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The Future of the United States Antarctic Program's Automatic Weather Station Project

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The last three decades have seen Antarctic surface meteorological observations augmented by an increasing number of automated weather stations (AWS). Since 1980, the University of Wisconsin-Madison has managed an expanding array of AWS in Antarctica that are funded through the United States' National Science Foundation. The AWS network began with six stations and has grown to approximately 60 stations. The majority of the AWS use a custom electronics package designed in the 1970s and modified over approximately 20 years. However, dramatic changes in the electronics industry have led the UW-Madison to transition its AWS to commercial-off-the-shelf (COTS) components capable of integrating on-station storage, varied sensors, multiple data telemetry options, and a flexible operating system. Among the important technical issues arising from adopting a COTS-based AWS system are limited temperature certification for Antarctic conditions; non-standard integration of the varied telecommunications equipment; potentially inflexible data acquisition schemes; and frequent product upgrades, changes, and obsolescence. The UW-Madison presents the current status of its AWS system; its recent experience with new data loggers, sensors, and communication options; and its attempts to obtain a standardized AWS. The intent is to encourage the development of a forum where groups can document their experiences with varied AWS systems in the extreme polar climate. Recent events have added another challenge within the United States Antarctic Program, as it has become clear that budgetary and logistic limitations will drastically impact the AWS program. With logistical costs playing a bigger factor in funding AWS operations, international coordination and cooperation will be important in deploying and maintaining the AWS networks (such as GCOS) that are critical to monitoring the world's climate.