REQUEST FOR PROPOSAL (RFP) DOCUMENT

FOR

PROCUREMENT OF 484 GSM/GPRS BASED AUTOMATIC WEATHER STATIONS (AWS)

FEBRUARY, 2014

Government of Bihar
Department of Planning and Development
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1. INTRODUCTION

DES has planned for installation of 484 Automatic Weather Stations in Bihar and its Block Headquarter with GSM/GPRS modem for transmission of data. The AWS shall provide real time Weather data through GSM/GPRS network at scheduled interval and as and when requested by the users. The WMO SYNOP MOBIL and BUFR message format is required to be generated at the server located in Bihar, Patna.

2. SCOPE OF PRESENT TENDER ENQUIRY

I. Supply of AWS equipment consisting of sensors, data logger (with built-in display) and transmission system incorporating GSM and GPRS modem facility and optional remote display unit for display of Meteorological Parameters and Central Server at Patna for reception of data.

II. Responsibility to execute the project on a turn-key basis by taking up the installation of 484 GSM/GPRS based AWS in sites identified by DES, Bihar and its Block Headquarters.

III. Identify a suitable GSM/GPRS Service provider for the mobile subscriber network. It would also be mandatory for the tenderer to provide leased line connection at the data centre. The space and electricity would only be provided by the DES, Patna.

IV. Scheduled and on demand transmission of data through GSM/GPRS network.(*Hourly date)*

V. At every AWS location LED display unit with scrolling characters of minimum height 4 inches is required.

VI. Ensure that an agreement with the service provider be arranged to provide capabilities to transmit weather data to predefined mobile numbers by SMS at scheduled hours, when a certain user defined threshold is reached and as and when requested.

VII. Preparation of AWS field sites as per specification provided in the RFP.

VIII. Installation and commissioning of AWS including transportation of all the equipments at site is bidder's responsibility.

IX. The bidder has to do the project on turnkey basis.

X. Vendors will be required to install the equipment at sites selected by DES, Bihar. The security of equipment at the selected sites will be the responsibility of the vender till it is handed over to the designated authority of DES after successful installation of the AWS.

3. ELIGIBILITY CRITERIA

Eligible Applicants:

The tenders for this contract will be considered only from those tenderer (firms, companies, corporations, consortium or joint ventures) who meet requisite eligibility criteria prescribed as under. In the case of a JV or Consortium, all members of the group shall be jointly and severally liable for the performance of whole contract. The consortium only consists of Prime bidder and secondary bidder and they must produce the MOU between both the organisation which clearly explain the roles and responsibility of both of them.

PERFORMANCE

- The prime Bidder should have running station experience for at least 100 Automatic weather stations in India for more than 3 Years. (Performance certificate against the same should be attached)
- The prime Bidder should be in Business in India for more than 6 Years in the field of Weather Stations.
- The prime Bidder should have installed GSM GPRS based/similar kind of network on at least 100 Stations.

FINANCIAL

- The Bidder (in case of consortium jointly) must have average Turnover of Rs.10 Crores per year in India during last 3 financial Years.
- Bidder should have done any single project in India worth of Rs.10 Crores in last 5 financial years. Completion certificate should be attached.

INFRASTRUCTURE

- Bidders must be Registered Company in India and having PAN/Tan and should have Functioning Office in INDIA since 5 years.

SERVICES

- The prime Bidder must have experience of maintaining at least 100 stations in India for more than 5 Years.

SALES TAX

- The Successful Tenderer will be required to register with Bihar Sales Tax, if not already registered, register & submit the proof of registration immediately after the order is placed. No Payment shall be released until Proof of the same is submitted.

- Tenderer must not have been blacklisted or deregistered by any central / state government department or public sector undertaking. Also no work of the tenderer must have been rescinded by client after award of contract during last 5 years.

EMD

- EMD for this project is 20 Lakhs.

4. OVERALL REQUIREMENTS

I. The AWS equipment should incorporate the state-of the-art technology and provide capability for unattended operation using a 12V/65AH single sealed maintenance-free battery, rechargeable through a solar panel. The battery shall be capable to run the system for minimum of 30 days during total cloudy conditions.

II. All equipment should be qualified for MIL STD-454K Specifications and suitable for outdoor applications

III. The AWS must be housed in weather-proof enclosure and shall meet all specified environment specification of international standards.

IV. Data logger must have certification from IMD/WMO for functional operation.

V. AWS system should have in-built memory of storing data for at least 12 months period.

VI. PCMCIA memory card slot/USB or any other commercially available latest technology memory device for data retrieval and transfer of set up of the system shall be provided. All set up and configuration files should be transferable through the solid state memory device to the data logger and vice versa.

VII. System should have a dedicated port to interface a *cable linked* remote display unit and facilitate values of meteorological parameters to be displayed in real time basis at user-defined intervals. The location of the display unit may vary *up to 300 meter from* site to site. The cost of the cable & its laying should be given on per meter basis which will be used for cost comparison for cable component.

VIII. Facility to give manual commands to transmit data for testing as well as for manual operation purposes shall be provided.

IX. Facility for standard positioning system (SPS) with GPS (location and time) receiver. (L1 frequency) shall be provided.

