Radiosonde (Model: SPS311 & RS41)

A Balloon-Borne Instrument for Atmospheric Profiling

INTRODUCTION:

A radiosonde is a lightweight, balloon-borne instrument that measures various atmospheric parameters and transmits the data via radio to a ground receiver. Radiosondes typically measure temperature, relative humidity, pressure, and GPS-based wind profiles as they ascend through the atmosphere. These data are critical for weather forecasting, climate studies, and atmospheric research. The radiosonde system consists of a sensor package, a telemetry unit, and a balloon that carries it into the upper atmosphere. It can reach altitudes up to 35 km before the balloon bursts, allowing for high vertical resolution observations from the surface to the stratosphere.

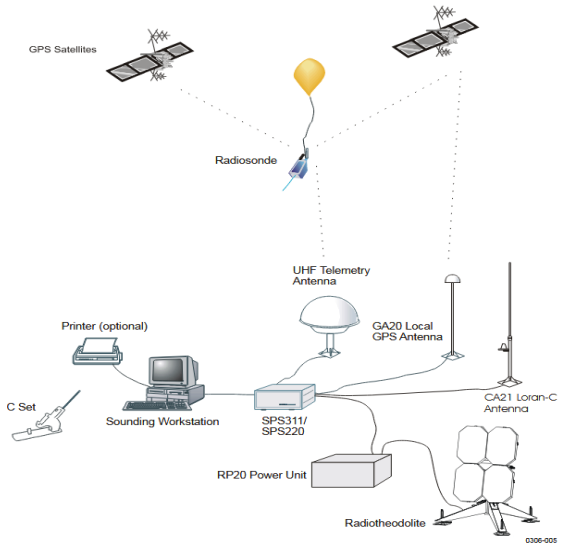
OBJECTIVES:

➢ Vertical profiling of temperature, humidity, and pressure
➢ Wind speed and direction analysis using GPS
➢ Data assimilation for numerical weather prediction models
➢ Boundary layer and upper-air research
➢ Calibration and validation of satellite sensors

DATA OUTPUT:

➢ Temperature (°C)
➢ Relative Humidity (%)
➢ Atmospheric Pressure (hPa)
➢ Wind Speed and Direction (m/s, degrees)
➢ Altitude (m)

FLOW DIAGRAM:



KEY SPECIFICATIONS (RS41 SGP):

➢ Temperature Range: -95°C to +60°C
➢ Humidity Range: 0 to 100% RH
➢ Pressure Range: 3 hPa to surface pressure
➢ Measurement cycle: 1 second
➢ Frequency range: 400.15 to 406 MHz
➢ Battery Life: ~240 min

MEASUREMENT AND WORKING PRINCIPLE:

The radiosonde operates by transmitting data from its onboard sensors to a receiving station via radio frequency as it ascends. The sensors measure temperature, humidity, and pressure at various altitudes, while a GPS receiver determines the wind speed and direction. Data are processed in real-time or archived for further analysis. The balloon eventually bursts at high altitude, and the radiosonde descends with a parachute.

KEY FEATURES:

➢ High Vertical Resolution and Accuracy
➢ Real-Time Data Transmission
➢ Lightweight and Disposable Design
➢ GPS-based Wind Profiling

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