

IceCube Project Monthly Report May 2005

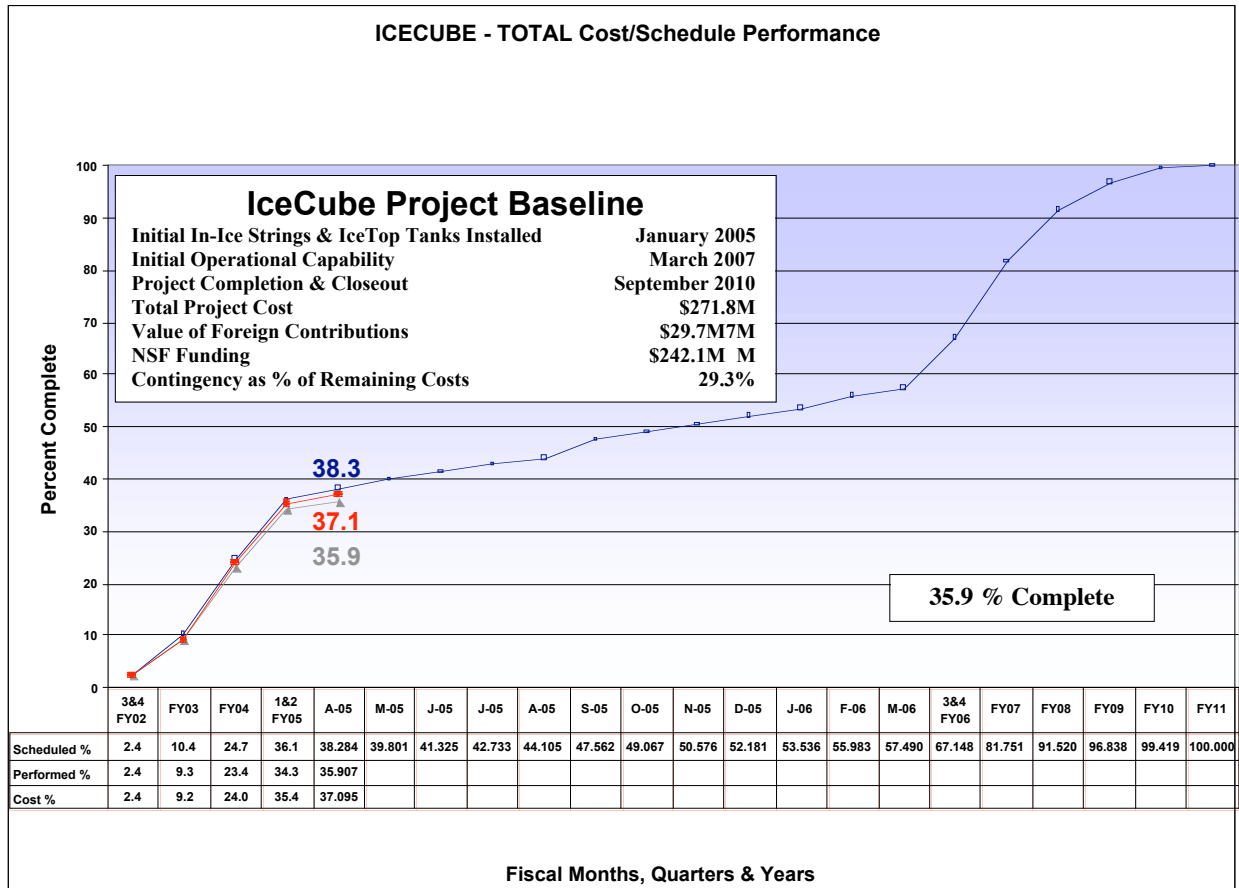
Accomplishments

All Digital Optical Modules (DOMs) installed at the South Pole continue to produce physics quality data. There are 60 DOMs installed in the operating string and 16 DOMs installed in the IceTop surface tanks.

Production of DOMs is underway at the three worldwide production sites (UW-Madison, Stockholm University, and DESY-Zeuthen). The project has integrated over 300 DOMs with over 200 in final acceptance testing. Approximately 930 DOMs will be produced this year.

