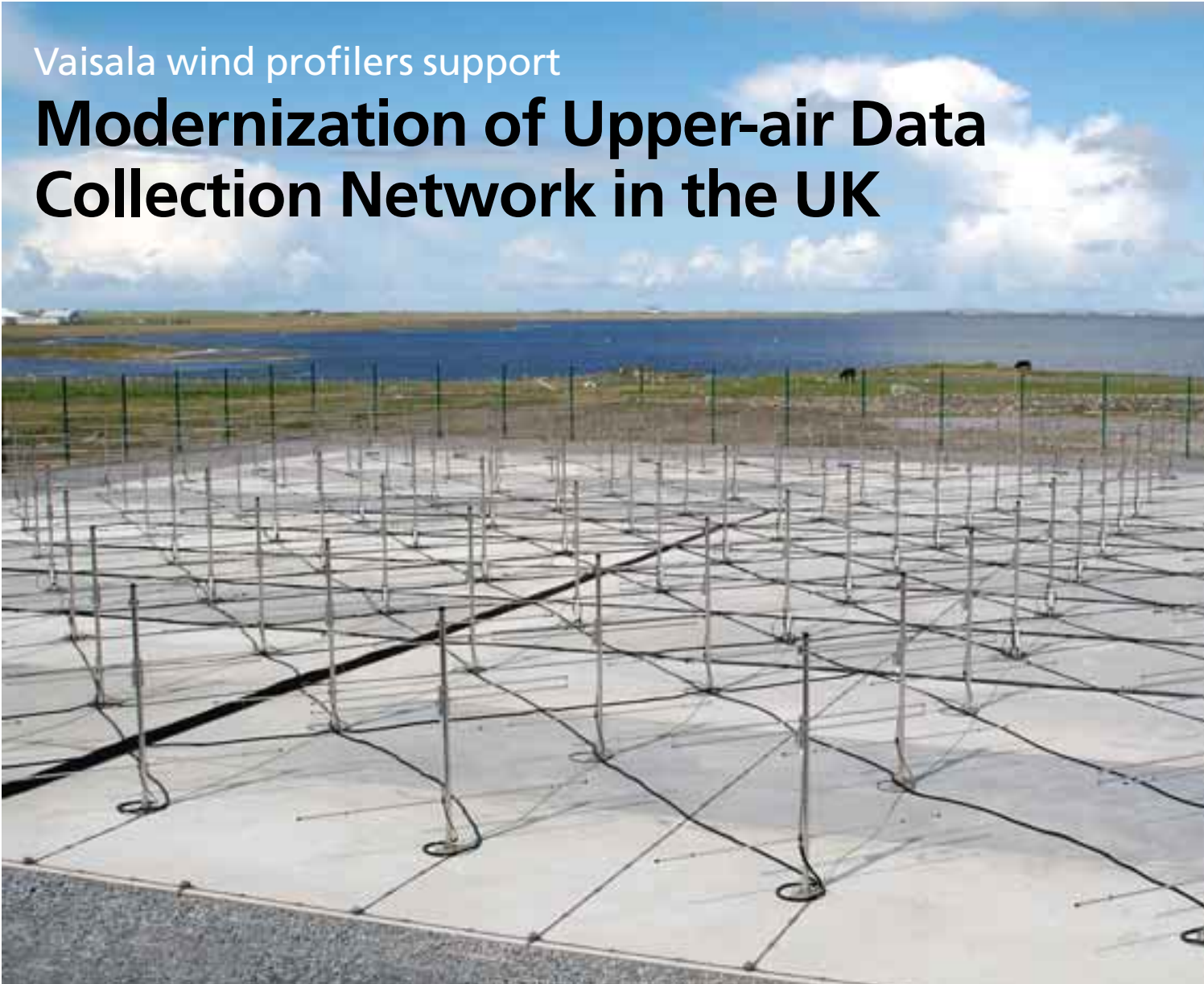


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Vaisala wind profilers support

# Modernization of Upper-air Data Collection Network in the UK



The UK Met Office has started using Vaisala wind profilers as part of a modernization effort in its upper-air data collection observation network, in which radar wind profilers are playing a significant role. A Vaisala Tropospheric Wind Profiler LAP®-12000 was installed in the Outer Hebrides, Scotland in fall 2003. The system, located on South Uist, is required to operate reliably and unattended in harsh weather conditions.

