United States Antarctic Program Blue Ribbon Panel

A 12-member Blue Ribbon Panel (BRP) – formed at the request of the Assistant to the President for Science and Technology and Director, Office of Science and Technology Policy, Executive Office of the President, and the Director, National Science Foundation – held its second meeting at the National Science Foundation, Arlington, Virginia 22230, 24-25 January 2012. The panel is assessing U.S. Antarctic Program operations, logistics, and management and is to recommend a long-term strategy regarding USAP[1] support in Antarctica and the Southern Ocean.[2]

The meeting was open to the public. [3] It was not recorded.

The BRP evaluation is the second of a two-phase review of the USAP. The first phase, coordinated by the National Research Council, identified science opportunities in Antarctica and in the Southern Ocean for the coming two decades.[4] The BRP will build on these findings and other input to accomplish its charge.

These minutes summarize presentations and discussions during plenary sessions at the 24-25 January 2012 meeting. Readers are encouraged to also use other documents on the BRP web site.[5]

Opening

The BRP chair, Norm Augustine, welcomed participants and welcomed Subra Suresh, Director, National Science Foundation. Director Suresh welcomed the distinguished group and thanked members for providing their counsel; he said that he had made his first inspection of U.S. Antarctic Program stations following the panel's first meeting, and he reiterated the offer of NSF staff support to enable completion of the work. Karl Erb, Director, Office of Polar Programs, NSF, also stated his appreciation of the panel's efforts.

Observations regarding the panel's November 2011 visit to Antarctica

The Chair noted that the trip was well organized logistically. South Pole Station is an effective facility although a little snow buildup has taken place. He perceived a lack of cost awareness among the people he talked with – the cost of a gallon of water at the South Pole, for example, working backward to fuel to melt it, fuel burned to deliver the fuel from McMurdo, icebreaker to get the tanker to McMurdo, etc. Some aspects of McMurdo Station are inefficient, ancient and a handicap to the program – big cost-drivers. Single points of potential failure include the icebreaker issue and perhaps others such as landing wheeled aircraft on the Pegasus runway. He saw low-hanging fruit for savings: a building with a hole in the half-inch plasterboard, no insulation in sight, a 6-inch stud, and metal clad. A repair could save dollars, but the building is

[1] Abbreviations are defined in the final section of this report.
[2] A 15 July 2010 Request for Independent Review, a 7 April 2011 Charter, and a 3 November 2011 Charge define the BRP mission.
[3] A *Federal Register* announcement states that the meeting is open (public) and is held in accordance with the Federal Advisory Committee Act.
[4] *Future Science Opportunities in Antarctica and the Southern Ocean*, National Academies Press, 2011, 230 p.
[5] Meeting agenda, documents, and images supplementing this report are on the BRP web site at www.nsf.gov.

old and perhaps should be replaced instead. He saw large amounts of scrap waiting to be hauled out of Antarctica and wondered if compressing it first would be effective. He referenced a Johns Hopkins study that found keeping hands clean saves money by preventing illness among employees: making bottles of spray disinfectant available everywhere had a huge impact. McMurdo could do something comparable; the physician told him last season half the residents had the flu. His general reaction is that the U.S. Antarctic Program is well run in both research and operations, but that it is hampered by some substandard infrastructure.

A Panel member concurred with this assessment and expressed appreciation for Norm Augustine's leadership. Some of the program inefficiency also results from the inherent working conditions and from the short working periods, he said. McMurdo seemed about the same as when he last visited some years back. A master plan is needed for improvements.

A Panel member noted that it may be time to do at McMurdo what we did at Pole – on the assumption that we will stay at McMurdo for the foreseeable future. Ships also are an issue, and the national commitment perspective needs to be taken regarding repair and replacement. He called attention to the recent urgent need for *Healy* icebreaker support to fuel Nome, Alaska, and the earlier NRC study regarding icebreaker requirements. He noted separately that rebalancing logistics and science support may be needed. Do we provide scientists with too much support?

