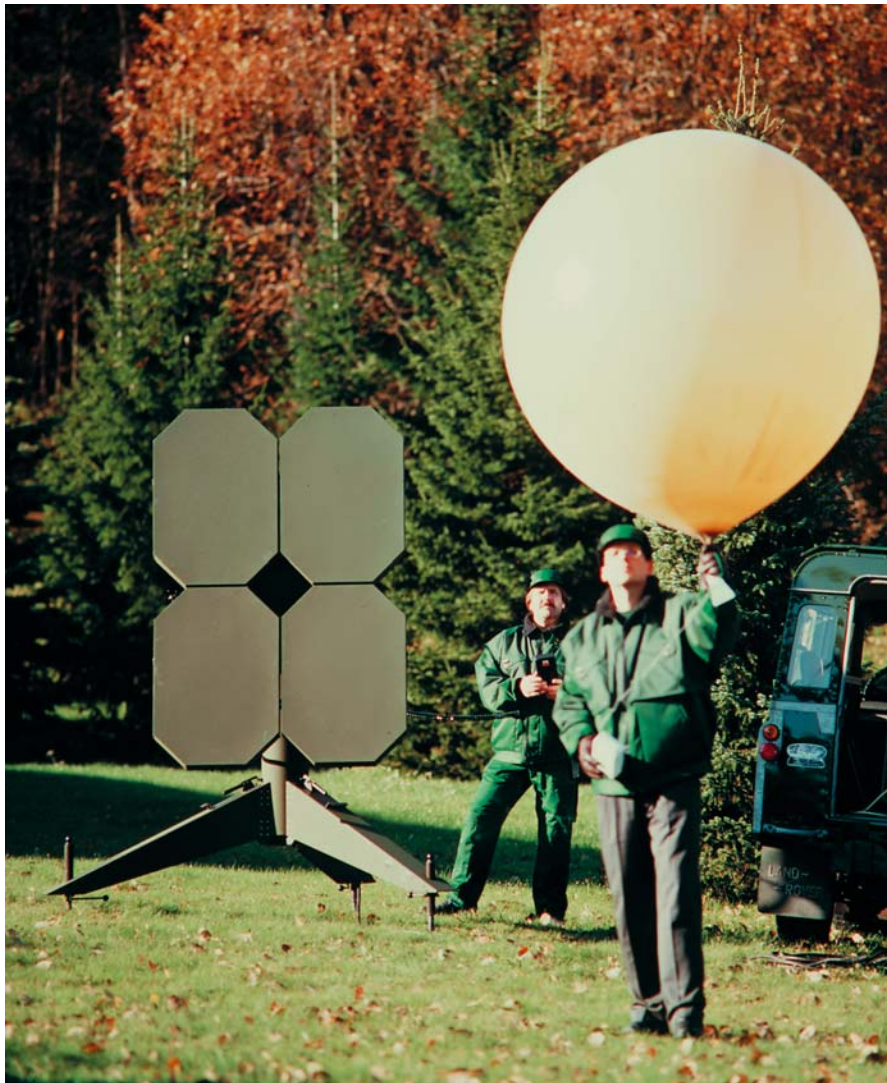


# Vaisala Radiotheodolite RT20



The artilleryman's choice for passive and independent upper-air windfinding

# Passive and Independent Windfinding at its Best

The Vaisala RT20 Radiotheodolite is the workhorse, all-weather antenna for automated meteorological data acquisition in support of artillery and other tactical operations.



The Vaisala RT20 Radiotheodolite is easy to assemble, dismantle and transport by truck, trailer or helicopter. It comprises 10 sub-assemblies packed in cases that a team of two can easily carry and - thanks to its high degree of automation - the same two operators can perform a sounding in under 15 minutes from unloading. The basic data set can be coded into several message formats for transmission in tactical communication networks.

The RT20 accurately locates radiosondes during soundings using a modern interferometric technique and light tracking motors. Advanced signal processing ensures data accuracy and reliability. The RT20 meets all the operational needs of defense forces while fulfilling stringent environmental and EMC/EMI requirements.

## One system - many applications

The Vaisala RT20 Radiotheodolite is extremely versatile. It can be used for:

- Ballistic corrections
- Refractive index analysis
- Acoustic support
- NBC protection
- Meteorological forecasts
- Test range support
- Environmental protection

*The antenna assembly consists of four detachable arrays. These arrays work as an interferometer, measuring the azimuth and elevation angles electronically in relation to the antenna axis. This minimizes the effects of ground reflections and ensures excellent wind measurement accuracy even at low elevation angles.*



### **Accurate wind data even at low elevation angles**

The windfinding accuracy of the Vaisala RT20 Radiotheodolite is maintained even at low elevation angles, where ground reflections can cause some theodolites problems. The typical wind vector error (standard deviation) is less than 1 m/s at elevation angles above

17 degrees and less than 1.5 m/s above elevation angles of 15 degrees up to an altitude of 20 kilometres. Good accuracy is achieved even at an elevation angle of 12 degrees. This accuracy is a result of the RT20's excellent attenuation of ground reflection, its sophisticated data processing capabilities, and its unique antenna array design.

