

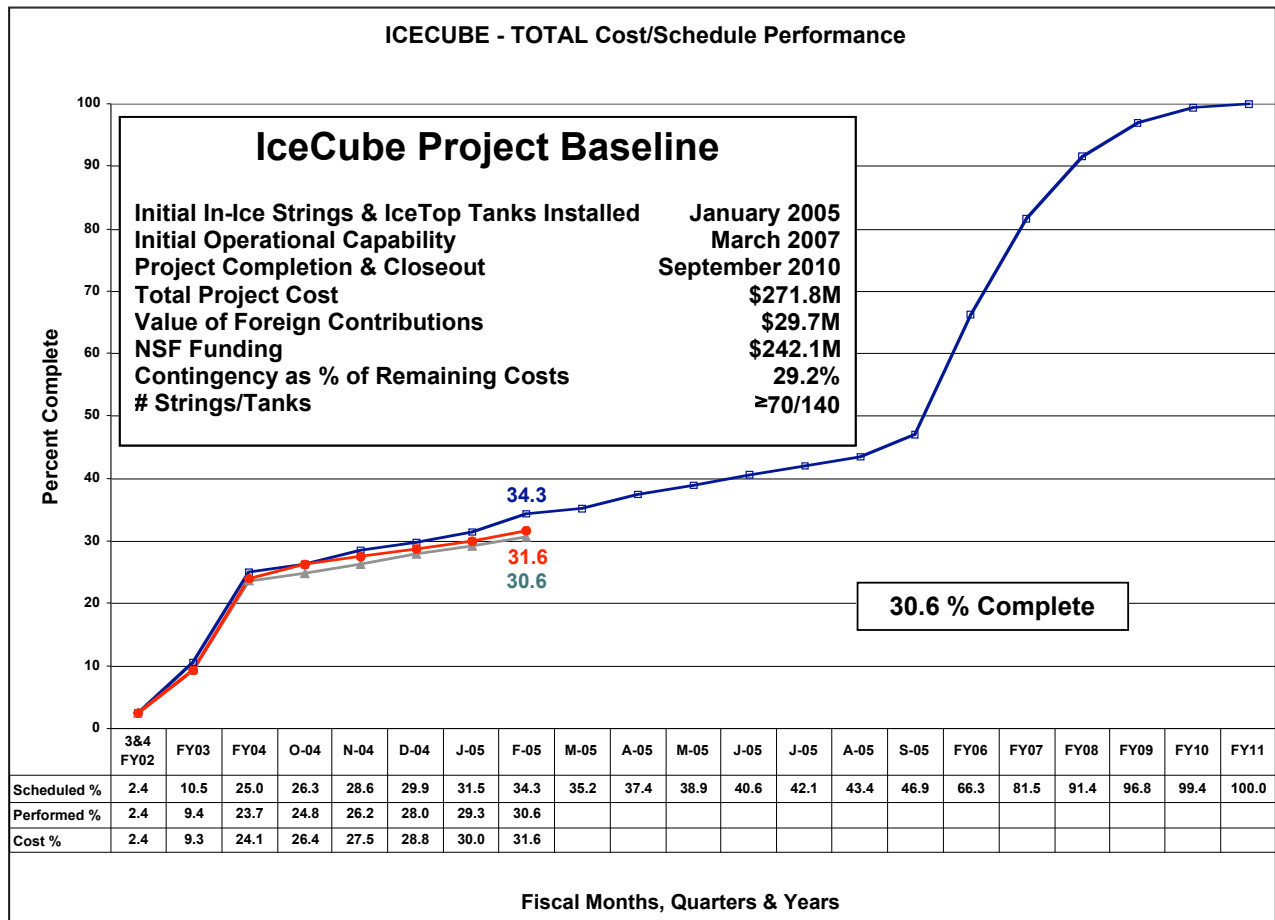
## IceCube Project Monthly Report March 2005

### Accomplishments

Two months after the first IceCube string was installed, the 60 Digital Optical Modules continue to operate and read data. The 16 DOMs frozen into 8 surface tanks are also operating and reading data.

The project completed a series of internal reviews and planning meetings in March and prepared the final work plan for the next project year, April 1, 2005 – March 31, 2006.

The IceCube and AMANDA collaborations merged into a single collaboration, IceCube. The new Spokesperson is Christian Spiering, DESY-Zeuthen. The IceCube Principal Investigator, Francis Halzen, UW-Madison, is Co-Spokesperson.



**Cost and Schedule Performance** – The total cumulative schedule and cost variances at the end of February were less than 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*** – A long list of improvements to the hot water drill are already underway. These improvements are necessary to support the current planning goals for next season:

- Set up and prepare for the start of drilling by Dec 10
- Drill and deploy strings over seven weeks (Dec 11 - Jan 28)
- Target drill speed less than 48 hrs/hole, including firm
- Target deploy speed of less than 24 hrs/hole
- Use both drill towers to leapfrog between drilling and deployment
- Deploy 2 strings per week
- Drill and deploy up to 12 strings

The nominal shift schedule for drilling operations is two shifts of ten people providing for 24 hours of drill operations. In order to ensure that the drillers do not work excessive hours, a problem last season, and that there is good information transfer between shifts, the two shifts will be staggered. Each shift will have two teams of five people with nine hours where all ten are at work together. There will be a 24 hour break before each hole is drilled.

