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Vaisala LAP[®]-16000 Tropospheric Radar Profiler to Deutscher Wetterdienst Expanding Upper-air Observing Network

A Vaisala Tropospheric Radar Profiler LAP[®]-16000 was handed over to the German Weather Service, Deutscher Wetterdienst (DWD), on September 26, 2003. This profiler installation at Ziegendorf in Mecklenburg-Vorpommern is the first of three under the Vaisala contract from DWD to expand their upper-air observing network.



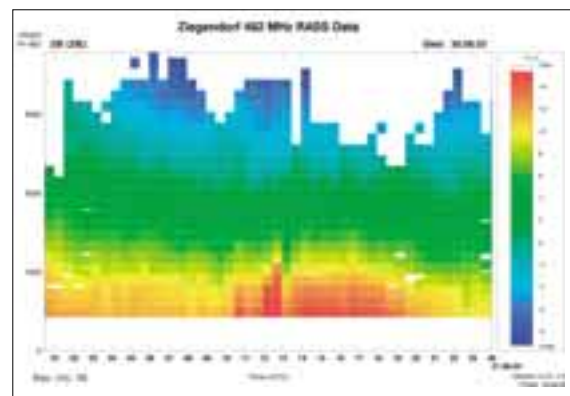
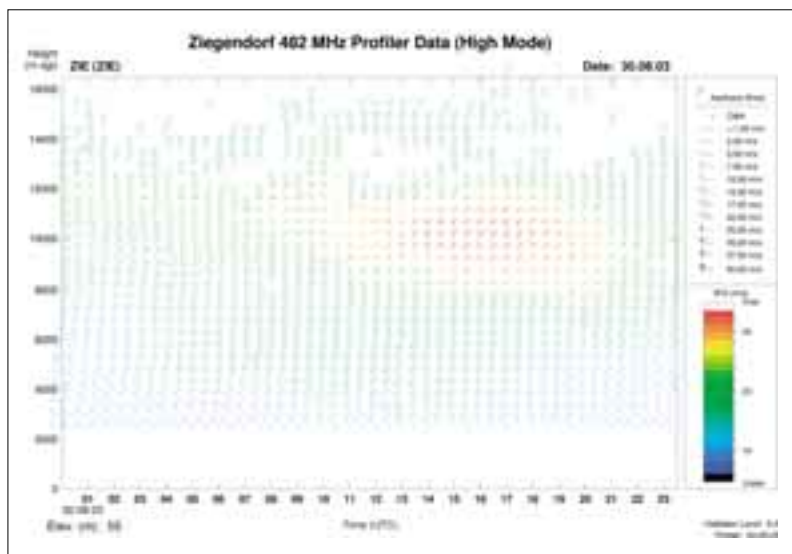
Vaisala Tropospheric Radar Profiler LAP[®]-16000 at Ziegendorf.

Operating on the 482 MHz frequency, the newly commissioned wind profiler at Ziegendorf measures wind speed and direction up to 16 km above ground level (agl). With the Radio Acoustic Sounding System (RASS), virtual temperature profiles are obtained up to 4 km agl.

A first prototype of the 482 MHz wind profiler was delivered to DWD in 1996 for evaluation at their research center in Lindenberg, Germany. Based on experience gained with the prototype, the system has been further developed. The new profilers will support DWD operations by providing continuous wind and temperature profiles to improve weather forecasting.

The LAP[®]-16000 Wind Profilers that are now being delivered have been improved in

many respects compared to the prototype. The antenna array now consists of 180 coaxial colinear antennas with 14 dipoles each, controlled by an electronically actuated phase shifter to provide the five different beams with an optimum antenna pattern. Antenna array power tapering and a surrounding earth wall have also been added to reduce unwanted signals from low-angle antenna side-lobes. The radar transmitter is now based upon advanced LD-MOS transistors and utilizes eight off-the-shelf TV transmitter amplifiers from FTK Rohde & Schwarz GmbH in Berlin. This amplifier has been specially modified for the pulse transmission mode for wind profiler operation. The nominal output peak power of the modular transmitter system is 16 kW. The effective isotropi-



The Graph-XM[®] software provides data visualization schemes such as time-height cross sections of wind barbs. Examples of data displays from the profiler at Ziegenderf.



Transmit and receive control unit at the equipment shelter.



The Radio Acoustic Sounding System (RASS) provides virtual temperature profiles, pictured is one of the four RASS units.

cally radiated power (EIRP) is 48 MW due to the antenna gain.

The transmit control electronics include a pulse shaping unit that constrains the occupied bandwidth within a narrow range. The receiver unit includes digital IF electronics, resulting in increased dynamic range and improved signal processing. Data processing with the Vaisala LAP-XM[®] software, which pro-

vides system control and signal processing functions, has been enhanced to include special features to meet DWD-specific requirements. The data display and communication capabilities were also delivered according to DWD specifications. The entire system includes built-in recording of internal operating parameters so that the functional status of system components can

be remotely monitored over a network connection using an internet browser.

With a truly global team and sub-suppliers coming from Germany, Finland and the U.S., the first system delivery at Ziegenderf has been finalized within the originally planned timeframe. The extended testing and verification process was accomplished jointly by Vaisala and

the DWD research and operations teams from Lindenberg and Hamburg.

For the next system, which will be installed at Nordholz in Lower-Saxonia, the infrastructure is currently under preparation and delivery to DWD is planned for the summer of 2004. Delivery of the third system to Bavaria is scheduled for early 2005. ●