



The Vaisala RK91 Low-Altitude Rocketsonde offers detailed boundary layer profiles of atmospheric pressure, temperature and relative humidity.

Vaisala Launches the RK91 Rocketsonde

Historically, in-situ measurements of pressure, temperature and humidity in the boundary layer have required the use of free-flight radiosonde or tethered balloon type atmospheric sounding systems. In some cases, the use of these conventional sounding techniques is not practical. Where availability of helium or hydrogen is a problem, or when ease and speed of deployment is desirable, Vaisala's new RK91 Rocketsonde is an ideal alternative for the acquisition of boundary layer profiles.

The Rocketsonde, essentially a rocket-deployed dropsonde, was originally designed in co-operation with Johns Hopkins University – Applied Physics Laboratory, to meet naval shipboard requirements for data used in modified refractive index calculations. Radar performance may be degraded in certain atmospheric conditions that produce ducting effects near the ocean's surface. Good, vertical resolution of pressure, temperature and humidity data is essential to determine the

refractivity conditions affecting the performance of radar and microwave communication.

The Rocketsonde has a key advantage over radiosondes, when acquiring refractivity profiles. Data from a ship-launched radiosonde is contaminated by the microenvironment surrounding the ship, and typically is not transmitting "clean" data at less than 200 or 300 meters of altitude. The Rocketsonde ejects its sensor payload outside of the ship's microenvironment and thus provides an uncontaminat-

ed profile down to the surface of the sea. Data acquired very near the water's surface is essential for determining ducting conditions.

With a Rocketsonde, vertical resolution is dependent on the rate of parachute aided descent (typically 3 m/s with the RK91), rate of data transmission (approximately 1 Hz) and humidity sensor response time. The response time is dependent on the ambient temperature. When it is above freezing, vertical resolution will typically be 3 meters.

The Rocketsonde can also be

used overland in applications where only thermodynamic data is required, or is an essential component. Test range meteorology is one example. When Rocketsonde data is integrated with wind data generated by another source such as a wind profiler, it becomes possible to model projectile trajectories over a wide range of atmospheric conditions.

The RK91 can be prepared for launch in less than 10 minutes; it reaches apogee in less than 20 seconds; and provides a detailed thermodynamic profile with 1-sec resolution. After ejection of the sonde payload, the sonde floats to the surface from an average altitude of 1 km in less than six minutes. The pressure, temperature and relative humidity sensors used in the RK91 are the same as those used in Vaisala's RS90 radiosonde. The sensor outputs and sonde-specific calibration coefficients are transmitted over the 400.15 - 406 MHz meteorological band to a Vaisala receiving ground station. The ground station uses the sonde-specific calibration coefficients to convert the sensor outputs into raw PTU data and outputs it in ASCII text on an RS-232 port. The raw PTU data is the final product, unaffected by filtering, averaging or other post-processing.

Wherever detailed boundary layer profiles of atmospheric pressure, temperature and relative humidity are needed, the Vaisala RK91 Low Altitude Rocketsonde is a practical solution that is available today. ●

Rocketsonde sounding component requirements:

- RK91 Low Altitude Rocketsonde
- Rocket motor
- Rocket motor igniter
- Ignition Control Unit (ICU)
- Launcher
- 400 MHz Antenna
- Antenna pre-amplifier
- Vaisala Sounding Processor