X. The number of analog/digital/SDI channels provided in the data logger shall be compatible to the sensors being supplied. There should have facility to interface at least 4 additional digital & 4 additional analog channel.

XI. RS 232 ports/RS 485 ports being provided shall be compatible to requirement of interfacing GSM/GPRS modem for the remote display unit. At least 3 Rs. 232 ports, 1 Rs. 485 and shall be provided is the data logger.

XII. Source code of the AWS software utilized in the data logger and transmission unit is to be provided along with compilers required for the same. Suitable training in these aspects may also be provided in India or abroad for 10 (ten) personnel for at least 10 working days.

XIII. Necessary software for communication purpose for submitting data to the central server is required.

XIV. Technically qualified bidders are required to make live demonstration of their fully functional system at DES, Bihar, Patna for a minimum period of 30 days. It should be done at most after 30 days of opening of the tender. All the expenses in this regard have to be borne by the bidder without any commitment from DES, Bihar. The data of the field trial will be used for technical evaluation of the tender. The failure to do this will lead to automatic rejection of the tender. Remote display is also a part of AWS for demo.

XV. It may be noted that the directorate does not pledge itself to accept the lowest or any other tender and reserves the right of accepting any tender amongst the tenderer who have qualified the technical evaluation, and for that matter negotiate with any tenderer which in the opinion of the directorate has the desired credentials. Directorate has right to split the tender at the lowest (l_1) rate**.**

5. GSM/GPRS COMMUNICATION REQUIREMENTS

i. Data from a network of 484 GSM/GPRS AWS in and around Bihar shall be utilized to analyse the changes in weather and provide real time access to users of GSM/GPRS network.

ii. A robust, reliable, broad based GSM/GPRS communication system with capacity of sending data in text format shall be proposed with alternate stand by data transmission facility. If transmission through GPRS mode fails after user defined tries the system shall automatically switch over to GSM mode for transmission of data.

iii. Each AWS shall have facility to transmit data via GSM and GPRS services to ensure data transfer in real time and avoid delay in reception of data at the server in case of network congestion.

iv. The GSM/GPRS AWS shall send an automatic message every 60 minutes (sampling interval) to the server. The sampling interval shall be programmable for user-defined intervals, say from 2 minutes to 60 minutes.

v. The weather data shall be transmitted in ASCII format to reach the central server, and/or to be routed to an e-mail address or can be sent as an UDP packet in GPRS to an address and port, that can also be programmed via SMS.

vi. Facility to log and store data locally into a flash EPROM, retrieve them later by placing a data call so as to obtain detailed logs with sampling intervals as accurate as 2 minutes.

vii. Facility to automatically gather data as & when needed at user-defined time interval and store in the server for later analysis.

viii. Respond to an SMS requesting for current weather data.

ix. Automatic SMS alarms at programmable levels for low/high temperature, strong wind, heavy rain and other adverse weather.

x. The GSM/GPRS stations must be configured to call the Server phone number at a user-specified time.

xi. The AWS shall call the Server at the set time to transmit the GPRS message. If the transmission isn't successfully acknowledged AWS shall retry transmission for user defined attempts. In case transmission in GPRS mode fails even after retries, AWS should switch over to GSM mode for transmission of data.

xii. Software to manage a GSM/GPRS network for auto troubleshooting and making the systems functional with minimum down time.

xiii. Facility to transmit using both GSM and GPRS mode.

xiv. Facility to display data, export to Excel, Mat lab or similar applications for graphical representation of weather data. Etc.

xv. Provide data on sudden development like gust, threshold, rainfall etc.

xvi. All AWS data received in the Central Server should be in standard exchangeable RDBMS format Necessary RDBMS software along with license is to be installed in the server for any query on any station for any period on any parameter. GUI based statistical tool should be available on the server.

xvii. In GSM/GPRS AWS, there has to be an Omni directional antenna which transmits the signal to GSM/GPRS network.

6. SPECIFICATIONS OF SENSORS

- The meteorological sensors with accuracy specifications as per WMO norms applicable shall be provided. All the sensors should have certification of NIST or accredited lab or IMD.
- The sensors along with the accessories shall be fully compatible with the data logger and transmission system specified below
- Optional features available with the sensors may also be clearly specified by the bidder.

Battery: The battery must be maintenance free & it must be of such a capacity that the AWS station will run uninterrupted even in complete cloudy weather for at least 30days.

Solar Panel: The solar panel should be enough rating to charge the battery during sun.

