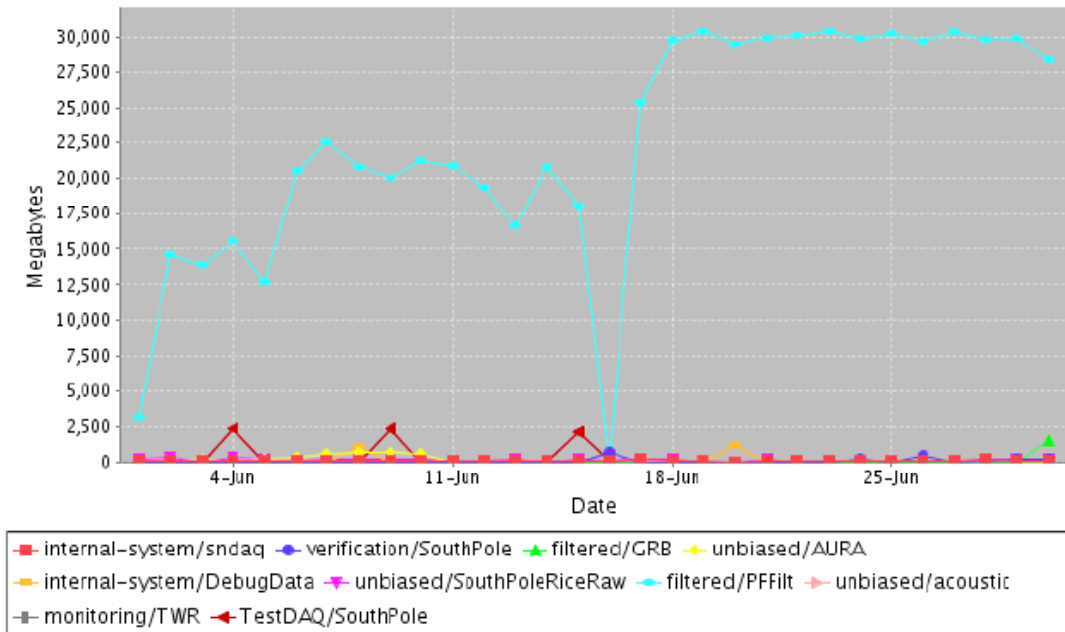
Data Systems

Data Handling

The South Pole Systems in the ICL continue normal operation. Data rates on the satellite are on the order of 20 to 30 GB per day. The figure below shows the satellite usage for a recent seven day period.

Continued operation, maintenance, and upgrades to the UW data center and data warehouse to keep pace with incoming engineering data from IC-22. Additional disk space has been ordered for increasing the Data Warehouse capacity to accommodate IC-22 data from satellite data transmission.

TDRSS Transfers Starting 01 Jun 2007 For 30 Days



Filtering, Software & Database

JEB/PnF merging of IceCube and Amanda TWR data streams continued at South Pole sending a pre-scaled sample of merged events over the satellite. Final testing of the IceTray online physics filter program, which will run at the South Pole reconstruction farm, was completed on real IC-22 pre-scaled data from the satellite to determine actual data rates from the filter and to adjust filters to be within satellite bandwidth requirements. Filter deployment was anticipated for early July.

The new release of the IceTray analysis framework to accommodate the IceSim release 2.0 is planned for early July.

Simulation

Work is continuing towards the major milestone of the IceSim release 2.0. IceSim 2.0 will be the production version of the Monte Carlo for IC-22 simulation over the next year. The full scale production should begin in July with the goal of achieving the equivalent of 20 live days of background simulation prior to the October collaboration meeting. Major improvements in IceSim 2.0 include better ice modeling, PMT charge modeling, DOM mainboard modeling, modeling of pre and after pulsing in the PMT.

Experiment Control

The experiment control system is running at Pole and coordinating all subsystem configuration start/stop and status information for all IceCube subsystems (i.e. p-DAQ, JEB/PnF/Spade/TWR-DAQ). Final feature set and improved ease of use for operators is continuing.

Quality Assurance and Safety – There are no significant issues to report. No lost time incidents were reported.

The monthly reports are posted at [IceCube Monthly Reports](#).

Upcoming Meetings and Events

Drilling and Deployment Training, Madison, WI

Collaboration Meeting, University of Gent, Brussels, Belgium

July 23 – August 3, 2007

October 6 – 11, 2007