A Panel member noted the bandaid approach to some of the maintenance and said that the payback opportunity from investing in improvements is huge. For transportation, McMurdo seems the best place, he said, because it offers multimodal transport options using traverses, airdrops, air delivery, ship delivery, and hub and spoke operations possibilities. Compacting equipment can improve snow roads and runways and lead to advances such as Pegasus for McMurdo and C-17 landings at Pole. He said the program needs to build up a savings culture.

A Panel member said Black Island is a potential single point failure for communications. Also, at McMurdo, a life safety issue is the use of pumps instead of gravity for the water system. Water storage on the hillside over the town should be considered. Old infrastructure needs to be discarded.

A Panel member called attention to the need for a master plan with a holistic approach. The warehousing is dramatically out of date. Vehicles are old. South Pole Station represents one of the highest costs per capita of all U.S. Government facilities; productivity gains will produce savings and serve as a model for other locations. The energy need is well managed, but there's opportunity for improvement and getting away from the carbon base. At McMurdo the wind installation could be expanded, and more solar seems in order. Why not burn the 500,000 pounds of scrap wood at McMurdo as fuel instead of shipping it to the United States? A volcano is 20 miles away: what is the potential for geothermal heat?

A Panel member, not present at the meeting, sent written comments to the panel.

The Chair summarized the well attended McMurdo town meeting held during the panel's Antarctic visit. The audience was interested and made highly responsible and informed inputs with no fear of retribution. They called a spade a shovel where appropriate. These comments are available to the panel. The Chair drafted an article for the *Antarctic Sun*.

A Panel member considered that water efficiency might be improved.

A Panel member said he inspected both the water production and the wastewater treatment operations at McMurdo; both were adequately sized and well run. He observed opportunities to reduce usage some, but not significantly. The kitchen has no grease trap, which means grease stays in the sewage system until it reaches the treatment plant – an inefficiency.

A Panel member said the grease causes foaming in the waste treatment plant, which requires people to spend time removing it.

OPP noted that a Panel member had observed that food waste is retrograded without removing the water first.

A Panel member said that bandwidth limits are an issue not just for getting data to home institutions but for enabling investigators to interact with their instruments from afar. Higher bandwidth would help greatly and would enable remote sensors such as automated geophysical observatories to be operated more flexibly, like scientific spacecraft.

A Panel member noted that Iridium, though low bandwidth, is what we have. He commented that alternative energy in summer is easy enough, but winter may reduce the options.

A Panel member said the AGOs use wind year-round, and wind data are in hand for a good part of Antarctica.

A Panel member noted the need to reduce the footprint while not underestimating quality of life issues. With flat or reduced National budgets foreseeable, Congress could be presented a plan focusing on education and research, which Americans favor. We may need to slow the science for a time in order to afford long term gains.

The Chair said a larger investment could save money later – for more science or lower program cost, a decision the panel has to choose.

A Panel member said international aspects need attention. NSF noted that South Pole Station was to remain a U.S. facility, but perhaps McMurdo could be run differently, and New Zealand and Italy already are partnered.

OPP said that Korean Antarctic program officials will visit NSF in March to discuss possible means of collaboration.

The Chair noted the panelists who visited Antarctica in November also met with airport and seaport officials in Christchurch and Lyttelton, New Zealand. Both facilities are scheduled for major improvements, partly in response to the 2010 earthquakes.

OPP said the airport is increasingly important to the local community there, and a runway lengthening project could keep C-17s away for a time. We will need to communicate our future needs to airport officials.

OPP said that an earlier noise restriction will not affect USAP air operations.

A Panel member noted that New Zealand wants USAP to stay, but they have their own substantial issues to deal with also. For the United States, USAP is the major part of the National presence on the South Island.

A Panel member said we need a resolution on U.S. military ship access to Lyttelton, and the discussion should involve DoD and State.