Individual Sensor Specifications

Air temperature	
Range	-10 Deg C to +55 Deg C
Accuracy	± 0.2 Deg C or better (with radiation shield)
Resolution	± 0.1 Deg C
Response Time	10 sec or better

Wind Speed

Range (Operation)	0 to 60m/s or better
Accuracy	± 0.5 m/s or better
Resolution	0.1 m/s
Sensor Type	Ultrasonic
Threshold	0.5 m/s or less
Response time	immediate (being ultrasonic)

Wind Direction

Range	0 to 359 Degrees
Accuracy	± 5 degrees or better
Resolution	1 deg.
Sensor Type	Ultrasonic
Threshold	0.5 m/s or better
Response Time	Immediate

Pressure Sensor

Range (With single sensor)	600 to 1100 hPa
Accuracy	± 0.2 hPa or better
Resolution	0.1 hPa
Sensor type	Solid state
Response Time	10 sec. or better

Relative Humidity Sensor

Range	0 to 100% Rh
Accuracy	± 3% or better
Resolution	1%
Sensor type	Capacitive/Solid-state
Response Time	10 sec or better

Rainfall Sensor

Range	Unlimited
Accuracy	± 5%
Resolution	0.5 mm
Sensor type	Tipping bucket rain gauge or any other suitable sensor

Note: Wind Speed and Wind Direction measurements are to be made at a height of 10 meters above ground level at all the AWS stations. The mast should be rugged & rust proof & should be able to withstand wind speed 60m/s. Necessary provision is to be made on the mast tower for the easy maintenance and sensor upkeep by the observational staff.

7. DATA LOGGER SPECIFICATION

- Data logger shall automatically collect the observations from attached sensors, process the same and store them into its memory as per the pre-programmed procedure at every 10 minute interval or any other user-defined interval which will be specified to the bidder.
- Data logger shall be provided with a keypad option and 2 line backlit LCD display in the front panel with facility to display at least 16 characters per line.
- The number of analog/digital SDI channels in the data logger must be compatible to the sensors being supplied.
- At least Ten built-in high performance analog channels, Eight built-in digital channels, Three RS-232 ports or One RS-485 channels must be available to interface different types of sensors. It should have standard independent and Ethernet USB port. The port convertors are not acceptable.
- The sensor's signal conditioning unit should be an integral part of the data logger.
- Data including the setup and program files shall be transferable from the system via a serial port to PC / PCMCIA card or other suitable memory device and vice versa. It should be possible to upload or upgrade the software of the data logger using RS-232 port/ *USB Port*
- The AWS shall also send the data with the help of GSM/GPRS modern interfaced to the data logger in a format compatible for decoding at the GSM/GPRS server.

- In addition, as and when the remote AWS is queried by the GSM/GPRS Server at any time to take samples of meteorological parameters, the same shall also be done and information be provided to the server for onward availability to the forecaster.

- The system shall also send the values of meteorological parameters (user selectable) to a remote display unit located at a distance up to 300 m depending on the location of each of the AWS site. **And Vendor will be responsible for routing the cable from AWS site to the display board and should also include 300 meter of cable in quotation. And the Cables must be routed properly inside the ground and in the proper Conduits.** It should be possible to interface any other commercially available standard scrolling display unit.
- 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
- 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.
- 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.
- The stored data shall be retrievable via serial port to a PC/laptop /a PCMCIA card or any other compact and commercially available solid state memory device.
- 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
- Setup shall be organized in a tree of menus and sub-menus. Protection of setup parameters and data through password should be supported by the system
- 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 data receiving server.
- Data logger should have a real time operating system such as embedded Linux or Windows. The data logger should have 32 bit or better microprocessor.
- The data logger should have in-built library or C/Basic language compiler which shall allow the user to create, compile and execute customized programs in the data logger. The library or compiler should support structured and modular programming. The library/compiler shall have in-built functions to take measurement of desired sensors connected to any channel of the data logger at user defined intervals. The library or compiler should have in-built functions to change the properties of all COM ports (RS 232 port) such as baud rate, data bits, parity, stop bits, flow control, CTS, DSR, DTR, RTS etc and thus enable the end user to flush required data in desired format to the COM port. All standard baud rates between 300 baud to 115.2 K baud shall be supported. The data logger should also support recursive execution of a customized program at user defined interval. This is a mandatory qualification criteria for the data logger.
- The data logger should have capability to sample and log the data for specified parameter at user defined intervals in multiple log files.
- It must be configurable at the user end.
- The user must be able to reload/upgrade the software of the data logger in the field using a laptop.

- It must be remotely programmable.
- It must have open architecture to connect any commercially available sensor.
- It must have its own operating system and compiler.

- The software of the data logger should be able to check the quality of the data collected by the sensors.
- The data logger should be fully compatible with a laptop at the site level.
- It should have open architecture system to configure any standard commercially available sensor. The system must also support the future up gradation of hardware & software at the site without removing the system from the site. The vendor must demonstrate it during the field trial.

Data Logger Specifications:-	
a) ADC Resolution	32 bit or better
b) Conversion Accuracy **System clock:**	± 1LSB
c) Stability Long-term	1 ppm/year or better
d) Stability (Temperature)	3 ppm or better from-10 Deg C to 55 Deg C
e) Operating Temperature range	-10 Deg C to +60 Deg C
f) Internal Memory	As required for storing of 1 year data
g) Battery Backup (Internal)	Lithium Battery, storage: 2 years
h) Real-Time Clock	GPS synchronized
I) Watchdog Timer	System Reset upon microprocessor failure
j) Sample Intervals	1 sec. to 24 hr in 1 second increments (user selectable)
k) Visual display	16 Character or more, alphanumeric LED/LCD to operate in temp, range-10^0 to ± 55^0C
I) Power consumption	Average over an hour shall be less than 0.5 A at 12V D.C including that of sensors, GPS and GSM/GPRS Modem
Power Supply	
a) Battery	Single 12V chargeable maintenance-free battery 65 Ah capacity
b) Charge controller	Internal or External
c) Solar panel	Rated capacity 30W, Open circuit voltage:21V, Short circuit current 2.4A

8. GSM/GPRS COMMUNICATION

Overall requirements for compatibility to a GSM/GPRS cellular network may be ensured by the bidder. Technical specifications in this aspect are broadly indicative. Complete end-to end solution shall be the responsibility of the bidder. In addition to sending an SMS of weather data over GSM network, GPRS communication features shall include support for UDP/TCP protocol for data transmission. Further support for dynamic domain name or fixed IP address of server needs to be ensured for receiving data from all 484 AWS. The bidder will have to bear all the expenses in this regard.

