U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HEARING CHARTER

The U.S. Antarctic Program: Achieving Fiscal and Logistical Efficiency While Supporting Sound Science

Thursday, November 15, 2012
10:00 a.m. - 12:00 p.m.
2318 Rayburn House Office Building

1. Purpose

On Thursday, November 15, 2012, the Committee on Science, Space, and Technology will hold a hearing to review the future options and logistical recommendations of the U.S. Antarctic Program Blue Ribbon Panel Report, *More and Better Science in Antarctica through Increased Logistical Effectiveness*, and to examine the work and goals of the U.S. Antarctic Program.

2. Witnesses

Mr. Norman R. Augustine, Chair, U.S. Antarctic Program Blue Ribbon Panel

The Honorable Subra Suresh, Director, National Science Foundation

General Duncan J. McNabb (USAF-Retired), Member, U.S. Antarctic Program Blue Ribbon Panel

Dr. Warren M. Zapol, MD, Chair, National Research Council's Committee on *Future Science Opportunities in Antarctica and the Southern Ocean*

3. Overview

- The United States presence on the continent of Antarctica began in 1830.
- In 1959, 12 nations, including the United States, signed the Antarctic Treaty establishing the peaceful purpose of the continent to continue the freedom of scientific investigation.
- Under the terms of Presidential Memorandum 6646[1], the National Science Foundation (NSF) manages the United States Antarctic Program and supports scientific research by overseeing a massive cooperative effort among researchers, the military, and civilian agencies.

[1] *President's Memorandum Regarding Antarctica*. February 1982. (http://www.nsf.gov/od/opp/ant/memo_6646.jsp)

- The United States Antarctic Program "supports the goals of the Antarctic Treaty, fosters cooperative research with other nations, protects the Antarctic environment, and develops measures to ensure only equitable and wise use of resources."[2]

- In 2010, NSF, in coordination with the Office of Science and Technology Policy (OSTP), initiated two activities to review the U.S. Antarctic program: one to focus on the science questions over the next two decades and one to focus on improving logistical support over the next two decades.

- In September 2011, the National Research Council's Committee on Future Science Opportunities in Antarctica and the Southern Ocean released a report highlighting important areas of Antarctic research and logistical "opportunities to sustain and improve the science program in the Antarctic and Southern Ocean."[3]

- In July 2012, the U.S. Antarctic Program Blue Ribbon Panel released a report, *More and Better Science in Antarctica through Increased Logistical Effectiveness*, highlighting well-managed U.S. Antarctic activities that suffer from an aging infrastructure, lack of capital budget, and the effects of operating in an unforgiving environment.

4. Background

Antarctica

According to the CIA World Factbook, "speculation over the existence of a 'southern land' was not confirmed until the early 1820s when British and American commercial operators and British and Russian national expeditions began exploring the Antarctic Peninsula region and other areas south of the Antarctic Circle."[4] While it was not officially established as a continent until 1840 and saw very little human activity other than exploratory expeditions well into the early 20th century, the continent received an increase of interest and scientific research following World War II.[5]

Scientific evidence indicates that Antarctica was once part of an enormous and temperate supercontinent that broke free and drifted southward from other land masses. Today, it is a continent of extremes.

> The continental landmass is 5.4 million square miles, an area larger than the U.S. and Mexico combined. More than 98 percent of the landmass is covered by an ice sheet that…averages just over 7,000 feet thick, but is more than twice that thick in places. Antarctica holds 90 percent of the world's ice, which in turn represents 70 percent of the world's fresh water. Yet, precipitation in the interior averages only a few inches annually, making Antarctica one of the world's great deserts. The ice sheet at the South Pole is in constant motion, moving

[2] http://www.nsf.gov/od/opp/antarct/usap.jsp
[3] *Future Science Opportunities in Antarctica and the Southern Ocean*. National Research Council, 2011. p. 6.
[4] *The World Factbook*: Antarctica. https://www.cia.gov/library/publications/the-world-factbook/geos/ay.html
[5] Ibid.

