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TECHNOLOGY FOR A REMOTE AUTOMATED ANTARCTIC OBSERVATORY

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Encouraged by recent data from Dome C station demonstrating the unique potential of the high Antarctic plateau for astronomy, a number of international groups intend to deploy telescopes and site testing instrumentation to various unmanned locations on the Antarctic plateau within the next few years. These instruments will require a reliable completely autonomous observatory to provide power, heat, control, and communications throughout the Antarctic winter. The AASTINO (Automated Astrophysical Site Testing INternational Observatory), which was designed with these goals, was deployed to Dome C in January 2003. It has successfully demonstrated many of the concepts essential for such operation. The second generation AASTINO, currently in development, has an extremely flexible power generation system that can consist of solar, battery, diesel, and stirling cycle systems. Power and Control Area Network (CAN) data is available to all scientific instruments via a universal connector system, simplifying the integration of instruments developed by diverse research teams and ensuring a more straightforward deployment process. System monitoring, commands, and low bandwidth experimental data transfer, is performed via a redundant Iridium satellite network up-link. Bulk data storage is achieved via a redundant array of mechanical hard disk drives in an atmospherically modified enclosure, preventing damage by low pressure and temperature. A dual redundant supervisor system controls all aspects of communication and control, and can handle individual system failures as well as many catastrophic computer failures. In the event of total communication loss, the supervisor system is designed to control all experiments autonomously including the rationing of electrical power.