**T**he UK Met Office is modernizing its operational upper-air data collection network. This modernization effort emphasizes integrated data sets through the deployment of new instrumentation that increases automation, reduces recurring labor costs and improves temporal and spatial data resolution.

Wind profilers have played a



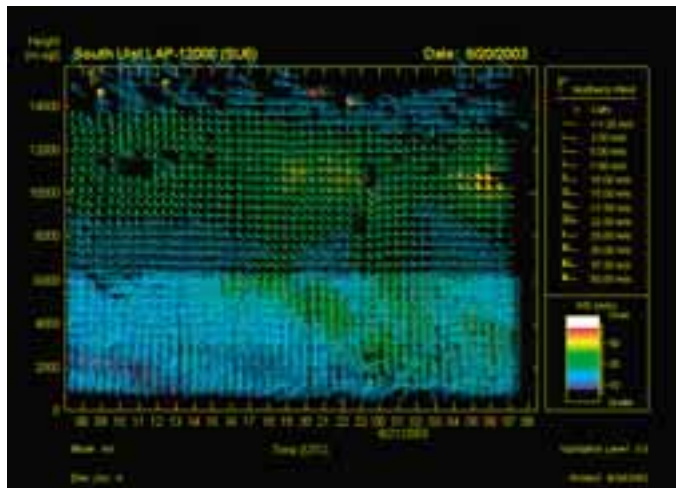
significant role in this modernization effort. The Met Office operates three operational boundary layer Vaisala LAP®-3000 Lower Atmosphere Profilers in Camborne, Dunkeswell and Wattisham in England. Operating at either 915 MHz or 1290 MHz, these profilers have reliably provided lower tropospheric wind data for several years. A fourth LAP®-3000 “re-

search” system has also provided data from several locations within Scotland and Wales in support of the expanding wind profiler program.

More recently, the Met Office decided to decommission its upper-air rawinsonde station in Stornoway, Scotland and to replace it with a wind profiler. The new wind profiler system, to be installed on South Uist Island in the Outer Hebrides, Scotland, was required to provide consistent wind data to a 12-km altitude. The system must also meet the operational needs of the UK Met Office by supporting continuous and remote operation, functioning reliably and unattended in an extremely hostile environment. The profiler will have six months between scheduled site visits, and achieve a ten-year operational life cycle. Vaisala was awarded a contract to manufacture and deliver its LAP®-12000 wind profiling radar to Met Office.

The Vaisala Tropospheric Wind Profiler LAP®-12000 combines electronics and signal processing licensed and manufactured by Vaisala under a Cooperative Research and Development Agreement (CRADA) with the National Oceanic and Atmospheric Administration (NOAA). The antenna and final amplifier are provided by ATRAD Pty. The system operates at a frequency of 64 MHz and has a final amplifier providing a peak output power of over 60 kW. The antenna array (see photo), constructed from 144 three-element Yagi-Uda stainless steel antennas, is electrically steerable in 5 directions and occupies an area of approximately 1025 m<sup>2</sup>.

The data system incorporates a Vaisala’s Digital IF receiver, which was officially launched at the World Meteorological Organization’s METEOREX 2002 exhibition in Bratislava, Slovak



*Sample of wind profiler data display at South Uist.*

Republic. The digital IF receiver has subsequently been integrated across the Vaisala LAP® wind profiler product line.

The system was delivered to the Met Office in August 2003. A one-month test was performed by the Met Office to evaluate the system’s operational reliability, data recovery and wind measurement accuracy. After confirming that the delivered system met the tender specification, the system was accepted on September 15, 2003. The LAP®-12000 which will become operational in early 2004 is the main upper-air sounding system for the Western Isles of the UK. Observations from this site are also used by European Met Services through the EUMETNET WINPROF Program.

Vaisala will continue to support the Met Office by providing technical expertise on the use and implementation of the advanced signal processing features available in the Digital IF architecture. These include Wavelets, Multiple Peak Picking and an experimental Droplet Size Distribution algorithm. The wind profiler at South Uist is part of the COST Wind Initia-

tive for a Network Demonstration in Europe, CWINDE, which comprises numerous wind profiler sites across Europe.

Our readers are welcome to review the South Uist data from the official CWINDE Web site at <http://www.met-office.gov.uk/research/interproj/cwinde/profiler/index.html>. Simply click on the South Uist location on the map and then scroll down to the 64 MHz data set. Twelve-hour data plots are provided for both high mode and low mode wind data. ●