

Recommendations of the South Pole User's Committee

2004

This memorandum summarizes the recommendations of the South Pole User's Committee (SPUC) for 2004. The topics on which these recommendations are based were discussed at the eleventh annual meeting in 2004; 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) Full-time, low-bandwidth Internet--- *The committee recommends that low-bandwidth internet over Iridium be done by SCOARA.* Full-time, low bandwidth email to and from the South Pole has been a top recommendation of the SPUC for the past four years. We were disappointed to learn that efforts by RPSC to construct such a system have been abandoned. The committee recommends that this project be taken over by the newly-created Science Coordination Office for Astrophysical Research in Antarctica (SCOARA), and that SCOARA be allotted sufficient funds to complete the work. These funds should be allocated from the logistics side of the OPP budget, not from science.

(2) Radio Frequency Interference Between Transmitters and Receivers--- *The committee recommends that transmissions be scheduled and logged.* The South Pole is one of the world's preeminent observatories for astronomy and ionospheric research. In particular, the South Pole has established world leadership in the measurement of the microwave background radiation, because the most sensitive radio receivers can be used to full advantage. All radio transmissions are a potential threat to these activities, and may have unanticipated consequences for other science operations. The committee recommends that transmitters be installed as far as possible from the Dark Sector. We note that every radar installed at the Pole to date has resulted in interference with scientific observations. At the same time, we recognize that radio frequency interference can be ameliorated in most cases. This requires additional effort and expenditure for the experiment receiving the interfering signal, however. The situation is not symmetric between those transmitting and those receiving interference. For example, modifying AMANDA to reduce radio interference from the VLF transmitter has cost about \$100,000 plus several person-months of software effort. AMANDA sensitivity is reduced during VLF transmissions.

Some radio astronomy experiments observe a single point on the sky for a year or more. For these experiments, interference by transmitters may not become apparent for many months. In order to definitively demonstrate that radio frequency interference is not affecting the data, it is essential that these experimenters be able to separate data taken when a transmitter is on from data taken when the transmitter is definitely off, and that the quantity of data taken in the transmitter off state be at least as great as that taken with the transmitter on. It is therefore essential that each transmitter be off at least half of the time. To be useful, the "off" periods need to be many minutes long, and the exact times of the on and off periods should be made available in a public log. These restrictions on transmission should be permanent.

(3) Science network Security Needs--- *Science computers at South Pole have different security needs from other parts of the network.* The science computers at South Pole contain no sensitive or proprietary information; science computers need only be protected from unauthorized use and denial-of-services attacks, a situation which is different from RPSC computers. Science computers also may run customized software, developed over many years, or use specialized operating systems (e.g., real time operating systems). Because

of this, security updates or configuration changes often require special system administrator skills. The committee suggests that the science computers be isolated on their own separately-managed and firewalled subnet, so that RPSC can implement security requirements as needed on RPSC computers, without interfering with science computers. The committee notes that a demonstration of this idea (a firewall protecting the network inside the AST/RO building) has been running successfully for over a year.

(4) 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 chemical waste disposal (not a drain). 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.

Respectfully submitted for the committee,

Dr. Antony A. Stark
SAO Mail Stop 12
60 Garden St.
Cambridge, MA 02138
tel: 617-496-7648
FAX: 617-384-7830
aas@cfa.harvard.edu