about 30 feet every year and necessitating an annual remarking of the geographic South Pole.[6]

Currently, a number of countries have seasonal and year-round stations, camps, and refuges to support scientific research. Seven countries (Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom) have made territorial claims to Antarctica, but these claims are not recognized by a majority of countries. The United States and Russia reserve the right to also make a claim, but have not. In an effort to form a legal framework for the activities of countries on the continent, an Antarctic Treaty was negotiated in 1959, which neither denies nor recognizes existing territorial claims. It was put into force in 1961.

U.S. Presence in Antarctica

In 1830, James Eights became the first U.S. scientist on the continent of Antarctica. In 1841, while mapping part of the Antarctic coast, a U.S. expedition team helped prove that Antarctica was a continent. In 1947, the largest single expedition to Antarctica took place when 13 ships and 4,700 personnel were dispatched to the region for the U.S. Navy's "Operation Highjump."[7] Americans have been studying the Antarctic without interruption since 1956.

Under the terms of Presidential Memorandum 6646, the National Science Foundation (NSF), through the Office of Polar Programs, manages the United States Antarctic Program and supports scientific research by overseeing a massive cooperative effort among researchers, the military, and civilian agencies. The USAP "supports the goals of the Antarctic Treaty, fosters cooperative research with other nations, protects the Antarctic environment, and develops measures to ensure only equitable and wise use of resources."[8] Antarctic research has three goals: to understand the region and its ecosystems; to understand its effects on (and responses to) global processes such as climate; and to use the region as a platform to study the upper atmosphere and space.[9]

Antarctic Treaty

The Antarctic Treaty was signed in 1959 and entered into force in 1961. The Treaty included 12 signatories. Today, these signatories are known as the original 12 consultative nations. The Treaty established a legal framework for Antarctica, or the area south of 60^{O}S and includes the recognition that it is in the "interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord."[10] Further, the Treaty requires Antarctica only be used for peaceful purposes and prohibits "any measures of a military nature,"[11] including weapons testing and nuclear storage and explosions. The Treaty continues the freedom of scientific investigation in Antarctica and calls for the exchange of plans, personnel and scientific observations from scientific programs and results taking place in Antarctica. It "does not recognize, dispute, or establish territorial

[6] http://www.nsf.gov/news/news_summ.jsp?cntn_id=102869
[7] Ibid.
[8] http://www.nsf.gov/od/opp/antarct/usap.jsp
[9] Ibid.
[10] *The Antarctic Treaty*. (http://www.nsf.gov/od/opp/antarct/anttrty.jsp)
[11] Ibid.

claims, and it prohibits assertion of new claims." It also guarantees access by any treaty nation to inspect others' stations and equipment."[12]

In addition to the original 12 consultative nations, 16 nations have achieved consultative status by acceding to the treaty and conducting substantial scientific research in Antarctica. "Consultative nations are empowered to meet yearly and to influence the operation of the treaty."[13] There are also 20 acceding nations that abide by the treaty but do not have substantial programs in Antarctica and are not part of the consultative process.

Original Signatories	Additional Consultative Nations	Acceding Nations
Argentina	Brazil	Austria
Australia	Bulgaria	Belarus
Belgium	China	Canada
Chile	Ecuador	Colombia
French Republic	Finland	Cuba
Japan	Germany	Czech Republic
New Zealand	India	Democratic Peoples Republic of Korea
Norway	Italy	Denmark
Union of South Africa	Netherlands	Estonia
Union of Soviet Socialist Republic (*Russia carries forward the signatory privileges and responsibilities established by the former Soviet Union*)	Peru	Greece
	Poland	Guatemala
	Republic of Korea	Hungary
	Spain	Monaco
	Sweden	Papua New Guinea
	Ukraine	Portugal
United Kingdom	Uruguay	Romania
United States		Slovak Republic
		Switzerland
		Turkey
		Venezuela

