Recommendations of the

South Pole User's Committee

2003

This memorandum summarizes the recommendations of the South Pole User's Committee (SPUC) for 2003. The topics on which these recommendations are based were discussed at the tenth annual meeting on 11 June 2003; 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--- *The committee recommends use of a Virtual Private Network.* Reliable, continuous access by grantee scientists to South Pole computers is essential to successful science at the Pole. While satisfying this need, the network security requirements for South Pole Station can be met by any of several commercially-available Virtual Private Network (VPN) systems. This will provide computer communication which is both encrypted and authenticated from the individual scientist's home computer through to the inside of the firewall protecting the South Pole network. Special client software running on the scientist's home machine will be required. In order to support the full range of computers used by South Pole scientists, the client software must be available for Microsoft Windows, Macintosh OS X, Sun Solaris, and Linux. One attractive possibility is Java-based client software that is automatically and securely delivered by a web browser such as Microsoft Internet Explorer or Netscape. Further discussion of this recommendation can be found in a [memo by the SPUC Information Technology Working Group.](#)

(2) 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. 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.

(3) Network modifications in summer only--- *Changes to the computer network should not be made during the winterover period.* Modifications to the arrangement or naming of network components often result in unforseen difficulties and loss of essential computer services. When these changes are made in the winter, network services have been lost for extended periods. Dealing with these problems has been a burden for winterover scientific staff, and data has been lost from scientific experiments. Changes to the computer network should be scheduled for the summer season only.

(4) 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 again urge that this be done immediately. We point out that such a system has been working well at an unmanned base at the North Pole for two years, even though the North Pole has satellite communications problems which are identical to the South Pole.

We strongly encourage the expansion of Iridium groundstation infrastructure at the Pole in order to increase communications bandwidth through the Iridium system. We consider this to be the most cost-effective

solution to broadband, continuous Internet service at the Pole.

(5) 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.

It is especially important that the 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.

(6) Network services--- *Provide Network Time Protocol, "scratch" disks, and anonymous FTP.* There are three network services that we encourage RPSC to provide for grantees at the Pole. The most important is Network Time Protocol (NTP), a UDP port service providing time signals to network computers. This need can be met by purchasing and installing an inexpensive commercial NTP server that works using Global Positioning System signals.

Temporary data storage should be made available to grantees in the form of a large (Terabyte) file system. In order to prevent this file system from filling up and becoming useless, it would be managed by RPSC personnel. It would be understood that data stored there is subject to erasure after a short period of time, at the descretion of the network manager.

One way of enhancing the usefulness of the South Pole computer network without compromising security is by installing an anonymous FTP server. This would be a secure computer owned and managed by RPSC, having two externally-available file systems. One, the "incoming" file system, can be written to but not read by anyone on the Internet. The second, the "outgoing" file system, can be read by anyone on the Internet, but not written to. Both the "incoming" and "outgoing" file systems would be available for reading and writing only by computers which are safely behind the South Pole firewall.

(7) Supply of Cryogenic Liquids--- *The liquid Helium supply in winter continues to be a problem.* The failure of the liquid Helium supply at the South Pole in September of this year caused a significant loss of data for some experiments. It is disappointing that the new liquid Helium transport and storage container did not perform to specifications. The reason for this failure should be determined before any additional cryogenic equipment is purchased. It is hoped that the liquid Helium needs for the winter 2004 season can be met using the equipment successfully used in 2002.

(8) 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. Science construction support has been especially

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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