OPP said the new IMO regulation against heavy fuel in the Southern Ocean also limits our choice of ships. A panel member speculated that within a decade or two ships will use light fuel globally.

Forthcoming site visits

The panel and NSF staff discussed details of a 22 February to 1 March 2012 visit to Palmer Station via King George Island to be conducted by panelists Norm Augustine, Craig Dorman, Don Hartill, and Diane Wall. [It was later determined that panelist Hugh Ducklow will also join the group.] Norm Augustine and perhaps other panelists will visit Port Hueneme 26 March. A visit to the 109th Air Wing in New York State needs to be scheduled. A UNOLS ship, *Atlantis*, will be available for inspection at WHOI 8-18 February. Edison Choest Offshore and the support contractor headquarters in Colorado were briefly mentioned as other potential candidate site visits.

Resupply issues

OPP provided a slide presentation on U.S. Antarctic Program resupply issues. This began with comments that advances over the decades sometimes have been more revolution than evolution. For example, in the 1970s a storm destroyed a newly completed steel pier in Winter Quarters Bay. To replace it the Navy built an ice wharf, still the practice today.

In discussion, a Panel member underscored advantages of the McMurdo site as a high latitude transportation hub. Sometimes overlooked in this locational dividend is the level route for traversing across the Ross Ice Shelf to within 350 miles of the South Pole.

A Panel member said the Army's Modular Causeway System being used at McMurdo to offload cargo this season is a floating wharf capability that DoD has worldwide. OPP called attention to the very strong support from DoD that made this happen.

A Panel member said that America's understated contribution to every national Antarctic program is this ability to meet emergencies. He also asked NSF to clarify the meaning of recycling. Taking waste to the United States is one thing, and it costs something. Recycling or reusing it at McMurdo instead (if possible) might represent a bigger savings.

OPP noted that the slide graphing the McMurdo airlift in 1990, 2000, and 2010 shows how the Pegasus runway has become a single point failure node. A Panel member pointed out, though, that Pegasus changed the game by freeing up ski airplanes for science. OPP added that introducing C-17 wheeled landings at Pegasus freed the LC-130s to supply the rebuild of South Pole Station.

A Panel member asked about non-U.S. runways in Antarctica. OPP replied that the only full service USAF-certified runway is Pegasus. A commercial airlift between Cape Town and Novolazarevskaya services several national Antarctic programs. Russia operates a short runway on the coast of East Antarctica.

The Chair requested cost data for the South Pole traverse, and OPP said that all cost data are available.

A Panel member asked if a second cargo ship to McMurdo would be useful. Another Panel member spoke of possible need for a second shuttle between Lyttelton and McMurdo during a large-scale station refurbishment. Another Panel member commented that fuel delivery represents a large fraction of delivered materials by weight.

OPP said DoD sets the C-17 cost rate, and if C-17 usage worldwide goes down the cost to USAP could go up. USAP can manage the supply chain to control the amount of cargo that moves by air. OPP commented that timing over the season is an issue. You can't fly in a shipload's worth over a short time: the ground infrastructure isn't up to it.

A Panel member circulated a report, Autonomous Polar Observing Systems, which resulted from a 2010 workshop that OPP supported.

NASA interests in Antarctica

Waleed Abdalabi, NASA, gave a slide presentation about NASA's involvement in Antarctic research and operations, noting that the agency does things in, around, and about – but mostly over – Antarctica. He said the NSF infrastructure investment has huge benefit for NASA missions, and the need is projected to grow.

A Panel member asked about the structure of the NASA/NSF collaboration. The response was that the program manager to program manager interaction is robust, and a more formal semi-annual forum has been considered but not implemented. A Panel member called attention to a current example: an NSF/NASA collaboration for a study of the radiation belt beginning in September 2012 that will involve a satellite launch and Antarctic balloon flights.