The Treaty calls for meetings of the consultative nations in order to exchange information, consult on matters of common interest, and formulate additional measures to further the principles and objectives of the Treaty that may be brought back to each nation's government for consideration. Meetings of the consultative nations have been held approximately every other year since 1961 and more frequently since 1993. Decisions are made by consensus, not vote. "Each meeting has generated recommendations regarding operation of the treaty that, when ratified by the participating governments, become binding on the parties to the treaty."[14]

The recommendations resulting from these meetings often result in a provision of rules for operating on the continent, including: the Agreed Measures for the Conservation of Antarctic Fauna and Flora;[15] the Convention for the Conservation of Antarctic Seals (1972); the Convention on the Conservation of Antarctic Marine Living Resources (1980); and the Protocol

[12] http://www.nsf.gov/od/opp/antarct/intcoop.jsp
[13] Ibid.
[14] *The Antarctic Treaty*. 1959. (http://www.nsf.gov/od/opp/antarct/anttrty.jsp)
[15] Ratified by the United States in the *Antarctic Conservation Act of 1978* (P.L. 95-541).

on Environmental Protection to the Antarctic Treaty (1991) that included the prohibition of mining.[16] Antarctic Treaty nations that operate field programs in Antarctica have established a Council of Managers of National Antarctic Programs (COMNAP) "to facilitate working level decision making and information exchange."[17]

The Role of the National Science Foundation

The United States Antarctic Program (USAP) was established in 1959, following the 1957-58 International Geophysical Year when 12 nations launched 60 Antarctic research stations. The USAP carries forward the U.S. support for the Antarctic Treaty, advances cooperative research with other nations, develops measures to ensure equitable use of resources, and protects the Antarctic environment. The USAP is managed by the National Science Foundation (NSF) as part of NSF's Office of Polar Programs (OPP).

The Administration's fiscal year 2013 (FY13) budget request included $75.8 million for Antarctic Sciences, an increase of 8.7 percent over the FY12 estimate, and $258.33 for Antarctic Infrastructure and Logistics, an increase of .6 percent over the FY12 estimate. Funding for these OPP programs supports research, labs and equipment (including the operation of the McMurdo, Palmer and Amundsen-Scott South Pole research stations), icebreakers for research and channel-breaking, small fixed-wing aircraft and helicopters, fuel tankers, and support provided by the Department of Defense (for more information see Appendix A). NSF also contracts with Lockheed Martin for logistical support for the Antarctic program. "Some 3,500 Americans are involved each year in the program's research and logistical activities. Every year, more than 800 scientists and their support teams conduct research in Antarctica's unique environment." [18]

In 1982, a *President's Memorandum Regarding Antarctica* laid out the continued role for the National Science Foundation (NSF) regarding the U.S. interests in Antarctica, including:

- budget for and manage the entire United States national program in Antarctica, including logistic support activities so that the program may be managed as a single package;
- fund university research and federal agency programs related to Antarctica;
- draw upon logistic support capabilities of government agencies on a cost reimbursable basis; and
- use commercial support and management facilities where these are determined to be cost effective and will not, in the view of the Group, be detrimental to the national interest.[19]

NSF is also a member of the Antarctic Working Group, providing policy guidance for all U.S. activities under the Antarctic Treaty. Other members include the Department of State and the

[16] http://www.nsf.gov/od/opp/antarct/intcoop.jsp
[17] Ibid.
[18] http://www.nsf.gov/news/news_summ.jsp?cntn_id=102869
[19] *President's Memorandum Regarding Antarctica*. February 1982. (http://www.nsf.gov/od/opp/ant/memo_6646.jsp)

Department of Defense. NSF is responsible for the overall funding and management of U.S. activities in Antarctica and:

