INDIAN INSTITUE OF TECHNOLOGY KANPUR
Department of Civil Engineering

<u>Enquiry letter for AWS</u>

Reference: HWRE/CZO/AWS01   **Dated: 15/03/2015**

Sir/Madam,

With reference to the subject mentioned above, you are invited to submit the quotation in a sealed cover. Configuration/Specification is given below:

The prospective suppliers are required to send quotation in two parts in sealed envelopes, as "Technical Bid" and "Financial Bid". The Technical Bid should contain detailed technical specification of the product being offered and should not mention any prices. The Financial Bid should include the detailed price quotation clearly including the cast of the equipment, taxes, service charges, shipping and installation charges, if any. **The two separate and sealed envelopes should be clearly marked appropriately as "Technical Bid" and "Financial Bid". Kindly write the inquiry no. on the top of envelop.**

   a) Supply and installation of TWO Automatic weather stations (AWS) as per the technical specifications given in ***Annexure I and Annexure II.***
   b) The rate should be included all taxes, installation and commission of the station, along with AMC for a minimum of three year.

After Sales Service:

   1. For providing after sales service for the AWS. The vender should have proper service support at the observatory which is about 15 km from IIT Kanpur. The vendor should adequate service persons, spares & standby AWS facility.
   2. Single point of contact for support: Vender has to provide details of single point of contact viz. Designation, address, and email address, telephone/mobile no. Escalation matrix for support should also be provided with full details.

Kindly send your offer (original, signed in sealed envelope) for the above items mentioning the following:

   1. All quotation must reach undersigned by **Monday April 04, 2016, 5 P. M.**
   2. Validity of quotation should be at least for 60 days.
   3. **Cost of the each item/sensor separately .**
   4. Technical specification for each item/sensor
   5. Educational discount applicable, considering end use for research and teaching.
   6. Prices should be quoted on the basis of delivery to I I T Kanpur.
   7. Delivery and Installation must be within 01 month.
   8. Quotation should carry proper certification like agency and/or proprietary certificate, etc.

9. Normal payment terms for the Institute will be applicable (90% on delivery of the items and remaining 10% after satisfactory installation/inspection).
10. Prices should be in Indian Rupees.
11. Any other relevant details.

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Annexure I

Sl. No.	Parameter	Feature	Specification
1	Air Temperature	Range	-40°C to +60°C
		Accuracy	±0.2 °C or better (with radiation shield)
		Resolution	±0.1°C
		Response Time	10 sec or better
2	Wind Speed	Range	0 to 60m/s or better
		Sustainability	Up to 75 m/sec
		Accuracy	±0.5 m/s or better
		Resolution	0.1 m/s
		Threshold	0.5 m/s or less
		Response time	10 sec. or better
3	Wind Direction	Range	0-360°
		Accuracy	±5° or better
		Resolution	1 deg.
		Threshold	0.5 m/s or better
		Response Time	10 sec or better
		Damping Ratio	Max 0.25
4	Pressure Sensor	Range (With single sensor)	600 to 1100 hPa
		Accuracy	±0.2 hPa or better
		Resolution	0.1 hPa
		Response time	10 Sec. or better
		Operating Temperatures	- 40°C to + 60°C
5	Relative Humidity Sensor	Range	0 to 100% RH
		Accuracy	±3% or better
		Resolution	1%
		Response Time	10 sec. or better
		Settling Time	Max 500 ms
		Temperature Dependence	max ±0.05% RH/°C
6	Rainfall sensor	Range	0 to 1023 mm/hr
		Accuracy	±5% or better
		Resolution	0.5 mm
7	Global Radiation Sensor	Range	0 to 1500 W/m²

		Accuracy	±5% or better
		Resolution	5 W/m²
8	Soil Temperature	Range	-40°C to +55°C
		Accuracy	±0.1°C or better
		Resolution	±0.01°C
		Response Time	10 seconds or better
		Depths	Two or more (5cm, 10cm. 20cm etc.)
9	Soil Moisture	Range	10 to 200 centibars suction
		Accuracy	±2 %
		Resolution	10 centibar suction
		Sensor Type	TDR
		Units	Percentage of moisture / mm
		Depths	Ground level and 5 other depths (15, 30, 45, 60 cm)
10	4 component net radio meter	Classification	WMO Good Qaulity
		Spectral Range	305 to 2800 (short wave) nm 4500 to 42000 (long wave) nm
		Sensitivity	5 to 20 µV/W/m²
		Temperature dependence of sensitivity(-10 ºC to +40 ºC)	< 4 %
		Response time	< 18 s
		Non-linearity	< 1 %
		Operating temperature	-40 to 80 °C