### **Automatic tilt compensation for dependable data**

Soft ground or snow can cause the mechanical attitude of a radiotheodolite to shift during a sounding, leading to erroneous elevation angle and wind data. The Vaisala RT20 Radiotheodolite compensates for this by means of a tilt sensor that automatically adjust the RT20's mechanical attitude. This feature ensures that correct wind data is collected even in difficult terrain and sounding conditions.



### **Ready for sounding in under 15 minutes**

When disassembled in its rugged carrying cases, the Vaisala RT20 Radiotheodolite can be transported with light vehicles. After arriving onsite, it is quick to assemble. The four interchangeable antenna elements have quick-lock mechanisms - two experienced operators will have the RT20 ready for sounding in under 15 minutes.

### **Field-proven sounding processing with optional navaid**

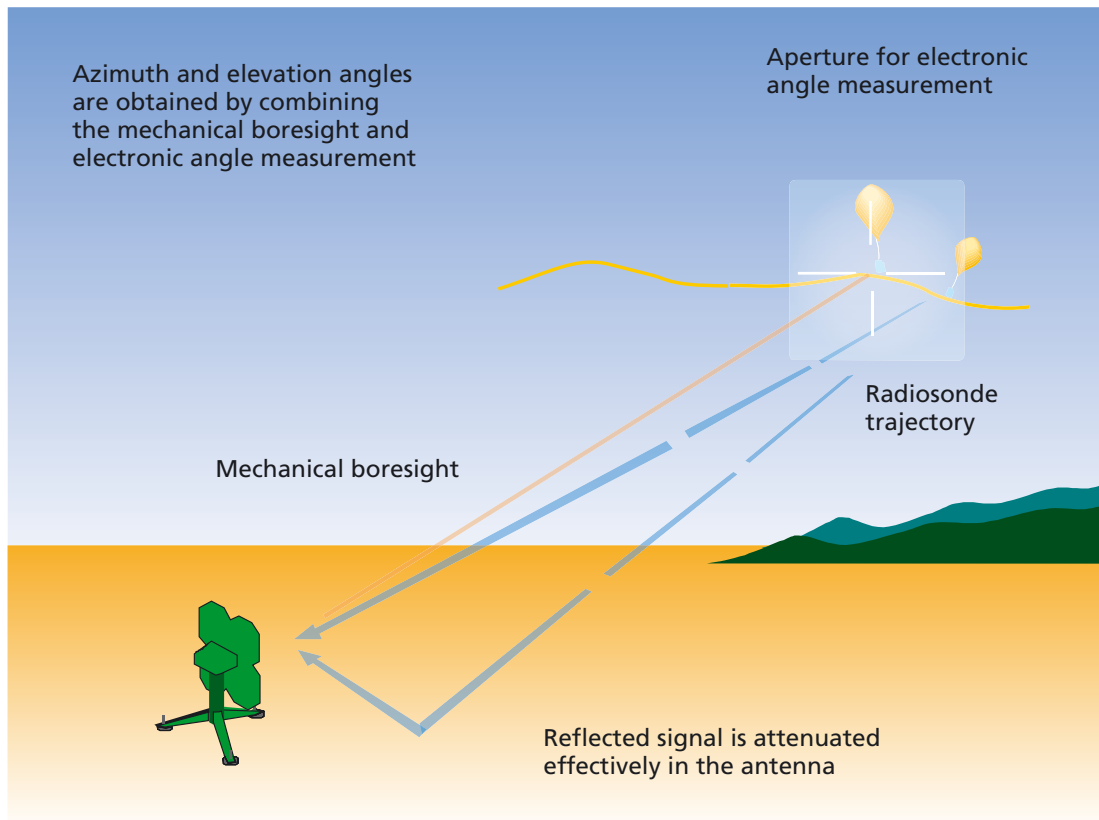
The RT20 Radiotheodolite operates with the Vaisala DigiCORA III Sounding System, the new generation of the well-known MARWIN and DigiCORA sounding family. DigiCORA III offers advanced and field-proven data processing. Its PC technology brings the advantages of open systems to sounding management: an easy-to-use graphical user interface, efficient real-time and post-ascent data analysis, and a wide selection of connectivity options.

The graphical user interface gives the operator full control over the sounding and provides the warnings and guidance needed. The archived data structures are standard and accessed with commonly available data processing tools. They can also be used in simulation mode when training operators to deal with special upper-air weather conditions.

The DigiCORA III sounding software consists of three modules: standard software, METGRAPH and STANAG.

### **GPS windfinding**

The Vaisala RT20 Radiotheodolite is compatible with a variety of ground-based systems that use the GPS satellite navigation system for windfinding. The mobile version of the DigiCORA III Sounding System can be equipped with GPS windfinding methods. Special measurements, such as radioactivity, can also be incorporated.