- Annually prepares plans and a budget for consideration within the Executive Branch and for review and appropriation by the Congress.
- Develops scientific goals for Antarctica, obtaining advice as needed from the scientific community and communicating these goals to the scientific community.
- Receives proposals for research projects from U.S. universities, other research institutions, and federal agencies; evaluates these proposals for relevance to program goals, scientific merit, and logistics feasibility; provides funds to these institutions for performance of the projects in Antarctica and completion of analysis upon return; and arranges cooperative scientific and logistics programs with other Antarctic Treaty nations.
- Plans the logistics requirements and transmits these requirements and necessary funds to the U.S. Naval Support Force Antarctica, the Air National Guard, and the United States Coast Guard (functions are described below).
- Manages, designs, plans, engineers, constructs, and maintains U.S. Antarctic facilities.
- Manages a contract with a commercial firm for operation of McMurdo, South Pole, and Palmer Stations; the research vessels Laurence M. Gould and Nathaniel B. Palmer; construction; and other services.
- Develops and implements a comprehensive safety, environment, and health program for U.S. activities in Antarctica.
- Serves as a clearinghouse and source of information regarding Antarctic records, files, documents, and maps maintained within agencies and nongovernmental organizations.[20]

In 2010, the NSF OPP, in coordination with the Office of Science and Technology Policy (OSTP), initiated two activities to review the U.S. Antarctic program. The first asked the National Research Council's Committee on Future Science Opportunities in Antarctica and the Southern Ocean to identify and summarize the changes to important science conducted on Antarctica and the surrounding Southern Ocean that will demand attention over the next two decades. The second activity was an NSF-organized Blue Ribbon Panel tasked to assist in making strategic decisions for improving the logistical support of the U.S. science program in Antarctica and the Southern Ocean over the next two decades.

Future Science Opportunities in Antarctica and the Southern Ocean

In September 2011, the National Research Council's Committee on Future Science Opportunities in Antarctica and the Southern Ocean released its report in response to the NSF/OSTP request. The report highlights important areas of research and distributes them between two broad themes, those related to global change and those related to fundamental discoveries. The research areas identified as most important by the Committee are as follows:

[20] http://www.nsf.gov/od/opp/antarct/usagency.jsp

Global Change	Discovery
How will Antarctica contribute to changes in global sea level? What is the role of Antarctica and the Southern Ocean in the Global Climate System? What is the response of Antarctic biota and ecosystems to change? What role has Antarctica played in changing the planet in the past?	What can Antarctica and the Southern Ocean reveal about past climates? How has life adapted to Antarctica and the Southern Ocean Environments? What can the Antarctic platform reveal about the interaction between the earth and the space environment? How did the universe begin, what is it made of, and what determines its evolution?[21]

Key findings from the NRC Committee's Report include:

- The Antarctic region is both an important influence on Earth's processes and a unique environment from which to monitor global changes.
- Antarctica and the Southern Ocean provide a natural laboratory for scientific discovery.
- Conducting research in the harsh environmental conditions of the Antarctic region is logistically challenging. Substantial resources are needed to establish and maintain infrastructure while at the same time minimizing the pollution of the environment and ensuring the safety of researchers. Opportunities could be leveraged to sustain and improve the science program in Antarctica and Southern Ocean in the coming two decades, including:
    - Building collaborations between nations, across disciplinary boundaries, and between public and private sector entities, and between science and logistics personnel.
    - Taking advantage of advances in energy and technology to make scientific research in the Antarctic region more efficient.
    - Supporting educational efforts to spark interest in polar science.
    - Developing a coordinated network of observing systems that can collect and record data on the ongoing changes in the Antarctic region.[22]

The Report suggests specific actions to help the United States achieve success in the next generation of Antarctica and the Southern Ocean science. These include:

- Lead the development of a large-scale, interdisciplinary observing network and support a new generation of robust earth system models.
- Continue to support a wide variety of basic research in Antarctica and the Southern Ocean to yield a new generation of discoveries.
- Design and implement improved mechanisms for international collaboration.

