Recommendations of the

South Pole User's Committee

2002

This memorandum summarizes the recommendations of the South Pole User's Committee (SPUC) for 2002. The topics on which these recommendations are based were discussed at the ninth annual meeting on 15 July 2002; the minutes for that meeting are available as a separate document from Raytheon Polar Services (RPSC). The present memorandum was begun in executive session at that meeting and refined by committee members through email correspondence; it will be distributed in both email and paper form.

(1) Internet Security at South Pole--- *Internet reorganization should accommodate the needs of all science users.* The RPSC plan for reorganization of internet communications is for the most part a benefit to South Pole science, and the committee encourages its speedy implementation. As mentioned in previous committee reports, it is important that this plan: (1) provide some support for "telnet" and "ftp" service to legacy machines; (2) support Appletalk; (3) involve consultation with science groups to determine policies for packet filtering and port blocking on their own machines; (4) support DHCP connections; (5) support permanent IP address assignments for science machines that need them; (6) include secure public-key and certificate server machines; (7) include "scratch" public disk storage space for temporary storage of large files.

(2) Rationing of communication resources--- *Communications should be prioritized by source, not by content.* Communications bandwidth to and from the Pole is finite and often outstripped by demand. Some communications to and from the Pole require higher priority than others: real-time medical data should have priority over recreational use of the internet. Rationing and prioritization of communications channels should be built-in to the network, as RPSC is preparing to do. The committee was alarmed, however, at the suggestion that this rationing be content-based, i.e. that someone at RPSC monitor the content of communications and adjust network use accordingly, or that recreational use of the internet be restricted to certain hours. The committee feels strongly that this rationing should be prioritized on the basis of the source of the communications, that RPSC should allow the communications from some sources priority over other sources. This would mean, for example, that communications from the medical facility would always have higher priority than communications from the general-use computers. Internet use of all kinds is essential to members of the South Pole community. Many South Pole researchers are neither RPSC employees nor Government employees, they are private citizens. When at South Pole station they are totally dependent on the network for all communications with the outside world. It is an invasion of privacy for RPSC to monitor the content of these communications, and RPSC should not waste resources doing so.

(3) Full-time, low-bandwidth Internet--- *The committee recommends immediate installation of low-bandwidth internet over Iridium.* For several years now, it has been technically possible to provide full-time email capability to the South Pole using the "Iridium" satellite network, and the committee has repeatedly urged that this should be done. Many science projects would benefit from a low-bandwidth, continuous internet capability. We point out that such a system has been working well at an unmanned base at the North Pole for over a year. Again we urge that this be done immediately.

At the same time, far more expensive plans have been proposed to connect the South Pole to other sites by optical fiber in order to provide continuous high-speed internet access. In our opinion, continuous high-speed internet is somewhat more beneficial than continuous low-speed internet, but the very high costs of this

marginal improvement should be considered carefully before a commitment of funds is made.

(4) Wireless Communication Devices at Pole--- *Use of wireless devices must be kept to a minimum.* The South Pole is one of the world's preeminent radio observatories for astronomy and ionospheric research. All radio transmissions are a potential threat to science which is not easy to assess or ameliorate. Unlike interference in radio communications systems, the only power level for radio transmissions which is definitely "safe" at a radio observatory is zero power, no transmission at all. This is because radio telescopes can, in principle, detect arbitrarily low signal levels by averaging many observations over time, and sequestration of transmissions by frequency is never perfect. The usual engineering paradigm of assuring electromagnetic compatibility between communication channels does not apply. Radio transmissions should be forbidden at the Pole unless a strong case can be made that they are necessary.

This should be kept in mind as wireless devices proliferate and are inevitably brought to the Pole. Many new computers now have built-in wireless devices which are "on" by default. Wireless internet, Bluetooth devices such as wireless keyboards and mice, pagers, and cell-phone devices have become ubiquitous; they are inexpensive and convenient. Any use of these items at the Pole should be carefully considered in the context of the insidious harm they may do to South Pole science, through the ever-increasing background of man-made radio noise.

The committee suggests that use of wireless devices be restricted to summer-only scientific use. During the winter, radio silence should be enforced, consistent with health and safety, and all wireless devices should be shut down. The need for radio quiet should be mentioned to each new arrival at Pole at the in-brief.

(5) Wet chemistry in the new South Pole Station--- *Laboratory space suitable for wet chemistry will be needed in the new station.* The committee suggests that a section of the planned laboratory space be made into a separate room with sink, laboratory water purification system, fume hood, and facilities for disposal of chemical waste. This room should be light-tight so it can also serve as a darkroom and should be equipped with basic laboratory equipment (e.g., glassware, electronic balance) and full LAN connections.

(6) Liquid Helium transport to experiments--- *Transportation of liquid He in winter is a problem.* Winter delivery of Liquid Helium from the new cryogenics facility to its point of use in the Dark Sector continues to be a problem which needs an effective solution. Possible solutions include a new transport vehicle which is operable at almost all times, or a warm "garage" space in the dark sector.

(7) South Pole Science Support--- *Science support this year was excellent overall.* The scientists at South Pole station gratefully acknowledge the contributions of RPSC staff to all aspects of the science projects. This high level of support has been beneficial to scientific work at South Pole Station. Science cargo has done an excellent job in both speed and reliability. Cryogenic support has been fully successful. Science construction support has been responsive and effective. The summer population limits continue to be tight during SPSM and this has resulted in the cancellation or postponement of some science activities.

Respectfully submitted for the committee,

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