

Latest developments of MODEM's upper-air sounding system

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Modem's new-generation upper-air sounding system consists in SR2K2 ground station associated with the M2K2 GPSonde. Last developments have brought some technical innovations to reinforce reliability, performances and easy operation and maintenance.

Ground station:

Beside the basic desktop station, Modem has developed a portable version. SR2K2-P is specially designed for temporary field operations on different sites. The receiving system is integrated in a very compact and robust suitcase including a laptop.

A built-in barometer board provides automatically launch area ground pressure to the software. There is no risk to forget updating the value just before the launch.

New generation ground system allows two simultaneous functions.

One is the calibration of temperature and humidity sensors prior launch. Sensor calibration is performed in ambient atmosphere without using any desiccant salt. Placing the sonde into the box doesn't need direct handling of sensor boom, reducing risk of damage and contamination of sensitive elements.

The second function consists in GPS initialization of the radiosonde. Thanks to the built-in GPS repeater antenna, indoor sonde initialization is performed while the sensor calibration is in progress. It is no longer necessary to place the sonde outdoor.

According to customers request, MODEM developed as an option, a dual antenna system particularly designed for shipboard station when deck superstructure doesn't allow ideal installation of a unique antenna.

Software

ICAR (Interface of Calculation and Analysis of Radiosounding) is the new software module developed by Modem's engineers for edition of WMO messages (Pilot, Temp, Climat Temp. . .) aerological reports (significant points, standard levels. . .) and sounding analysis

0.1 Radiosonde

M2K2 conception refers to the highest technology in this matter and is fully compliant with the recent ETSI EN302054 standard for radiosonde transmitter.

The full coded GPS receiver board provides the position along Latitude, longitude and Altitude with a constant accuracy (10m) during the whole flight

Modem's GPS antenna is an original design for optimization of satellite signal reception in spite of unusual move due to strong pendulum.

M2K2 GPSonde offers three connectors for additional sensors. It is fully compatible with ozone sounding without using the costly interface board traditionally necessary

GPS wind finding is based on differential calculation providing position and speed components (V_x , V_y , V_z) as well. Therefore, we have two radically different methods to determine wind speed:

- Speed is derived from GPS positions (Geometric calculation)
- Doppler measurement is performed on instant speed

Our system combines both possibilities choosing for each data frame the more appropriate method to get the best quality.

Pressure is calculated from GPS altitude and temperature and humidity parameters accordingly to Laplace law. No pressure sensor is implemented in the radiosonde. The entire meteorological community now recognize that it is the best accurate way to get the pressure.

M2K2 radiosonde is powered by alkaline dry cells instead of traditional water activated battery.

On environmental point of view, dispersion of water activated batteries (electrolytic liquid) is finally worse than unleaded dry cells

A new generation dereeler with field-proven efficiency is delivered along M2K2 GP-Sondes