[21] *Future Science Opportunities in Antarctica and the Southern Ocean*. National Research Council, 2011. p.2.
[22] Key findings of the *Future Science Opportunities in Antarctica and the Southern Ocean* Report. National Academies website. (http://dels.nas.edu/Report/Future-Science-Opportunities-Antarctica/13169)

- Exploit the host of emerging technologies including cyberinfrastructure and novel and robust sensors.
- Coordinate an integrated polar educational program.
- Continue strong logistical support for Antarctic science.[23]

The Report also encourages the Blue Ribbon Panel to develop a plan to support Antarctic science in the next two decades that includes the following goals:

- Improve the efficiency of the support provided by the contractors and enhance the oversight and management of contractors by the scientific community.
- Increase the flexibility and mobility of the support system to work in a continent- and ocean-wide manner, utilizing as much of the year and continent as possible, and fostering innovative "cutting-edge" science.
- Maintain and enhance the unique logistical assets of the U.S., including the research stations, aircraft, and research vessels and icebreakers.[24]

More and Better Science in Antarctica Through Increased Logistical Effectiveness

In July 2012, the members of the U.S. Antarctic Program Blue Ribbon Panel released a report, *More and Better Science in Antarctica Through Increased Logistical Effectiveness*, detailing suggested efforts to increase cost savings and conduct more science through the USAP. The report from the Blue-Ribbon Panel notes that "conducting world-class science is a centerpiece of U.S. activities in the Antarctic and the Southern Ocean, but the substantive research itself is only the visible part of the iceberg…Substantial opportunities exist to devote a greater share of scarce resources to science by reducing the cost of logistics efforts."[25]

The Blue Ribbon Panel was made up of 12 members who had collectively taken "82 trips to Antarctica, including 16 to the South Pole and numerous trips aboard research vessels in the Southern Ocean."[26]

The Blue-Ribbon Panel report concludes that "U.S. activities in Antarctica are very well managed but suffer from an aging infrastructure, lack of a capital budget, and the effects of operating in an extremely unforgiving environment…In the longer term, increased logistical efficiency could yield savings that would substantially increase the amount of research supported by NSF."[27] The report assesses the McMurdo, Amundsen-Scott South Pole, and Palmer Research Stations, as well as field sites and oceangoing vessels. It also acknowledges key challenges for the USAP, including environment, uncertainties in logistics planning, activities of other nations, and economic considerations.

[23] Ibid.
[24] Ibid.
[25] *More and Better Science in Antarctica Through Increased Logistical Effectiveness.* Report of the U.S. Antarctic Program Blue Ribbon Panel. July 23, 2012, Washington, DC. p.1.
[26] Ibid. p.2
[27] Ibid. p. 3.

The Blue Ribbon Panel report focuses on eight issues the Panel views as significant: 1) capital budgeting, 2) alternatives to McMurdo Station, 3) icebreakers, 4) transportation on the Continent, 5) hard-surface ice runway at the South Pole, 6) energy, 7) communications, and 8) safety and health. The report also acknowledges that another way to ensure projects are not unexpectedly disrupted, personnel injured, or equipment damaged is to "eliminate circumstances in which the failure of one element of a system renders the entire system incapable of performing its function,"[28] termed "single-point failures." Potential single-point failures include:

- The Antarctic Treaty and related instruments (potential circumvention)
- U.S. icebreaking capability (lack of assured access)
- Broadband communications for South Pole Station (interruptions to telemedicine, impact on research)
- Pier at Palmer Station (vulnerability to major accident)
- Multimode hub at Christchurch (earthquake, airport restructuring)
- Pegasus Runway at McMurdo (melting, accidents)
- Fire Suppression Systems requiring electric power (inadequate backups)
- *Gould* and *Palmer* (aging with long replacement cycle)
- Single automated dishwasher at McMurdo (food service for as many as 1100 people) [29]

Further, the Blue Ribbon report establishes 10 overarching recommendations:

1. Antarctic Bases: Continue the use of McMurdo, South Pole, and Palmer Stations as the primary U.S. science and logistics hubs on the continent. (There is no reasonable alternative, particularly concerning McMurdo.)