***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. Four DOMs on one quad show an elevated bit error rate in the startup mode but they are able to produce full quality data. The cause for the bit error rate is still being investigated. One DOM is being operating at lower voltages due to excessively high noise rates at high voltage.

Overall, the data from the first string are very promising and adequate for moving ahead on production plans. Single photoelectron noise rates (1/4 PE threshold, no dead time) have settled at about 750 Hz. This noise rate is excellent and slightly exceeded expectations. Calibration data and reconstructed events were shown.

***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.

***Instrumentation Production, Testing, and Shipping*** – The IceCube DOM production plan and actual status is shown in the attached graph.

***Quality Assurance*** – Recent progress on completing a rather long list of project documentation is very good and is tracked by the Quality Assurance Manager and Project Manager. Through a

Pareto Analysis of all the DOMs that failed final acceptance testing and the South Pole rejects, we have identified the top three failure modes:

- STF Flasher Board failures (21%)
- Low PMT Gain (17%)
- DOM Reboot Failures (16%)

Corrective/ Preventive Action plans have been implemented to greatly reduce and/or eliminate the potential for recurrence of these problems. These actions are an integral part of the plan to increase the First Pass Yield % from 70% to 90 % for the upcoming year.

**Safety** – The Hazard Analysis for the IceCube Laboratory at the South Pole will be completed this summer. The waiver concerning the stack height of the heaters (Waiver 10) still needs to be closed out. There were two event reports in March, both back sprains, one at the South Pole and the other in Madison. The work processes involved are being reviewed from an ergonomic perspective to eliminate the potential for future back sprains.

**Future Meetings and Events**

Amanda/IceCube Collaboration Meeting @ Berkeley/LBNL	March 19-23, 2005
UW/RPSC Detailed Planning Meeting in Support of SIP @ UW	April 5-6, 2005
NSF Site Visit @ UW	April 8, 2005
NSF Baseline Update Status Review (Hartill IV) @ UW	May 23-25, 2005
International Oversight and Finance Group Meeting @ NSF	Week of June 13, 2005

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

IceCube Neutrino Observatory Cost Schedule Status Report Reporting Period Ending: 2/28/2005 <sup>1</sup>											
WBS Element	Cumulative To Date (AY K\$)					At Completion (AY K\$)			Complete (%)		
	Budgeted Cost <sup>2</sup>		Actual Cost of Work Performed	Variance		Budgeted AY \$s	Latest Revised Estimate	Variance	Scheduled	Performed	Actual
	Work Scheduled	Work Performed		Schedule	Cost						
1.1 Project Support <sup>3</sup>	11,882.5	11,669.7	12,255.0	-212.8	-585.3	28,694.2	29,279.4	-585.3	41.4%	40.7%	42.7%
1.2 Implementation	13,009.5	13,014.2	14,209.5	4.7	-1,195.3	27,757.2	28,952.5	-1,195.3	46.9%	46.9%	51.2%
1.3 Instrumentation	28,601.3	29,033.7	32,594.1	432.4	-3,560.4	90,057.4	93,617.8	-3,560.4	31.8%	32.2%	36.2%
1.4 Data Systems	7,110.8	6,038.3	5,310.0	-1,072.5	728.3	26,408.7	25,680.4	728.3	26.9%	22.9%	20.1%
1.5 Detector Commissioning & Verification	5,121.3	3,100.8	2,861.6	-2,020.6	239.1	19,610.1	19,371.0	239.1	26.1%	15.8%	14.6%
1.6 Polar Support Services	11,445.4	6,223.7	4,175.8	-5,221.7	2,047.9	32,311.1	30,263.1	2,047.9	35.4%	19.3%	12.9%
NSF <sup>3</sup>	416.0	416.0	416.0	0.0	0.0	1,263.0	1,263.0	0.0	32.9%	32.9%	32.9%
Sub Total	77,586.8	69,496.3	71,822.0	-8,090.5	-2,325.7	226,101.7	228,427.4	-2,325.7	34.3%	30.7%	31.8%
Management Reserve											
Total Contingency						45,669.3	43,343.6	42,963.8			
Items Outside of Approved Baseline											
IceCube Neutrion Observatory	77,586.8	69,496.3	71,822.0	-8,090.5	-2,325.7	271,771.0	271,771.0	0.0	34.3%	30.7%	31.8%

Notes: 1 Incorporates approved and currently pending baseline changes.  
 2 Budgeted contingency includes \$536K of currently undesignated Non-US Contributions.  
 3 Budgeted contingency is 29.2% of the Budgeted cost of work remaining.

**29.2%**  
Budgeted Contingency @ Completion as a percentage of the Estimate to complete

**\$536.0 K Undesignated Non-US Contribution**

### IceCube DOM Production PY4 - Summary

