



Testimony of
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Before the

U.S. House of Representatives
Committee on Science, Space, and Technology

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

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Chairman Hall, Ranking Member Johnson and distinguished members of the Committee, I am pleased to appear before you today to speak in my capacity as Director of the National Science Foundation (NSF) about the results of the review of the U.S. Antarctic Program (USAP) by a Blue Ribbon Panel.

I would like to take this opportunity to thank Mr. Norm Augustine for agreeing to lead this immense undertaking, and the Panel for their exhaustive work and insightful analysis of the challenges we face in supporting research in Antarctica. I also want to thank Dr. John Holdren and the Office of Science and Technology Policy for collaborating with us to form the Panel and support its efforts. I would be remiss if I did not acknowledge the stage-setting conducted by the National Research Council (NRC) Committee in its report on *Future Science Opportunities in Antarctica and the Southern Ocean*.

Let me begin by noting that NSF is proud of its Presidentially-directed role in managing and budgeting for the USAP on behalf of the U.S. Government. We must continuously address and anticipate the logistics—often extremely complex and always in a remote and harsh environment—that are needed to implement frontier science and engineering research. Providing supplies, maintaining infrastructure, and transporting people to our widely dispersed Antarctic facilities requires a tremendous logistical commitment by the U.S. Government and its partners.

Need for the USAP

So if it is so difficult, one may rightly wonder why we continue to have a U.S. Antarctic Program. The answer is that despite its breadth: the polar environment serves as an

extraordinary laboratory and important bellwether for virtually all areas of science. NSF supports research in astrophysics and geospace, organisms and ecosystems, earth science, glaciology, ocean and atmospheric sciences, and integrated system science. This research has three goals: to understand the region and its ecosystems; to understand its effects on (and responses to) global processes that impact our climate and sea level; and to exploit the region as a unique platform from which to study the upper atmosphere, space, and the inner earth. To maximize efficiency, the USAP also is responsible for providing logistic support to other Federal agencies (e.g., the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), and the Smithsonian Institution) carrying our research in Antarctica.

If you will allow me to describe just three discoveries demonstrating this breadth: the Ozone Hole was confirmed by long-term records produced by the USAP and other countries. The USAP responded rapidly by mounting a research effort that pinpointed the cause and led to the worldwide ban on chlorofluorocarbons, and led to a 1995 Nobel Prize in chemistry. This year, the seasonal ozone hole above the Antarctic was the second smallest in 20 years. Long-term NSF support of research in Antarctica enabled U.S. researchers to discover “fish antifreeze” and genetic modifications behind its production, which led to understanding of how the organic molecules inhibit freezing and may allow anti-freeze genes to be incorporated into crops, thus allowing them to be grown in sub-zero environments. And just a couple of months ago, the South Pole Telescope found an extraordinary galaxy cluster that has proven to be not only one of the most massive in the universe but also contains a galaxy producing stars at high rates never before observed. Such new and surprising information about star-forming processes is filling in key knowledge gaps regarding the formation of our universe.

To support this diverse research, the USAP operates three year-round stations: McMurdo Station, located on the southern tip of Ross Island; the South Pole Station, located at the geographic south pole, approximately 800 miles from McMurdo; and Palmer Station, located on Anvers Island on the Antarctic Peninsula. Research is also supported by icebreaking and ice-capable research vessels and at temporary camps. The USAP supports our sister agencies in implementing their missions, including NASA’s long duration scientific ballooning and meteorite collection programs, and NOAA’s key observations for long-term atmospheric monitoring. NSF effectively partnered with sister agencies both in the U.S. and in Europe to stand up and operate the data acquisition system in the Antarctic that is vital to U.S. and global weather prediction systems upon which we all rely. In addition to its scientific importance, the USAP implements U.S. policy and the Department of State’s interests regarding an active and influential presence in Antarctica; our commanding scientific presence ensures the U.S. a governing role in the Antarctic Treaty System.