9. GSM/GPRS MODEM

GSM and GPRS facility with fast and reliable wireless data communications along with support for dynamic domain access to the central server IP address. The following technical specifications are indicative and not exhaustive. (If power consumption is more, additional battery supported by solar panel need to be included for power supply in addition to the 12 V/65 AH battery specified). The bidder ahs to ensure that a turnkey solution is provided.

- Frequency range: 900 and 1800 MHz
- GSM and GPRS facility with fast and reliable wireless data communications.
- Remote dial-up facility
- Shall support Voice, SMS and Data
- Quad Band GSM transmission
- Accept standard SIM card with built-in holder
- Operating Temperature: -10 to+60 degrees Celsius
- RS 232 interface with data cable
- PC Communication via RS 232/485/USB/ Ethernet Port
- Facility for Fixed IP and domain transfer of data through GPRS
- Supports standard AT command set
- Full voice call, SMS Support
- Compatible for Standard GSM/GPRS Networks available in India
- Suitable power supply to function during alarm situations like fog, thunder, rainfall etc.
- If required additional battery supported by solar panel needs to be included for power supply.

10. GSM/GPRS ANTENNA

Frequency range	900 MHz: 824-960 MHz/1800MHz:1710-1880 MHz
Impedance	50 ohms
VSWR	≤ 2.0
Radiation	Omni-directional
Operating temperature	-10 to + 60 degrees Celsius
Connector	SMA adaptable to GSM/GPRS modem
Cable length	As required
Max. power	To be specified

11. GPS ANTENNA

Centre Frequency: 1575.42 MHz Band width: +/-1,023 MHz SWR: 2.0 MAX Impedance: 50 Ohm
Current consumption: standard rating in MA Supply voltage: 3-5 volts
Operating Temperature:--10C to + 60C

12.HAND HELD GPS

Display	256 TFT display
Tracking	Automatic tracking with a log facility
Position format	Lat/Long
GPS receiver	More than 10 parallel channel GPS receiver to continuously track & update position
Acquisition Time	10-20 secs
GPS accuracy	Position: Less than 20 meters Velocity: Less than 0.1 m/s
Compass	In built electronic compass with a resolutions 1^0
Barometric Altimeter	Accuracy: Less than 20 feet Resolution: 1 foot Range:0-25000 feet
Pressure	In mbar
Operating Temperature	-30^0C to 50^0C

Power	Rechargeable battery with charger (Battery life more than 24 hrs)
Memory	SD card slot, USB interface, 4GB SD car
Case	Carrying Case

13.REQUIREMENTS FOR ONSITE DISPLAY/UNIT

External slave display units to display the values of eight or more meteorological parameters near the premises of the AWS site are required. The following facilities are to be provided by the bidder**.**

- Option for selection of sensors whose data is to be displayed is to be provided.
- User defined measurement schedules for selected sensors (eg:-minute, 2 minutes, 5 minutes) along with option for displaying instantaneous or average values is to provided.

- Provision to display hourly and daily maximum/minimum temperature and hourly, daily and daily cumulative rainfall shall be provided. The daily cumulative rainfall shall be reset at every 03 UTC
- One Remote display unit is required for every location. On-site display unit is required to be installed at indoor location, not Outdoor.
- Selections required in the configuration and set up files to be provided.
- Measured data should be sent to the display through a suitable output port, preferably/RS-485 port so as to support a distance up to 300 meter between AWS and display.
- Suitable display unit compatible with the data logger having alpha-numeric LED display with character height of at least 4 inches with proportionate width so that it can be viewed clearly. It should display at least 32 characters at a time.
- The display unit can be software programmable with a PC, if required.
- The design of the display unit should be universal with compatibility to interface any type of data logger.
- Display unit should have independent power supply (AC Mains/Battery)
- Provision for onsite display for user selected parameters at desired time interval.