2. Polar Ocean Fleet: Restore the U.S. polar ocean fleet (icebreakers, polar research vessels, mid-sized and smaller vessels) to support science, logistics, and national security in both polar regions over the long term. (Follow through on pending action in the President's FY 2013 Budget Request for the USCG to initiate the design of a new icebreaker.)

3. Logistics and Transportation: Implement state-of-the-art logistics and transportation support as identified in this report to reduce costs and expand science opportunities continent-wide and in the Southern Ocean. (Replace some LC-130 flights with additional traverse trips by automating the traverse and by constructing a wheel-capable runway at South Pole Station for C-17 use; reduce the LC-130 fleet.)

4. McMurdo and Palmer Facilities: Upgrade or replace, as warranted by an updated master plan, aging facilities at McMurdo and Palmer Stations, thereby reducing operating costs and increasing the efficiency of support provided to science projects. (Modify or replace the pier and reconstruct the boat ramp at Palmer

[28] Ibid. p. 17.
[29] Ibid. p. 17.

Station, install fire suppression—with backup power—in unprotected berthing and key operational facilities, upgrade medical clinics, and improve dormitory use to prevent the transmission of illnesses.)

5. USAP Capital Budget: Establish a long-term facilities capital plan and budget for the USAP. (Provide phased plan for modernization of USAP facilities.)

6. Science Support Costs: Further strengthen the process by which the fully burdened cost and technological readiness of research instrumentation and observing systems, as well as overall projects, are considered in the review and selection of science projects. (Increase overall awareness of the true cost of resources provided in Antarctica.)

7. Communications: Modernize communication capabilities in Antarctica and the Southern Ocean to enable increased science output and reduced operational footprint. (Provide increased bandwidth on as well as to and from the continent.)

8. Energy Efficiency: Increase energy efficiency and implement renewable energy technologies to reduce operational costs. (Provide additional wind turbine generators at McMurdo, better insulate selected buildings, and invest in technology for converting trash-to-energy and burning waste oil so that it does not have to be returned to the United States.)

9. International Cooperation: Pursue additional opportunities for international cooperation in shared logistics support as well as scientific endeavors. (The existence of numerous national stations in the Peninsula region offers a particularly promising opportunity for an international supply system.)

10. Antarctic Policy: Review and revise as appropriate the existing documents governing Antarctic Policy (Presidential Memorandum 6646 of 1982 and Presidential Decision Directive 26 of 1994) and implementing mechanisms for Antarctica, taking into account current realities and findings identified by the National Research Council report and the present report. (Focus on policy and national issues as opposed to operational matters.)[30]

The Blue Ribbon Panel report concludes with a significant recommendation (not incorporating the issue of icebreakers) regarding funding for the USAP over the next five years:

> In spite of the above challenges, USAP science and science support could be vastly enhanced within about five years. The improvements could be funded by increasing for each of the next four years the USAP's annual appropriation for support by six percent relative to the FY 2012 appropriation (an additional $16 million per year), diverting six percent of the planned science expenditures over the next four years to upgrades of the science support system ($4 million), and permitting the savings accrued from the five highest payout projects (Table 2) and

[30] Ibid. p. 18.

the 20 percent reduction in contractor labor to be reinvested in upgrading support capabilities ($20 million per year).

The investments thus made would be repaid in approximately seven years if the five highest payout projects produce the expected return and a 20 percent reduction in contractor staff is in fact possible and implemented. Thereafter, the annual savings generated will allow the USAP to increase science awards while ensuring safe and effective science support and appropriately maintained facilities. Given the important improvements in safety and science opportunities contained within the above option, a seven-year financial breakeven is considered by the Panel to be a reasonable investment, particularly when compared to the cost of not making one.[31]

[31] Ibid. p. 21-22.

