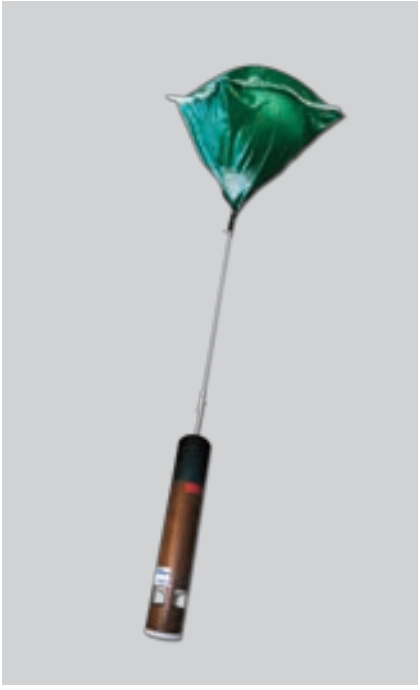
VAISALA www.vaisala.com

# Vaisala Dropsonde RD93



The Vaisala Dropsonde RD93 is a general-purpose, precision dropsonde meant for high-altitude drops from high-speed aircraft. It transmits PTU and wind data at a high data rate.

## What is a dropsonde?

The Vaisala Dropsonde RD93 is a meteorological device that is launched from an aircraft. Descending through the atmosphere by parachute, it measures atmospheric pressure, temperature, relative humidity (PTU) and wind from the point of launch to the ground. The RD93 is used with the Vaisala AVAPS and AVAPS Lite dropsonde receiving systems. The RD93 transmits data over a telemetry link to the onboard receiving system. The onboard GPS receiver tracks the dropsonde's horizontal movement as it is borne by the wind. The dropsonde electronics board has a microprocessor for measuring and controlling the sensor module and data transmission. The narrowband transmitter can be set anywhere in the 400 MHz meteorological band.

## Stable descent

A parachute with a patented square-cone design deploys immediately upon launch. It slows and stabilizes the RD93's descent and ensures that it does not descend with a pendulum motion. The rate of descent is approximately 11 m/s. Mid-sized and large parachutes, available as options, provide descent rates of 7 m/s and 5 m/s respectively.

## What are the Vaisala avaps and avaps lite?

The Vaisala AVAPS and AVAPS Lite systems receive, display and store the dropsonde data. TheVaisala AVAPS can track up to four descending dropsondes at the same time. This is an essential ability in weather reconnaissance that is carried out with high-speed, high-altitude reconnaissance aircraft.

### Features/Benefits

- For use with Vaisala AVAPS andAVAPS
- Lite dropsonde receiving systems
- Manufactured under license from NCAR
- Widely used since 1997

The Vaisala AVAPS Lite is a receiving system for receiving data from one dropsonde at a time. Small and lightweight, it can be operated with a laptop PC.

## Intellectual property rightsand development

The Atmospheric Technology Division (ATD) of the National Center of Atmospheric Research (NCAR) developed the hardware and software for the Vaisala RD93 Dropsonde, the Vaisala AVAPS and the Vaisala AVAPS Lite. The hardware and software are licensed to Vaisala Inc., USA. NCAR/ATD and Vaisala are committed to the continuous development of the AVAPS and AVAPS Lite hardware and software in accordance with the evolving requirements of our customers. Vaisala AVAPS and AVAPS Lite bring together world-leading GPS technology and PTU sensor technology, the results of Vaisala's 60+ years of expertise in atmospheric measurement.

Thousands of RD93 dropsondes are used every year in hurricane reconnaissance and other meteorological research projects.

# Technical data

## Vaisala Dropsonde RD93

| | |
|---|---|
| Weight | < 420 g |
| Size | 7 cm in diameter, 41 cm in length |
| Maximum deployment airspeed | 250 kt IAS (= 125 m/s IAS) |
| Shelf life | 1 year from delivery |

## Transmitter

| | |
|---|---|
| Frequency range | 400 MHz to 406 MHz |
| Frequency stability | ±3 kHz |
| RF power output | 100 mW |
| Channel spacing | 100 kHz |
| IF bandwidth | 20 kHz |
| Harmonic & spurious output | >50 dB below the carrier level |
| Total modulation | >2.5 kHz, <3.5 kHz |
| Telemetry range with recommended receiving antenna | 325 km |

## GPS Receiver

| | |
|---|---|
| Type | Commercial code-correlating GPS receiver |
| Channels | Tracks up to 8 satellites simultaneously |
| GPS data downlink | 1200 baud, digital |
| Modulation | FSK |
| Error checking | CRC |

## PTU Modulation

| | |
|---|---|
| PTU data downlink | 640 baud, digital |
| Error checking | CRC-16 |

## Battery

| | |
|---|---|
| Type | Six lithium CR-2 cells in series |
| Voltage | >15 VDC |
| Current | Max. 235 mA, 200 mA average |
| Life | 2 hours (operating), 3 years (shelf) |

## Pressure sensor

| | |
|---|---|
| Vaisala BAROCAP® silicon sensor | |
| Range | 1080 hPa to 3 hPa |
| Resolution | 0.1 hPa |
| Accuracy | |
| Repeatability* | 0.4 hPa |

## Temperature sensor

| | |
|---|---|
| Vaisala THERMOCAP® capacitive bead | |
| Range | -90 °C to +60 °C |
| Resolution | 0.1 °C |
| Accuracy | |
| Repeatability * | 0.2 °C |
| Response time (when used and measured in Vaisala Radiosonde RS80) | |
| 6 m/s, 1000 hPa | |
| < 2 s | |

## Relative humidity sensors

| | |
|---|---|
| Vaisala H-HUMICAP® thin film capacitor, heated twin-sensor design | |
| Range | 0 % to 100 % RH |
| Resolution | 1 % RH |
| Accuracy | |
| Repeatability * | 2 % RH |
| Response time (when used and measured in Vaisala Radiosonde RS92) | |
| 6 m/s, 1000 hPa, +20 °C | < 0.5 s |
| 6 m/s, 1000 hPa, -40 °C | < 20 s |

## Horizontal winds

| | |
|---|---|
| Range | 0 m/s to 200 m/s |
| Resolution | 0.1 m/s |
| Wind measurement accuracy | 0.5 m/s RMS |

## Descent

| | |
|---|---|
| Descent speeds | |
| RD93 | ~11 m/s at sea level |
| RD93M (custom order) | ~7 m/s at sea level with optional mid-size parachute |
| RD93L (custom order) | ~5 m/s at sea level with optional large parachute |
| Descent time for RD93 | |
| From 14 km | ~15 mins |
| From 7.5 km | ~8 mins |

*Standard deviation of differences between two successive repeated calibrations, k = 2 confidence level

VAISALA

For more information, visit www.vaisala.com or contact us at sales@vaisala.com

Ref. B210371EN-B ©Vaisala 2009



CE