

Technical specification for proposed

GPS Radiosonde Sounding System (including compatible ground systems)

Sr. No.	Specification
1.	<p>Application:</p> <ul style="list-style-type: none"> ● A complete radiosonde sounding system, including ground receiver station, sensors, communication devices and accessories, for atmospheric measurements of temperature, humidity wind and geopotential height using weather balloons, with the possibility of continuous data transmission. The system shall include all items necessary to measure, process, output, archive and display the atmospheric data.
2.	<p>Quality & Standard:</p> <ul style="list-style-type: none"> ● GUAN (GCOS upper air network) standard GPS based radiosounding system. The radiosonde offered (or an earlier version of the offered model) should have scored 4.0 or more under Table 12.1 of the WMO Technical Report No. 107 (WMO TD No. 1580) on all parameters or having GRUAN certification to this effect. If not already GRUAN-certified, evidence should be provided for the offered model to have been entered into the application for GRUAN certification ● Above-mentioned quality and standard is required for each of temperature, humidity, wind and geopotential height.
3.	<p>Temperature Measurement:</p> <ul style="list-style-type: none"> ● Minimum temperature: -90 deg C ● Maximum temperature: +60 deg C ● Resolution: less than or equal to 0.01 deg C ● Response time: less than or equal to 0.5 s ● Stability: less than or equal to 0.05 deg C ● Overall uncertainty: less than or equal to 0.3 deg C
4.	<p>Humidity Measurement:</p> <ul style="list-style-type: none"> ● Measurement range: 0-100% RH ● Resolution: less than or equal to 0.1 % RH ● Response time: 1 s or lower at 20 deg C, 10 s or lower at -40 deg C ● Stability: less than or equal to 2% RH ● Overall uncertainty: less than or equal to 3% RH
5.	<p>Wind Measurement:</p> <ul style="list-style-type: none"> ● Measurement range of wind speed: 0 to 65 m/s ● Resolution: 0.1 m/s ● Overall uncertainty: less than 0.15 m/s ● Measurement range of wind direction: 0 to 359 deg. ● Resolution: 0.1 deg. or lower ● Overall uncertainty: 2 deg. or lower
6.	<p>Operating conditions for outdoor equipment:</p> <ul style="list-style-type: none"> ● Minimum operating temperature: 0 deg C ● Maximum operating temperature: + 55 deg C ● Operating humidity: 0-100% RH ● Minimum storage temperature: 0 deg C

	<ul style="list-style-type: none"> ● Maximum storage temperature: + 70 deg C ● Storage humidity: 0-100% RH
7.	<p>Operating conditions for indoor equipment:</p> <ul style="list-style-type: none"> ● Minimum operating temperature: 10 deg C ● Maximum operating temperature: + 50 deg C ● Minimum operating humidity: 10% RH ● Maximum operating humidity: 90% RH ● Minimum storage temperature: 0 deg C ● Maximum storage temperature: + 65 deg C ● Minimum storage humidity: 5% RH ● Maximum storage humidity: 95% RH
8.	<p>Communication systems:</p> <ul style="list-style-type: none"> ● To include (i) Directional UHF antenna with automatic direction control, (ii) omnidirectional UHF antenna, (iii) portable antenna for UHF and GPS, (iv) GPS antenna, and (v) advanced multipath rejection GPS antenna. ● Meteorological frequency band for telemetry: 400.15-406 MHz or 1668.4-1700 MHz ● User-adjustable frequency tuning in steps of 10 kHz ● Error detection and correction using Reed-Solomon codes ● Telemetry range of up to 350 km or above using the directional antenna
9.	<p>Ground equipment:</p> <ul style="list-style-type: none"> ● Ground receiver station, including antenna, cables, a processor and a workstation, compatible with the above radiosonde and communication requirements ● A workstation with all required hardware and software to download and analyze the radiosonde measurements, plot and prepare soft & hard copies of report, along with a processing subsystem with software defined radio technology and code correlating GPS. ● The UPS shall have capacity for running the complete sounding system for 2 hours. ● The sounding software shall run in Windows/Linux operating system. The operating version shall be fully supported along with licensed version. ● All sounding data shall be stored into single data file to preserve data integrity and to make it easy to manipulate archived sounding data. ● The system computer shall have hard disk space for at least 1000 soundings. ● The system must be capable of producing data sets in BUFR format as specified in the latest WMO Manual on codes. Tenderer shall list the available BUFR message sequences. ● Meteorological messages shall be coded automatically and as soon as sufficient amount of data has accumulated. For example TEMP part A shall be coded immediately after data from surface to 100hPa level is received and processed. The complete TEMP report including all parts shall then be coded after the sounding is finished. ● It shall be possible to transfer any of the produced data sets or the complete sounding data file automatically to another computer without operator intervention. The data transfer shall take place immediately after sufficient amount of data is collected also during sounding. The data transfer shall be via local area network (LAN). ● The system software shall include diagnostics capabilities to detect faults and malfunctions in any of the system components. The results of the diagnostics shall be

	<p>recorded into log files and any detected malfunction shall be reported to the user either on the system main display or with indicator lights on the faulty unit. The fault detection shall be at module level (line-replaceable unit).</p> <ul style="list-style-type: none"> ● The system shall be equipped with software tools that enable remote diagnostics and software maintenance via internet.
<p>10.</p>	<p>Consumables:</p> <ul style="list-style-type: none"> ● 100 radiosonde sensors plus other consumables for the next five years
<p>11.</p>	<p>Other operating conditions:</p> <ul style="list-style-type: none"> ● Operations to be possible under precipitating conditions as well ● The radiosonde and de-reeler design must enable a balloon launch in wind speeds up to 35m/s. The suspension string between the radiosonde and balloon shall be 30 meters or more to eliminate possible temperature errors caused by the balloon. The suspension string shall be uncoiled slowly enough to prevent the sonde from hitting the ground when released. It shall be possible to use the de-reeler together with a parachute. ● Operation from a ship to be possible with continuous transmission of data - antenna compatible with marine environment ● Battery capacity shall be sufficient for a flight of 120 minutes after a 15 minutes preparation time. Total capacity shall be at least 135 minutes. Sampling rate of all sensors and wind data shall be at least once per second (1Hz). System for calibration of radiosonde in a controlled environment before launch
<p>12.</p>	<p>Additional Requirements:</p> <ul style="list-style-type: none"> ● Vendors should provide continuous technical support and maintenance of equipment. ● Vendors have to provide warranty for a minimum of five years for the ground equipment, and one year for the radiosondes. ● Vendors must have sufficient experience in supplying equipment in reputed organizations for research purposes. They must provide references like Purchase order copies of end users whom we can contact for their experience with the supplied machine. Performance Certificate and experience details of the end users will also be used as a criterion for the selection of bids that meet technical requirements. ● Vendors must provide detailed documentation for the equipment. ● Vendors may be called to visit and give presentation/demonstration on the equipment after opening the technical bid. They need to provide the approximate date for this presentation in the bid. The time period for this Presentation will be intimated at a later date. ● Vendors must provide training to our technical staff for using the equipment. ● All the expenses for installation, training and post sales technical support will be borne by the vendor