A training program for IceCube drillers and string installation staff is planned for the 3rd and 4th week of August.

NSF completed an annual progress review on May 23-25, 2005. The review was very favorable.



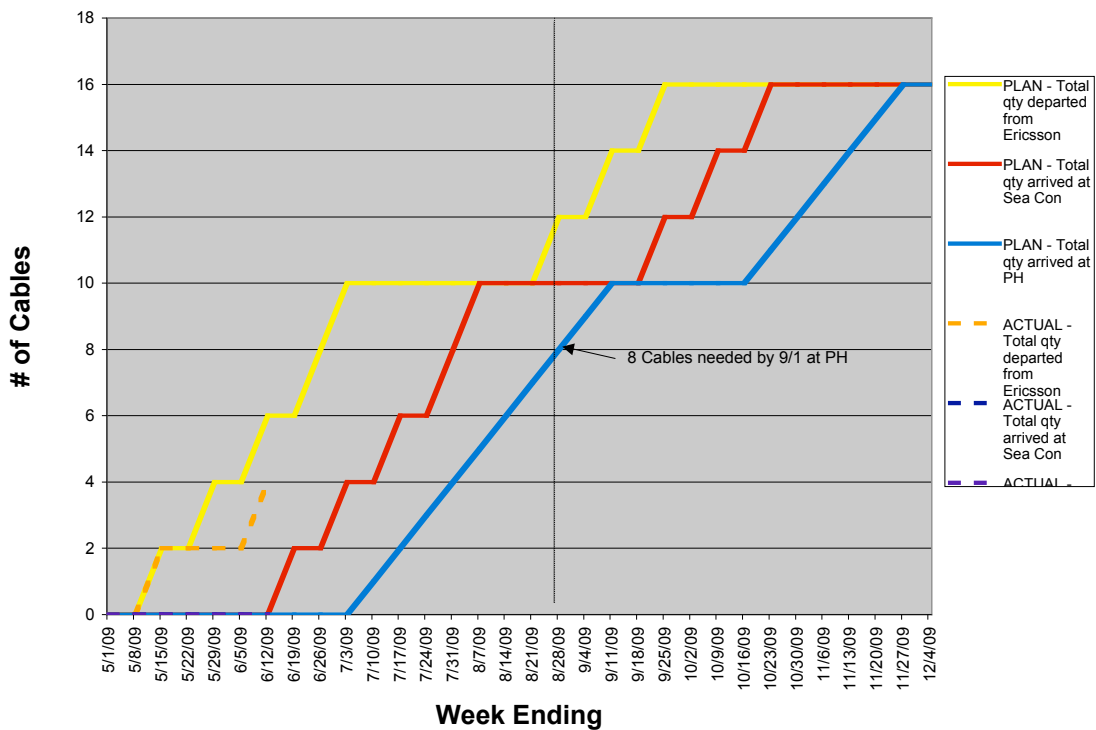
Cost and Schedule Performance – The project is roughly 36% complete. The total cumulative schedule and cost variances at the end of April were a few percent. A report of cumulative variances at a lower level of the work breakdown is provided as an attachment to this report.