Annexure II

Data Acquisition and telemetry:

a) The system shall automatically collect the observations from attached sensors, process the same and store them into its memory as per the pre programmed procedure.

b) The system shall also send the values of meteorological parameters (user selectable) to a remote display unit or a webserver accessible via the internet.

c) The number of analog/digital/ SDI channels in the data logger must be compatible to the sensors being supplied. Atleast four additional analog and digital channels each, extra RS-232, RS-485 and SDI -12 channels must be available to interface other types of sensors. The type and the number of extra channels provided in the data logger must be specified.

d) The sensor's signal conditioning unit should be an integral part of the system.

e) The system shall have provision to easily include and change the following information as mandatory requirements:
   - Unique station identification code
   - Time of observation
   - Sensor identification.

f) The system shall have an integrated microprocessor based data acquisition and storage system having adequate hardware configuration and software support to serve as an interface between sensors and the communication link to perform tasks of data logging, AWS health monitoring and telemetry.

g) Providing necessary electrical power to the sensors and conversion of electrical output signals from the sensors into engineering values based on calibration equations stored in the memory. Full compatibility with all types of sensors provided in the packages shall be mandatory.

h) Storage of observed data along with time for all the parameters in the memory. Memory capacity to retain at least one year's data is required. Data shall be available even if the power supply to the system has failed (RAM Backup battery) for one year

i) The stored data shall be retrievable via serial port to a PC/laptop and a PCMCIA card or any other compact and commercially available solid state memory device. Additionally, a serial port should make the latest data accessible for alternate telemetry devices.

j) The system should be stand-alone and all programming functions/set-ups to be carried out through system keypad and display independent of a PC/Laptop.
k) The system should be capable of continuous updating of the values of sensed weather parameters and post processing the instantaneous values into average values over a specified period of time for transmission to the AWS earth station.

l) Management of AWS transmitter to optimize the battery consumption.

m) The system shall provide a complete health status of the battery, transmitter and other components.

n) The health data shall be stored as a log record and shall be capable of being retrieved and displayed when required.

o) The system shall have in-built sensor simulation system options to conduct tests on the system for field installation, two-point calibration/re-calibration and maintenance of the sensors.

p) The system shall have a weather-proof housing.

q) The system shall have self-diagnostic facility and be capable of displaying Station ID/Sensor ID codes and messages on the display panel for general identification of the fault. Facility to monitor these codes and other health status through an external lap top/PC.

r) The system shall be provided with a keypad option and at least 16 character display in the front panel. Setup shall be organised in a tree of menus and sub-menus. Protection of setup parameters and data through password should be supported by the system. In addition, the AWS shall support the manual entry of data through keypad and its display.

Analog to digital converter:	
Resolution	16 bit or better
Conversion Accuracy	± 1 LSB
System clock:	
Stability Long-term	1 ppm/year or better
Stability (Temperature)	3 ppm or better from -40°C to 55°C

Other features:	
Operating Temperature range	-40°C to + 55°C
Internal Memory	1 MB RAM minimum
Battery Backup (internal)	Lithium Battery, storage: 2 years
Real-Time Clock	GPS synchronised
Watchdog Timer	System Reset upon microprocessor failure
Sample Intervals	1 sec. to 24 hr. in 1 second increments (user selectable)
Visual display	16 Character or more, alphanumeric LED/LCD to operate in temp. range -10°C to +55°C
Power consumption	Average over an hour shall be less than 0.5 A at 12V D.C. including that of sensors, GPS and transmitter.
Power Supply:	
Battery	Single 12V chargeable maintenance-free battery 65 AH capacity
Charge controller	Internal or External
Solar panel	Rated capacity 30W, Open circuit voltage: 21V, Short circuit current 2.4 A