USAP Two-Tiered Review

Since 1958, the Nation has reviewed the USAP roughly once a decade to determine whether it is effectively structured, appropriately balanced, and in line with national goals. NSF began discussing a review with the Office of Science and Technology Policy

just after the landmark Antarctic Treaty marked its 50th anniversary on December 1, 2009, and coincident with the completion of the new South Pole Station that brought new capabilities to Antarctic research and the conclusion of official International Polar Year activities that pointed to new research directions and modalities. The first phase of the review, carried out by the NRC Committee, focused on identifying priorities for research over the coming decades and a second phase, the Blue Ribbon Panel, focused on ensuring that the logistics and infrastructure were in place to support that science. Given the austere budget environment, the Blue Ribbon Panel's review was designed to identify opportunities for efficiencies and to inform and prioritize future budget requests for logistics and infrastructure.

The NRC Committee considered the current importance of Antarctica and the Southern Ocean to science and engineering research, and surveyed the horizon to identify some of the science drivers that will be of increasing importance in the future. The report asserted that enhancing science in the Antarctic region will require substantial organizational changes, broader geographical spread, increased international involvement, and a growth in the quantity and duration of measurements. The Blue Ribbon Panel, in turn, surveyed the existing logistics and infrastructure system and made recommendations that will enable the USAP to meet its current and future obligations, and to meet them in a more efficient and cost-effective manner, with due regard for safety, health, and the environment.

The Blue Ribbon Panel provided our Nation – and the entire international scientific community – an enormous benefit, laying out a detailed and realistic blueprint for securing and improving world-class research in Antarctica. But they also provided a warning that resonated with me as an engineer: the USAP is currently operating under the threat of multiple single points of failure. This fact alone is a compelling illustration of the vital role of logistics to scientific research and how fine the line is between success and failure.

NSF Response to Blue Ribbon Panel Report

Immediately after release of the report, I chartered a Tiger Team of senior NSF managers to respond to and guide development of a rolling five-year Long-Range Investment Plan and Integrated Master Schedule to implement recommendations contained in the report. Their work is now nearing completion. First, let me say that NSF agrees with the majority of the recommendations, although not all of the recommendations can be implemented by NSF alone. For example, recommendations concerning icebreaker capabilities for the United States necessarily require action on the part of the other components of the Federal Government. The balance of the recommendations can be acted on, and are being acted on in different ways. Paramount of course are the recommendations related to safety. We expect to address these immediately by providing funding for the most critical, and engaging experts to assist us with identifying future courses of action for others. Some of the recommendations require further study to determine feasibility and full cost implications. The FY 2013 Budget Request for USAP logistics and infrastructure is just under \$260 million.

The Tiger Team has reviewed the process underway in Polar Programs, directing particular attention to approaches that would benefit from or be beneficial to enhanced cross-Foundational and external engagement. We have also gone a step further and asked the Tiger Team to assist with developing approaches for issuing grand challenges in, for example, the energy and engineering arenas. Each of the Tiger Team members has a constituency in their discipline that can be engaged to bring fresh ideas from both their learned and their “learning” colleagues. We anticipate that we will not only learn from them but also that they will broaden their view of how to use their skills as they proceed through their careers. Along these same lines, we fully expect Lockheed Martin, our current Antarctic Support Contractor, to implement some of the cost-saving ideas they included in their proposal, such as improved supply chain and logistics management software, operational consolidation and personnel footprint reduction, and better resource management through integrated master scheduling. Since the contract transition earlier this year, they have been heavily focused on assuming responsibility for providing support to researchers in Antarctica—a very steep learning curve. Our Department of Defense partners also continue to bring forward ideas for operating more efficiently as they work to improve the fuel efficiency of and develop the remote science capabilities for the LC-130 Hercules fleet.

We expect to provide the National Science Board with a point-by-point response to the Blue Ribbon Panel recommendations at its next meeting in early December, and would be happy to provide a copy to the Committee.

Mr. Chairman, we appreciate this opportunity to discuss our initial response to the Blue Ribbon Panel report, and look forward to continuing to support cutting edge research in Antarctica and the Southern Ocean. I would be pleased to answer any questions.