A Panel member suggested the panel develop a recommendation regarding the structure of interagency collaborations regarding Antarctic research and operations.

In response to a question about funding, OPP pointed to a research balloon program preceded by a workshop and then formalized with a NSF-NASA memorandum of understanding. NASA funded building of the facility and instruments, and NSF covered Antarctic housing and logistics. No money changed hands between the two agencies.

Waleed Abdalabi described numerous examples of NASA's requirement for data that can be acquired only on the ground in Antarctica, the current work at Pine Island Glacier being one. In response to a question from OPP, he said the ground stations in Antarctica are entirely sufficient for the coming decade – partly because Svalbard has a backup station (despite recent severing of the Svalbard-Norway cable). Loss of one ground station is tolerable; loss of two would be bad.

NOAA interests in Antarctica

Tim Butler, NOAA, gave a slide presentation on NOAA's several interests in Antarctica and the Southern Ocean arising from Congressional tasking. South Pole (since 1957) is one of four NOAA atmospheric baseline observatories worldwide, and Summit, Greenland, is in process of being added. Antarctic Marine Living Resources research has been going on for the last 26 years. NOAA depends strongly on the NSF Antarctic infrastructure for its missions.

Issues include protecting the South Pole Clean Air Sector from intrusions, which would affect measurements.

DHS interests in Antarctica

Morgan Geiger and Ron Salazar, Department of Homeland Security, provided paper copies of slides titled "Strategic Overview: the Antarctic" and read presentations from prepared texts. The texts will be available pending DHS clearance.

DoD interests in Antarctica

Gordon Tanner, DoD, read a presentation that is to be available to the panel.

Panel's report

The Chair stated that in its report the Panel needs to provide evidence wherever possible and not just assertions. Best of all is proof, or at least evidence. Cost estimates will be needed for some topics, and NSF and others will need some time to prepare these, so Panel members were urged to enumerate their needs during the meeting.

For findings and recommendations, some will be obvious: the grease traps would be an example. Just recommend them. A second example would be a topic that requires cost data to support it, or further action and analysis; we still need to give all the data we have. Charts, graphs, and photographs will be needed. Please collect them or turn them in to us. We'll provide a style sheet. This report is not just a philosophical treatise.

The morning session concluded after a video presentation of Sam Feola, RPSC, and Celia Lang, Lockheed Martin, discussing the support contract transition.

Abbreviations

AGAP	Antarctica's Gamburtsev Province
AIS	Automatic Identification System
BAS	British Antarctic Survey
BRP	[United States Antarctic Program] Blue Ribbon Panel
DOD	Department of Defense
DOD/DOA	Department of Defense/Department of the Army [?]
GPS	Global Positioning System

HF	High frequency (radio)
ICSU	International Council for Science
ICT	Information and Communications Technology
IPY	International Polar Year
IT	Information Technology
LRAD	Long Range Acoustic Device
MAPCON	Mapcon Technologies, Inc.
MREFC	Major Research Equipment and Facilities Construction (NSF program)
N.Z.	New Zealand
NASA	National Aeronautics and Space Administration
NEON	National Ecological Observing Network
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
NSF	National Science Foundation
OPP	Office of Polar Programs (NSF)
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
PGR	Postglacial Rebound
PHI	Petroleum Helicopters International, Inc.
PRV	Polar Research Vessel
PSR	Point of Safe Return
RFI	Request for Information
RPSC	Raytheon Polar Services Company
RV	Research Vessel
SCAR	Scientific Committee on Antarctic Research
SOOS	Southern Ocean Observing System
STEM	Science, Technology, Engineering, and Mathematics
TDRSS	Tracking and Data Relay Satellite System
U.K.	United Kingdom
UNOLS	University-National Oceanographic Laboratory System
USAF	United States Air Force
USAP	United States Antarctic Program
USCG	United States Coast Guard
USCGC	United States Coast Guard Cutter