APPENDIX A

NSF OFFICE OF POLAR PROGRAMS ANTARCTIC SCIENCES

NSF Spending on OPP Division of Antarctic Sciences[32]

(dollars in millions)

	FY11 Actual	FY12 Estimate	FY13 Request	FY13 Request versus FY12 Estimate	
				$	%
Research	64.20	65.03	70.93	5.90	9.1
Education	1.38	1.27	1.42	0.15	11.8
Infrastructure	3.49	3.45	3.45	0	0
Total:	69.07	69.75	75.80	6.05	8.7

Antarctic Sciences (ANT) funds research on high priority scientific topics for which access to Antarctica is essential to advancing the scientific frontiers. This includes research on physical, biological, geological, glaciological, oceanographic, and atmospheric processes in Antarctica, as well as on interactions of the ice sheets with the underlying continent, the surrounding ocean, and the overlying atmosphere. These studies also elucidate the Antarctic environment's role in the global Earth system. In particular, a new programmatic emphasis on system science fosters linkages across the disciplines in order to better advance understanding of Antarctica as an integrated system. ANT also provides instrumentation and supports research in astronomy and astrophysics that takes advantage of the polar environment to study the origin of super-high-energy neutrinos and the nature of dark energy and dark matter in the universe.

In general, 65 percent of the ANT portfolio is available for new research grants. The remaining 35 percent is used primarily to fund continuing grants made in previous years.[33]

NSF OFFICE OF POLAR PROGRAMS ANTARCTIC INFRASTRUCTURE AND LOGISTICS

NSF Spending on OPP Division of Antarctic Infrastructure and Logistics[34]

(dollars in millions)

	FY11 Actual	FY12 Estimate	FY13 Request	FY13 Request versus FY12 Estimate	
				$	%
U.S. Antarctic Facilities & Logistics	191.89	189.22	190.81	1.59	0.8
U.S. Antarctic Logistical Support	67.52	67.52	67.52	0	0
Total:	259.41	256.74	258.33	1.59	0.6

[32] *FY13 NSF Budget Request to Congress*, p. OPP-9.
[33] Ibid.
[34] *FY13 NSF Budget Request to Congress*, p. OPP-11.

Antarctic Infrastructure and Logistics supports research through a network of stations, labs, equipment, and logistical resources that enables research activities in Antarctica. This includes operation of a year-round inland research station at the South Pole and two year-round coastal research stations (McMurdo and Palmer) with extensive laboratory, transportation, housing, communication, and computing capabilities (approximately $85.0 million); summer camps as required for research (approximately $5.0 million); icebreaking research ships—the *Laurence M. Gould* and the *Nathaniel B. Palmer* (approximately $32.0 million); small fixed-wing aircraft and helicopters (approximately $9.0 million); icebreakers for channel-breaking and ship escort and an annual fuel tanker and cargo ship at McMurdo Station (approximately $40.0 million for ship charters and fuel). The division uses a mix of government and civilian contract service providers for research support activities in Antarctica.

The U.S. Antarctic Logistical Support budget line funds support provided by the U.S. Department of Defense (DoD). DoD operates as a logistical support provider on a cost-reimbursable basis. Major funding elements of DoD support include: military personnel, LC-130 flight operations and maintenance support through the 109th Airlift Wing (AW) of the New York Air National Guard in Scotia, New York, and Antarctica; transportation and training of military personnel supporting the U.S. Antarctic Program; support for air traffic control, weather forecasting, and electronic equipment maintenance; the charter of Air Mobility Command airlift and Military Sealift Command ships for the resupply of McMurdo Station; bulk fuel purchased from the Defense Logistics Agency; and reimbursement for use of DoD satellites for communications.[35]

[35] Ibid.