14.DETAILS OF WEATHER PARAMETERS

The following weather parameters are required from the sensors interfaced with the data logger through GSM/GPRS transmission.

i. Instantaneous sampled value of air temperature in deg C at every 10 minute interval.

ii. Max. air temperature of the hour (samples taken every minute)

iii. Minimum air temperature of the hour (samples taken every minute)
iv. Daily maximum temperature (at 12 and 03 UTC).
v. Daily maximum temperature (at 03 UTC)
vi. Wind speed in knots at every 10 minute interval with 3 minute vector averaging.
vii. Wind direction in degrees at every 10 minute interval with 3 minute vector averaging.
viii. Wind speed in knots (3 minute vector averaging)
ix. Wind direction in degrees (3 minute vector)
x. Daily minimum and maximum wind speed
xi. Daily maximum wind gust.
xii. Station level pressure (sampled at the end of every 10 minutes)
xiii. Instantaneous value of RH at the end of every 10 minutes.
xiv. Daily maximum and minimum value of Relative Humidity
xv. Dew Point temperature at every 10 minute interval.
xvi. Cumulative rainfall since last reset (reset at 03 UTC everyday)
xvii. Hourly rainfall (reset every full hour UTC)
xviii. Battery voltage (hourly)

15. SPECIFICATIONS OF SERVER FOR THE GSM NETWORK (INDICATIVE)

1	CPU	Intel Xeon Six Core Processor or better (or any latest available at the time of supply without financial implication) with 1 MB L2 cache memory per core or better
2	Mother board	Intel or better Original Mother Board Capable of 800 MHz FSB or better
3	Slots	3 PCI Express and 3 PCI 64 bit or 6 PCI Express (64 bit)
4	Memory	16GB 64 DIMM slots
5	Hard Disk Drive	3×160GB or more 10000 rpm SCSI controller ultra 320 hot plug
6	Networking Features	Dual LAN (10/100/1000) Network card with security management
7	DVD (R/W) drive	Read/Write CD ROM/DVD with 52X or better
8	Monitor	21" colour LCD monitor
9	Keyboard	104 keys
10	Mouse	Optical mouse (three button)
11	Speakers	In-built/320 W with multimedia compatibility

12	Sound card	AGP & sound card
13	Video controller	On-board 8 MB dynamic video memory
14	USB port	6 USB ports (at least two in front)
15	Printer Port (parallel port)	1NO
16	RS 232 Port (serial port)	1No
17	Power Supply	Redundant power supply
18	Fan	Redundant fan
19	PCMCIA card drive	In-built PCMCIA card driver
20	DAT drive	USB based plug-in type or built in for taking back-up
21	Modern	Internal 56.6 kbps (or more)
22	Certification	Windows/Linux/Novell certified

23	Pre-loaded software	Windows 2010 server or latest available at the time of delivery Or Red Hat Enterprise Linux latest edition Antivirus protection software Firewall protection for networks
24	RDBMS package	Oracle or equivalent latest version. The platform for RDBMS packages should be mentioned (Windows or Linux)
25	Printer	Colour Laser Jet (1200×1200 dpi), Paper size: A3 connectivity" USB/IF possible Parallel Port also Minimum printing capacity 20 ppm with duplexing facility
26	UPS on line with inverter and Maintenance-free batteries	12 hour back-up at full load (Input 160-270 v); 220-230 output
27	Additional software	Customized Application Software to process the AWS data received from all GSM/GPRS based AWS and process the data in graphical format and display, export in user-friendly format compatible for real-time display of weather data. Disaster Recovery Software for real time quality control, retrieval and monitoring of AWS data. Standard FTP and TCP/IP Socket communications

16. APPLICATION SOFTWARE

i. The central server shall have application software which shall have options to display data in engineering units as well as in graphical format, analyze trends in weather parameters, export to Excel or similar applications for graphical representation of weather data.

ii. The central server shall be linked to the main computer network of DES and transmit meteorological messages to DES, Bihar through standard TCP/IP socket communication iii. The central server should also have facility for secured FTP service. Provide information on sudden development like gust; squall or user defined threshold of other parameters to the central server so that they can be flashed via SMS/FTP/e-mail and to any web-site as alarm messages through the application software in the server.

iii. GIS based software in the central server Located at Patna (Bihar) to manage the GSM network for troubleshooting and making the systems functional with minimum down time. Options to indicate sensors that are non-functional in each of the sites may be provided.

iv. The data received at the central server shall be further coded into a format (WMO for transmission of meteorological data. WMO No. 306 Manual on Codes is required to be followed to convert the AWS data into coded format. The software should have a provision to generate coded message in FM 14-XII Ext. SYNOP MOBIL, FM 94-XIII Ext. BUFR and FM 95-XIII Ext. CREX format. The details of the coded are available at http://www.wmo.ch/pages/prog/www/WMOCodes.html). The format in which the data is to be coded into shall be user selectable. The coded data will be used as an input to numerical weather predication models.

v. Software for real time quality control and quality assurance of the AWS data shall be provided to ensure the quality of the data. Quality control procedures for gross error checks for each parameter, time consistency checks for each time of observation etc shall be implemented. Doubtful and erroneous values of the parameters shall be flagged suitable and shall not be considered while coding of data into WMO format.

vi. All the licences for software are to be provided to DES, BIHAR (Patna).

vii. Bidder is required to provide source code of application software.

17. TRAINING

The manufacturer/supplier should provide in-depth training in hardware, software and integrations to at least Ten DES officials in India or abroad for 10 working days in installation, operation and maintenance of the system.

