Antarctic Infrastructure and Logistics Division
GPRA Highlights, FY 2008

NSF Dedicates New Research Station at the South Pole

Highlight ID: 16526, Version: AC/GPA

The United States has dedicated a new scientific station at the geographic South Pole--the third since 1957--officially ushering in a new support system for sophisticated large-scale experiments in disciplines ranging from astrophysics to environmental chemistry and seismology. The new Amundsen-Scott South Pole Station was dedicated January 12, 2008 by the Director of NSF and an assembled group of dignitaries. The elevated station is the most imposing structure ever built at the Pole. The 12-year effort for planning and construction required extraordinary effort to complete in an inhospitable environment on the high polar plateau that sees an annual mean temperature of -49° C. The project required 925 flights by ski-equipped LC-130 aircraft flown by the N.Y. Air National Guard. At 26,000 pounds of cargo per flight, a total of 24 million pounds of cargo were transported. All the while, cutting-edge research continued along with the construction of the IceCube Neutrino Observatory and the 10-m South Pole Telescope that achieved first light in February 2007. The elevated station consists of a series of interconnected modules mounted on steel support beams above the snow surface. Features of the new South Pole Station include seasonal differential heating of individual building modules as well as subsurface water and wastewater utilities that are maintained in the ice sheet through subsurface tunnels. The successful completion of the new South Pole Station relied on the year-round commitment and hard work of USAP personnel. The dedication took place at the height of the International Polar Year (IPY), a concerted scientific field campaign supported by more than 60 nations worldwide, which shares many of the IGY goals has a particular resonance.

Primary Strategic Outcome Goal:

- Major Multi-User Facilities (definition)

Secondary Strategic Outcome Goals:

- Disciplinary/Interdisciplinary Research (Anything not covered by one of the 12 categories below.)

How does this highlight address the strategic outcome goal(s) as described in the NSF Strategic Plan 2006-2011?
The new South Pole Station reasserts the National Science Foundation's (NSF) vital role in managing the U.S. Antarctic Program to meet the needs of the U.S. research community. The station has an Atmospheric Research Observatory, the Martin A. Pomerantz Observatory for astrophysics, and computer systems for research and communication including Internet access. Astronomy and astrophysics have flourished in recent years, taking advantage of excellent optical properties of the atmosphere (resulting from its high elevation, low temperature, and low humidity) and, for neutrino detection, the extremely clear and homogeneous thick ice below. A small biomedical research facility is present.

Does this highlight represent transformative or potentially transformative research? *If so, please explain why. For more information, see Report to Congress: Transformative Research at the National Science Foundation, April 16, 2008 and Important Notice 130: Transformative Research*
No

How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc?)
No

What may be the benefits of the proposed activity to society?
No
OPP/AIL 2008

Tags: 2010 Transition Team and 2010 Budget
Program Officer: Jerry Marty
NSF Award Numbers:
NSF Contract Numbers:
0000373

NSF Investments: None Applicable

Logistical Support and Engineering Make Possible the Dedication of Amundsen-Scott South Pole Station

Highlight ID: 16668, Version: AC/GPA

On January 12, 2008 the new Amundsen-Scott South Pole Station was dedicated by members of the United States Antarctic Program (USAP) and an assembled group of dignitaries. The dedication was the culmination of 12 years of planning and construction of the elevated station. Over this period of time, 925 LC-130 aircraft flights transported a total of 24 million pounds of cargo to the Station for construction. Facing challenges including an annual mean temperature of -49° C, winds averaging 10.7 knots, and snow accumulation of 20 cm per year, construction of the new South Pole Station relied on the year-round dedication and hard work of USAP personnel. The elevated station is comprised of a series of interconnected modules mounted on steel support beams above the snow surface. Features of the new South Pole Station include seasonal differential heating of individual building modules as well as subsurface water and wastewater utilities that are maintained in the ice sheet through subsurface tunnels. All personnel, equipment, and cargo arrived from McMurdo Station, 850 nautical miles from the South Pole, by plane or via traverse. With 24-hour sunlight at the Pole, construction on the Station was continuous during the summer season. During the 2007/2008 austral summer season alone, South Pole Station was host to an average of 200 people from November to February, 150 of whom worked on station construction and maintenance. Throughout construction, logistical support allowed science projects at the South Pole to remain fully operational.

Primary Strategic Outcome Goal:

- Disciplinary/Interdisciplinary Research (Anything not covered by one of the 12 categories below.)