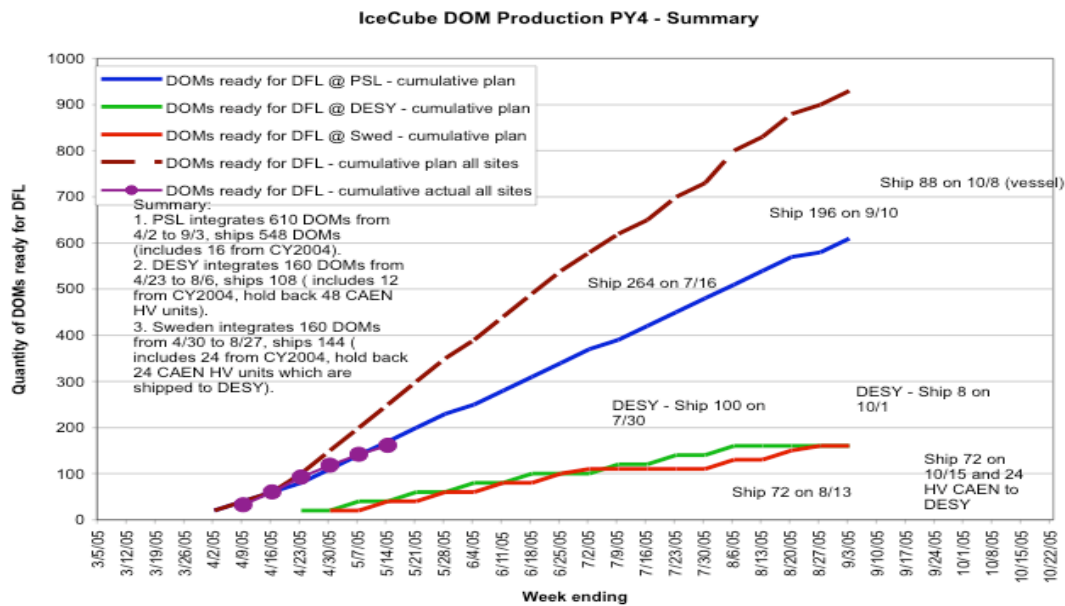
Drill Construction and Operation – Improvements to the reliability and general performance of the hot water drill are in progress at the University of Wisconsin’s Physical Sciences Laboratory. The majority of the required reliability improvements are well underway along with the purchase of new sections of hose and the fabrication of strain relief coils that will be placed at the hose joints. The coils will eliminate the potential for deformation of the hose, so called “necking,” under full loading. A recent inspection of progress at the hose vendor was very positive and another visit is planned for late in July. There has been good progress on developing standard operations procedures for the drill. The current planning goals for next season include:

- Set up the drill camp and prepare for the start of drilling by December 10th.
- Drill and install strings over seven weeks (December 11th – January 28th).
- Achieve drilling time per hole of less than 48 hrs, including firm drilling.
- Achieve deployment times of less than 24 hrs (last season was ~18 hours).
- Assemble and use a 2nd drill tower to leapfrog between drilling and deployment.
- Install 2 strings per week with a total of 12 strings possible at this rate.

Instrumentation Production, Testing, and Shipping – The production goals for this calendar year are to produce 16 surface-DOM cables, 16 surface cables, and 930 DOMs. Approximately 800 DOMs and all cables will be sent to McMurdo Station. More than 300 DOMs are already integrated with 200 DOMs in final acceptance testing. The IceCube Surface to DOM Cable and DOM production plans and current status are shown in the following graphs.

Surface to DOM Cable PY4 Production





String and IceTop Commissioning – All 76 DOMs are operating and reading data (60 DOMs on the string and 16 DOMs in 8 surface tanks). Communication tests show that all DOMs can communicate simultaneously at a bandwidth of about 1/2 Mbit/DOM/sec. The four DOMs on the top quad show an elevated bit error rate in the startup mode but they continue to produce acceptable data. One DOM is operating at relatively low voltage, a gain of 3×10^6 , due to excessively high noise rates at higher voltages.

Overall, the data from the first string and IceTop tanks is promising and supports moving ahead with production plans for 2005.

Instrumentation System Test Status – The South Pole Test System located at the Physical Sciences Laboratory continues to operate as a test environment. The engineering and instrumentation team use the setup for off-line trouble shooting including tests of new software.

Data Systems – The data handling systems are installed in the temporary counting house (future optical module laboratory) and the software is operational. Due to cargo shipment limitations NSF and Raytheon decided to postpone build out of the interior of the permanent counting house until next year. It is now anticipated that conditional occupancy of the IceCube Counting House will be December 1, 2006.

Quality Assurance – The IceCube Quality Assurance Manager is playing a major role in the Nonconforming Material Analysis Process. There are a large number of nonconforming components at this early stage in production.