18. WARRANTY AND MAINTENANCE

It is evident that, any complex system requires maintenance support. Corrective maintenance is required for component failures. To minimize corrective maintenance and to increase the performance of an AWS, well-organized preventive maintenance is recommended. **Preventive maintenance** is required for all system components, not only cleaning and lubricating the mechanical parts. In view of the increasing reliability of the electronic components of an AWS, preventive maintenance, including services and sensor calibration, will become the controlling factor in maintenance. Since the maintenance of a network of automatic stations is often a grossly underestimated task, it is essential to organize maintenance according to a rational plan that details all the functions and arranges them so as to minimize costs without adversely affecting performance. The modular structure of many modern automatic stations allows maintenance to take place in the field, or at central centre.

- The bid should include cost of the comprehensive warranty for Five years after commissioning of the system in the field and central server. Response time for rectifications of faults in the field AWS equipment should not be more than 2 (two) days and immediate for central server. If the down time is more specified time the warranty period will be presumed to be extended by a period six timers the down time.

- Penalty on the vendor will be imposed if he fails to replace the defective data logger, transmitter or sensors. GSM/GPRS modern within a fortnight. Cost of AWS data (@ Rs.150 per day per site for full or partial data loss) shall be calculated and imposed on the vendor to compensate loss of crucial data.

- The amount will be calculated at the end of each quarter and will be deducted from the final instalment of amount which will be pending with DES towards payment for installation and commissioning the last 50 AWS. Remaining amount pending with DES towards installation charges of last 50 AWSs will be paid to the vendor after the completion of years warranty period.

- Servicing and routine maintenance of field equipment including upkeep of the site once in three months shall be done by the vendor. A penalty of Rs. 10,000/= per site per quarter will be imposed on the bidder in case of failure to perform the above mentioned works. The maintenance work must be done in the presence of authorised DES official.

- Reports of maintenance visits should be submitted on a quarterly basis to the DES, Bihar, Patna.

- Analysis of the data quality with a co-located meteorological observatory, if available, should be submitted. Hand-held digital standard for pressure, air temperature, relative humidity should be compulsorily available with the firm and taken to the AWS sites by the maintenance party to compare and evaluate the data quality. The hand held digital standards must be calibrated with standards available in DES. Hand-held GPS should be carried to the sites to get the correct geographical coordinates of the sites.

- If any part of the AWS system is to be carried away for repairs then it should be replaced with a working part

- No advance payment will be made toward installation charges. Payments will be made after every 50 AWS are commissioned and accepted.

- In case of accidental or theft the bidder will be responsible to replace the spare within 5 days from the issue of spare from department. Spares will be provided by DES from the 10% stock. If bidder is not able to replace the same within 10 days the penalty (as mentioned above) will be applicable on the bidder.

After the end of five years of comprehensive maintenance the bidder will be paid the annual maintenance charge as per IMD norms.

19.SECURITY DEPOSIT

The successful Tendered shall furnish Performance security in the form of an Account pay Demand Draft or fixed Deposit receipt from a commercial BanK or a Bank Guarantee on any Nationalized Bank in the favour of Sr. Research officer (DDO), Directorate of Economics & Statistics, Bihar, Patna for amount equivalent to 10% of the order value within 15 days of acceptance of this supply order the said security shall stand forfeited in the event.

(i) The commissioning in part or in full are not effected in accordance with the delivery schedule.

(ii) The refection of supplies on account of sub-standard product, not in conformity with the specification.

(iii) Any act of breach of contract

After furnishing performance security, the Earnest money in respect of successful tenderer shall be refunded/returned.

20.Quality Control of the AWS data

The quality of the AWS data has to be ensuring at each & every stage. Some important steps are:

- Site Level- the AWS site must be installed as per the established norms.
- Sensor Level- All the sensors must be installed as per the norms specified.
- Data Logger Level- The data logger must check the quality of the data before it is sent to the transmitter. Some of the important aspects which can be verified is:

1. Range
2. Climatologically Average
3. Comparison of the data with nearby stations

- Transmission level- In case of GSM/GPRS based communication, the quality of transmission of the data is totally dependent upon the service provider. Cost of the service provider will be borned by the bidder.
- Earth Station Level- The quality of the AWS data shall be monitored at the server of the earth station as per the norm set by department. The brief features the software must have are:

1) Parity check
2) Range check
3) Consistency check
4) Comparison of the data with nearby stations
5) Comparison of the data with climatologically average the above quality check procedure is just suggestive one. The details may be discussed while preparing the specifications.

21.DOCUMENTATION

i. The authorization of representation from the manufacturer of the equipment should be submitted by the bidder along with the technical bids.

ii. The bidders shall submit literature/brochures of the products and components being offered in the technical bid in response to this tender enquiry.

iii. **Note:-**Failure to provide these documents along with technical bid will be deemed as NON-COMPLIANCE. All such technical bids will be considered as NON-RESPOSIVE and are liable to be REJECTED.

iv. The manufacturer should provide detailed manuals for operation, servicing and maintenance of each sub system including all block diagrams and detailed circuit diagrams.

v. The catalogues of all the vital components used in the system should also be provided.

vi. The copies of software listings may be provided in the form of CD ROMs or other suitable media. All manuals should be given in printed form also.

vii. Separate hard & soft copies of manuals must be provided for each station.

viii. RFP document is to be returned in original with all the Tender documents along with the terms and conditions Eligibilty Criteria only filled up and should be sealed as per procedures explained in the letter. Each page of the RFP including terms and conditions should be stamped and signed by the bidders.

