

Automatic weather reports from Antarctica

The Russian Arctic and Antarctic Research Institute uses a Vaisala system for the first automatic weather station – ever – in Antarctica.

International Polar Year gets automated weather

To mark the International Polar Year (2007-2008), the Russian Arctic and Antarctic Research Institute (AARI) installed an automatic weather station in the western sector of Antarctica. On the 25th of February 2007, the first automatic meteorological station in Antarctica began operating near the closed Russian weather station of Molodezhnaya. The following day, the first weather data and geophysical transmission were received by satellite telemetry in the Russian Antarctic Expedition main office in St.Petersburg.

Forming part of the Russian Federal Service for Hydrometeorology and Environmental Monitoring, the AARI was organized in 1920 and is now the oldest and largest Russian research institution in the field of comprehensive studies of the Polar Regions. The objective of the project was to relay detailed, accurate weather and other data from Antarctica to Russia without the need of a manned station.



Challenge

- Obtaining ongoing, accurate and detailed weather and geophysical information without the expense and logistical issues of having a person stay on-site
- Maintenance and power supply to the weather station in extreme cold and extended periods of darkness
- Installation in remote locations where major equipment such as vehicles is not available

Solution

- Vaisala MAWS110 for automatic atmospheric and geophysical measurement, including solar/battery power supplies. The weather station weighs less than 170 kilograms (375 pounds) and can be set up by a 2-person team. It requires no maintenance over the course of five years

Benefits

- Automatic weather station transmits meteorological and geophysical data without direct human contact, minimizing cost and logistical considerations
- Accurate, detailed data is transmitted directly to the Russian Antarctic Expedition main office in St.Petersburg
- Transportation and installation was simple and no maintenance is required during the station's operating life



Russian system uses Finnish technology

For the first time ever, experts were gathering meteorological data from Antarctica without any direct human intervention. And it was done with a completely independent Vaisala Automatic Weather Station, MAWS110, created together with the local integrator, NPO Morsky Center.

Two of the key issues surrounding an automatic weather station in Antarctica were the cold temperatures and the dark Antarctic winter. That is why the solar panels and special nickel-cadmium batteries were carefully chosen to ensure top performance throughout the station's 5-year service time. To date, the MAWS110 has recorded normal operating power levels even at temperatures below -45 degrees Celsius.



Extreme functionality for an extreme climate

Designed by Russian and Finnish specialists, the Antarctic project culminated in a weather station that can operate in extreme cold and during long periods of darkness. At the same time, the Vaisala MAWS110 boasts tremendous functionality, measuring not only the full range of meteorological parameters, but also geophysical. Measurements include: wind speed and direction, atmospheric pressure, air temperature and humidity, ground surface temperature and various data gathered through geophysical sensors.

Easy installation, no maintenance

The MAWS110 weather station is anchored to the rock of Antarctica. But other than the need for some basic power tools, installation did not present enormous challenges: the complete station weighed under 170 kilograms (375 pounds) and the longest part of the package before assembly was 2.5 metres (8 feet).

The station was designed to be not only easily transportable, but also maintenance-free for the duration of its 5-year lifecycle. To date, no maintenance has been required: solar panels have generated enough electricity for consistent operation. Data gathered is stored in an internal, onboard memory and is transmitted by Iridium Short Burst Data satellite communication system.

More stations

The automatic weather station that AARI installed during the International Polar Year was such a success that the institute decided to install other MAWS110s – one of them equipped with a Vaisala acoustic wind sensor – near other Russian western Antarctic bases. In January through to February 2008, two more automatic stations were installed at Russia's Leningradskaya and Russkaya Antarctic bases. These, together with the first station at Molodezhnaya, are now regularly transmitting weather data to St. Petersburg.

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