Safety – A safety workshop is planned for the end of June to review the status of hazard analysis, procedures, and general expectations concerning the IceCube safety plan and program. The Project Director has invited RPSC and two external consultants from Fermilab to participate in the workshop.

Meetings and Events

| | |
|---|--|
| NSF Baseline Update Status Review (Hartill IV) @ UW | May 23-25, 2005 |
| UW IceCube Safety Workshop w/ RPSC | June 27-28, 2005 |
| IceCube Drill Workshop with Advisory Group | July 26-27, 2005 |
| NSF Safety Review of the IceCube Project | week of August 7, 2005 |
| IceCube Drill Training | week of August 15 th , 2005 |
| IceCube String Deployment Training | August 23-24, 2005 |
| International Oversight and Finance Group Meeting @ NSF | probably October 2005 |

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

| IceCube Neutrino Observatory Cost Schedule Status Report Reporting Period Ending: 4/30/2005 ¹ | | | | | | | | | | | |
|--|-----------------------------|----------------|-------------------------------|----------|----------|------------------------|-------------------------|----------|--------------|-----------|--------|
| WBS Element | Cumulative To Date (AY K\$) | | | | | At Completion (AY K\$) | | | Complete (%) | | |
| | Budgeted Cost ² | | Actual Cost of Work Performed | Variance | | Budgeted AY \$ | Latest Revised Estimate | Variance | Scheduled | Performed | Actual |
| | Work Scheduled | Work Performed | | Schedule | Cost | | | | | | |
| 1.1 Project Support ³ | 12,568.4 | 12,367.0 | 12,872.1 | -201.4 | -505.1 | 28,694.2 | 29,199.2 | -505.1 | 43.8% | 43.1% | 44.9% |
| 1.2 Implementation | 13,734.8 | 13,479.7 | 14,709.5 | -255.2 | -1,229.9 | 27,757.2 | 28,987.0 | -1,229.9 | 49.5% | 48.6% | 53.0% |
| 1.3 Instrumentation | 34,940.1 | 34,813.7 | 36,875.5 | -126.4 | -2,061.8 | 92,289.3 | 94,351.1 | -2,061.8 | 37.9% | 37.7% | 40.0% |
| 1.4 Data Systems | 8,422.3 | 7,215.8 | 6,494.5 | -1,206.4 | 721.3 | 26,568.9 | 25,847.6 | 721.3 | 31.7% | 27.2% | 24.4% |
| 1.5 Detector Commissioning & Verification | 5,943.6 | 3,904.2 | 3,809.1 | -2,039.4 | 95.1 | 19,596.8 | 19,501.7 | 95.1 | 30.3% | 19.9% | 19.4% |
| 1.6 Polar Support Services | 11,493.2 | 9,886.0 | 9,622.7 | -1,607.1 | 263.3 | 32,634.4 | 32,371.1 | 263.3 | 35.2% | 30.3% | 29.5% |
| NSF ³ | 437.3 | 437.3 | 437.3 | 0.0 | 0.0 | 1,263.0 | 1,263.0 | 0.0 | 34.6% | 34.6% | 34.6% |
| Sub Total | 87,539.7 | 82,103.7 | 84,820.8 | -5,436.0 | -2,717.1 | 228,803.6 | 231,520.7 | -2,717.1 | 38.3% | 35.9% | 37.1% |
| Management Reserve | | | | | | | | | | | |
| Total Contingency | | | | | | 42,967.4 | 40,250.3 | 42,963.8 | | | |
| Items Outside of Approved Baseline | | | | | | | | | | | |
| IceCube Neutrion Observatory | 87,539.7 | 82,103.7 | 84,820.8 | -5,436.0 | -2,717.1 | 271,771.0 | 271,771.0 | 0.0 | 38.3% | 35.9% | 37.1% |

Notes: 1 Incorporates approved and currently pending baseline changes.
 2 Budgeted contingency includes \$536K of currently undesignated Non-US Contributions.
 3 Budgeted contingency is 29.3% of the Budgeted cost of work remaining.