Sale of bid document of RFP starts from **11.04.2014 to 22.04.2014 at 5.00 PM**
Date of Pre Bid Meeting: **25.04.2014 at 3.00 PM**
Last date of submission of Tender Form: **30.04.2014 at 2.00 PM**
Date of opening of Tender and Technical Bid: **30.04.2014 at 3.00 PM**
Date of opening of financial bid - **30.04.2014 (After Evaluation of Technical Bid)**
Venue: -Directorate of economics & Statistics, Bihar, Patna Phone no.-0612/2280322 Email: dir-stat-bih@nic.in

22.COMPLIANCE/NON-COMPLIANCE STATEMENT

The tenderer shall submit a detailed item-wise compliances/non-compliance statement referring Para-wise to the requirements given in this document. The compliance statement shall be supported by original brochure (s) of the equipment or sub component from the manufacture. In case the original brochure is silent on any part of tender specification, it shall be supported by an undertaking by the manufacturer, if claimed complied. Make and models of all the equipment should be given.

Compliance/non compliance statement be submitted with hard and soft copy.

The technical specifications and other requirements contained in this document are essentially required by the indenter. However, reasons for non-compliance, even of small nature shall be mentioned clearly. **Silence on any part of the technical specification or failure/omission to provide any such details will be treated as non-compliance.**

23.EVALUATION OF TRIAL SYSTEM

Each bidder is required to install a complete trial system with PC based server in DES, Bihar, Patna for evaluation. The operation and features of the system needs to be demonstrated for 15 days. The cut-off date for installation of the trial system will be informed to all bidders. The bids of all vendors will be evaluated by the Technical Evaluation Committee based on the inputs available on the capabilities of the equipment being offered by the bidder. Hence the successful and foolproof performance of the trial system is a mandatory requirement for further evaluation of the tender bids.

24.SPARES AND CONSUMABLES

The vendor shall retain sufficient stock of spares and consumables at their nearest maintenance centre in Patna for replacement at field sites on priority basis during the warranty and maintenance period of 5 (Five) years.

25.INSTALLATION, SYSTEM INTEGRATION AND COMMISSIONING

AWS will be located in a fenced plot of land measuring 8m x 10m having adequate exposure for sensors. During all transportations, proper insurance shall be arranged by the bidder. Installation may be done as per details laid down in Annexure II, III, IV, and V.

Note: All the components of AWS network for NCR must be under the insurance cover against theft/sabotage/accidental damages during transport. The insurance charges will be borne by the bidder. All the transportation & insurance charges shall be paid by the bidder.

26.DELIVERY SCHEDULE

(a)	Delivery	I) All 484 AWS within three months of placement of supply order
(b)	Commissioning	ii) All 484 AWS within six months of placement of supply order.

In case of delay of supply of the consignment, liquidated damage change will be imposed @ 2% in delay of every month or its part to a maximum of 10%

Delivery of the equipment should be done at the district headquarter. Transporation cost of the material term district head quarter to the installation site will be borne by the bidder. The equipment must be under insurance during transportation.

If the bidder is unable to execute the project to the satisfaction of consignee, DES has right to re-tender after giving adequate notice to the supplier. The cost of re-tendering demurrage and the difference in the cost, if any, of the new order would be payable by the supplier.

27.PRICE PROPOSAL

The bidder shall submit the detailed price proposal containing separately, item-wise, the prices for each and every deliverable item and support services like fencing and other civil works separately. Since the plot size may vary, different items of the work for site preparation may be quoted as rate per square meter or per meter as the case may be.

Price proposal should be given in a separate sealed cover. Technical document should contain an exact copy of the price bid without revealing the price details.

Copy of un-priced bill of materials (hard &soft copy) should also be included in technical bid.

List of deliverables is given in (Annexure-I)-Since the turn-key solution is required therefore the list is suggestive and not exhaustive.

28.TESTING AND ACCEPTANCE

The bidder shall submit test and acceptance plan for comments by DES. The systems will be tested and evaluated at DES, Bihar, Patna according to the document.

29.SITE PREPARATION

The bidder shall prepare the AWS site according to the details and layout given in Annexure-II in and around, Bihar. It is to be ensured that DES's representative is present at the site at the time of site preparation/installation and official commissioning of the AWS site. All cabling in the AWS site should be concealed/underground using suitable GI/steel piping/conduits. Each site should have a good quality metal sign board (Size: Height 4ft x width 3 ft) as depicted below, which is painted in English and Hindi, with the following information

Government of Bihar
Directorate of Economics & Statistics
AUTOMATIC WEATHER STATION

Contact- Director (DES, Bihar, Patna)
Directorate of Economics and Statistics
FAX/Phone No-2215035
Phone No.-0612-2280322

(Property of Govt. Trespassers will be prosecuted) (Name of the station)

30.SYSTEM DESIGN REVIEW

After award of contract a detailed design review meeting will be conducted where full technical details of the system will be mutually discussed between DES or DES nominated expert/agency and vendor's engineers. A detailed design review document needs to be provided by the supplier. The full technical details of GSM/GPRS based AWS will be discussed and finalized in the Design Review Meeting. Test plan and general test procedures will also be discussed during this review.