Secondary Strategic Outcome Goals:

- Major Multi-User Facilities (definition)

How does this highlight address the strategic outcome goal(s) as described in the NSF Strategic Plan 2006-2011?
The new South Pole Station reasserts the National Science Foundation's (NSF) vital role in managing the U.S. Antarctic Program to meet the needs of the U.S. research community. The station has an Atmospheric Research Observatory, the Martin A. Pomerantz Observatory for astrophysics, and computer systems for research and communication including Internet access. Astronomy and astrophysics have flourished in recent years, taking advantage of excellent optical properties of the atmosphere (resulting from its high elevation, low temperature, and low humidity) and, for neutrino detection, the extremely clear and homogeneous thick ice below. A small biomedical research facility is present.

Does this highlight represent transformative or potentially transformative research? *If so, please explain why. For more information, see Report to Congress: Transformative Research at the National Science Foundation, April 16, 2008 and Important Notice 130: Transformative Research*
No

How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc?)
No

What may be the benefits of the proposed activity to society?
No
OPP/AIL 2008

Program Officer: Jerry Marty
NSF Award Numbers:
NSF Contract Numbers:
0000373

NSF Investments: None Applicable

Innovative Resupply of South Pole Station

Highlight ID: 16794, Version: AC/GPA

Following on the successful completion of the Proof of Concept project in 2005, the South Pole Resupply Traverse made its first production trip to South Pole. With two years of inactivity on the trail, this year s team was prepared for, and executed, a considerable amount of trail maintenance in the form of renewing markers and grooming areas with either heavy snow accumulation or the growth of large sastrugi (rigid irregular snow ridges and grooves formed by the wind). While still performing some optimization studies for the movement of goods to South Pole, and doing trail maintenance, the traverse team successfully established a large cache of aircraft fuel and science field camp supplies deep in the Ross Ice Shelf for the POLENET project. At South Pole, the traverse deposited 8,000 gallons of fuel, and unexpectedly, stood by for three days in preparation for potentially assisting a stranded international science traverse team in the area.

Primary Strategic Outcome Goal:

- Major Multi-User Facilities (definition)

Secondary Strategic Outcome Goals:

- Disciplinary/Interdisciplinary Research (Anything not covered by one of the 12 categories below.)

How does this highlight address the strategic outcome goal(s) as described in the NSF Strategic Plan 2006-2011?
A more efficient supply chain to the remote South Pole Station will free up other assets, such as aircraft, to serve the increasing needs of deep field camp research in Antarctica.

Does this highlight represent transformative or potentially transformative research? *If so, please explain why. For more information, see Report to Congress: Transformative Research at the National Science Foundation, April 16, 2008 and Important Notice 130: Transformative Research*
No

How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc?)
No

What may be the benefits of the proposed activity to society?
No
OPP/AIL 2008

Program Officer: George Blaisdell
NSF Award Numbers:
NSF Contract Numbers:
0000373

NSF Investments: None Applicable

McMurdo Station's Crary Lab and South Pole Station meet and exceed new Federal energy efficiency guidelines

Highlight ID: 16796, Version: AC/GPA

A new ruling requires Federal facilities to comply with strictly defined energy efficiency standards and exceed them by 30%. This energy efficiency can be measured in many ways. Although McMurdo Station s Crary Lab and the newly commissioned South Pole Elevated Station are grandfathered and exempt from compliance NSF s Office of Polar Programs showed commitment to upholding the standards by undertaking a professional assessment of its main facilities. The South Pole Elevated Station has an efficiency factor of 42% better than the new regulations, beating the 30% better than goal by 12%. This is particularly noteworthy in that the cold region engineering applications that NSF applies perform as expected even in the harshest environment on the planet. The Cray Lab efficiency factor was computed as 3% better than the base requirement, impressive considering its inherently older technologies. Improvement initiatives underway are expected to boost performance up to or beyond the 30% better than goal.

Primary Strategic Outcome Goal:

- Major Multi-User Facilities (definition)

Secondary Strategic Outcome Goals:

- Disciplinary/Interdisciplinary Research (Anything not covered by one of the 12 categories below.)

How does this highlight address the strategic outcome goal(s) as described in the NSF Strategic Plan 2006-2011?
Environmental stewardship is a critical goal of the U.S. Antarctic Program. Ensuring that its structures are energy efficient helps ensure that this goal will be met.
Does this highlight represent transformative or potentially transformative research? *If so, please explain why. For more information, see Report to Congress: Transformative Research at the National Science Foundation, April 16, 2008 and Important Notice 130: Transformative Research*
No

How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc?)
No

What may be the benefits of the proposed activity to society?
No
OPP/AIL 2008

Tags: 2010 Transition Team and 2010 Budget
Program Officer: Sandra Singer

NSF Award Numbers:
NSF Contract Numbers:
0000373

NSF Investments: None Applicable