### Accurate calculation of azimuth and elevation angles

The angle at which the radiosonde signal arrives at the RT20 is calculated by means of phase comparison. This method uses mathematical formulas that are applicable regardless of signal strength or variations in radio frequency. Off-axis tracking ensures high accuracy without using conventional servo-motors.

Zero-backlash synchronized encoders measure the mechanical attitude of the RT20 with great accuracy. The mechanical and electronic measurements are combined, and the true azimuth and elevation angles are calculated accurately. This combination of electronic and mechanical measurement ensures reliable operation and uses small servo-motors that consume little power.

### World's most field-proven radiosondes

Vaisala Radiosondes incorporate high-precision sensors for measuring upper-air pressure, temperature and humidity. These solid state sensors are insensitive to mechanical stress, dirt and humidity. Their accuracy is fully documented in international comparisons carried out by the World Meteorological Organization (WMO).

The FM-modulated 1680 MHz Vaisala Radiosonde is commonly used with the Vaisala RT20 Radiotheodolite. Vaisala Radiosondes are small, lightweight and easy to handle. The radiosonde and its battery are hermetically sealed in a metal foil bag for long shelf life.

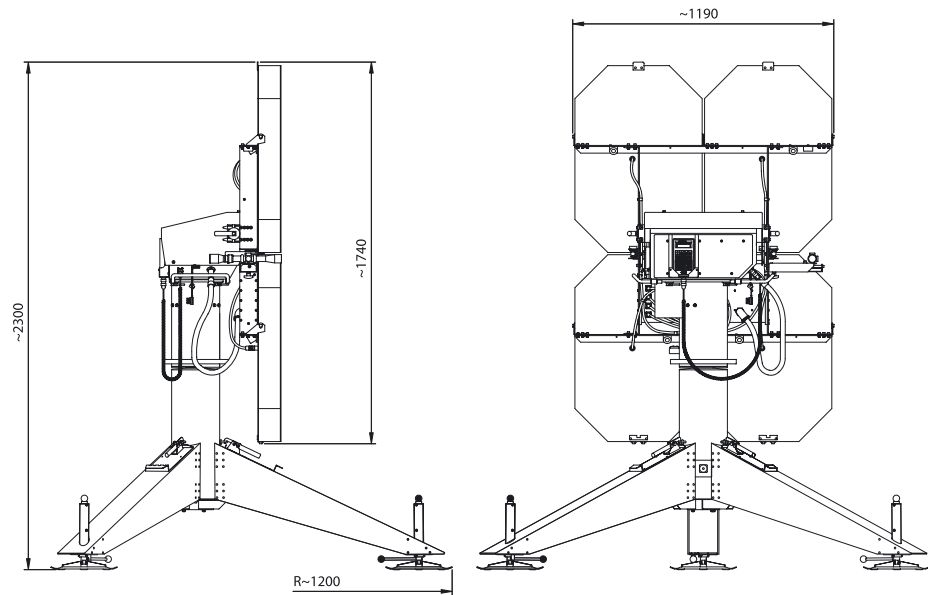
### Supporting you after the sale

We support your Vaisala RT20 Radiotheodolite and associated Vaisala equipment under the flexible terms of the Vaisala Service Contract. The Vaisala Service Contract consists of three service levels: Software Upgrades & Maintenance, Spare Part Service and Emergency Calls. You can attach optional services to any level such as 24-hr Online help or Annual Maintenance. Please discuss the possibilities with your Vaisala representative.

# Technical Information

## Dimensions

Height	2300 mm
Foot span diameter	2400 mm
Antenna arrays	
Height	1740 mm
Width	1190 mm
Weight	172 kg



## General

Operating frequency	1600...1700 MHz
Average wind vector accuracy (calculated from METCM messages)	Better than 1 m/s with EL angle >17 °
Distance from antenna to Sounding Processor	Max. 30 + 30 m
Primary power	115/230 VAC or 24 VDC (vehicle battery)
Operating temperature range	-30°C to +55°C (Radiotheodolite) 0°C to +55°C (Sounding Processor)

## Antenna

Tracking principle	Phase comparison
Antenna type	Four 24 element arrays
Polarization	Vertical
Gain	Min. 16 dBi
Side lobe attenuation	> 20 dB to the direction of specular ground reflection on flat terrain when El angle > 14 °

## AZ-EL Platform

Rotation	Continuous azimuth -5°C to 95° elevation
Drives	DC motors with low backlash reducing gears
Slewing speed	25 °/sec, AZ and EL
Angular position reading	Synchro decoders, no backlash, 0.02° resolution (14 bits)

## Receiver

Tuning frequency range	1660...1700 MHz
Tuning	Manual with automatic frequency control Automatic search and lock on
Sensitivity	-110 dBm RF input and 12 dB S+N/N
IF bandwidth	300 kHz
Automatic gain control dynamic range	-110 dBm...0 dBm



Your Partner in All Weather

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