31. RECURRING CHARGES FOR THE GSM/GPRS NETWORK

Successful bidder shall be responsible for payment of recurring charges towards GSM/GPRS network for 3 years after installation and commissioning of the AWS network.

32. SITE ACCEPTANCE CRITERIA

Site acceptance test will be as per DES criteria and firm has to show at the site whatever specification indicated in RFP regarding system test and sensor specification with manual validation at their own cost (ANNEXURE-IV). Procedure for site acceptance will have to be done on mutually agreed conditions as envisaged in the document (Tentative Format Attaches ANNEXURE-V) The satisfaction of DES representative and his satisfactory completion report; will only entail payment of the firm.

33. TERMS OF PAYMENT:

80% Payment of the material cost will be made on receipt of material at office or as directed by DES, Bihar in case of Indian supplier/indigenous firms. Remaining 20% of material cost will be paid after commissioning and acceptance by DES, Bihar or any officer authorised by DES, Bihar. No advance payment will be made towards installation charges.

34. LAW GOVERNING THE CONTRACT

- The Law of India shall govern this contract
- Irrespective of the place of delivery, the place of performance or place of payment under the contract, the contract shall be deemed to have been made at Patna.
- Jurisdiction of Court: The court of Patna alone shall have jurisdiction to decide any dispute arising out of or in respect of this contract.
- All the disputes, differences and questions arising in respect of the tender (Except those where otherwise herein provided for) shall be referred to the Principal Secretary, Department of Planning and Development, Bihar. The award of the Principal Secretary shall be final and binding on the parties. Upon each and every such reference, the assessment of the cost of the incidental to the reference and award respectively shall be at the discretion of the Principal Secretary, Department of Planning and Development, Bihar, Patna.
- For Technical evaluation of the bids, DES reserves the right to nominate any expert/agencies(s) at its discretion

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ANNEXURE-I

LIST OF DELIVERABLES

LIST OF DELIVERABLE ITEMS	QTY	UNIT COST	TOTAL COST
AWS EQUIPMENT CONSISTING OF			
Data logger and transmission system (with built-in display), suitable signal conditioning for analog/digital sensors, serial (RS-232 interface) PCMCIA/solid state memory drive (16 MB) solar charge controller, GPS Receiver.	484		
System enclosure as per NEMA-4 standards with gasketing etc.	484		
Sealed maintenance free rechargeable batteries 12 V (65 AH) or better	484		
Solar panels for charging the above battery (21V/30W)	484		
System operation, maintenance and service manuals (Hard copies) and CDs containing soft copies	484		
GSM/GPRS Equipment with suitable cables and connectors.	484		
GSM/GPRS Modern (Tx& Rx)	484		
GSM/GPRS antenna (Tx & Rx)	484		
GPS antenna (Tx & Rx)	484		
SENSORS	484		
Air temperature/relative humidity sensor with suitable connector and 10 m cable	484		
Atmosphere pressure sensor with accessories and cable	484		
Wind speed/wind direction sensors with 10 m cable	484		
Rain gauge sensor with 10 m cable	484		
Sensor mast assembly with suitable enclosures for housing the different sensor free from solar radiation etc.	484		
Solid state memory devices (16 MB)	57		
8 GB USB Pen Drive	57		
Hand held GPS	57		
LAPTOPS of standard brand like DEll/HP/Compaq (intel (R)core(TM)i5M (2.40 GHz, 3 MB L3 cache), Intel original Motherland, 4 GB DDR3 RAM or better, 500 GB SATA HD/ DUAL Layer DVD Writer, 2 USB, Serial, VGA, 10/100 Ethernet port, 56 kbps modern or better, WIFI, Integrated Bluetooth, Built in speaker, Latest version of windows 7 ultimate & MS office with license, Norton Antivirus with three years license.	57		

Hand-held high precision standard digital thermometer (Accuracy 0.1^0C)	15		
Wind speed/direction indicator	15		
Rain gauge calibration kits	15		
Standard relative humidity indicator	15		
"Standard rust proof locks (Preferably Godrej or Navtal make, with three keys) for Nema enclosure & AWS site.	968		
Display units for respective AWS site	484		
Server equipment and software (As per specification mentioned under RFP documents)	1		
GSM/GPRS based mobile phones with SIM card having lifelong validity.	57		
Standard INSTALLATION AND CIVIL WORK	484		
Leveling of sites, fencing of AWS, provision of 10m mast and other related accessories for	484 sites		
UPS	1+1		
Printer (Colour/ Laser Jet)	2		
Installation of AWS equipment and sensors including installation and commissioning of equipment & display units			
RECURRING CHARGES FOR GSM/GPRS NETWORK			
Recurring charges for GSM/GPRS network for 5 years			
Cables charges per meter for Display Unit			
Standard shaft for mounting of AT/RH sensor.	484		
Training	10 Persons	10 Days	

NOTE:- 1. All taxes and duties to be paid by the supplier.

2. GSM/GPRS equipement will suitable cables and connections include modem and antenna and as such no extra modem and antenna are required to be supplied.

ANNEXURE-II SPECIFICATION OF AWS SITE PREPARATION

1. AWS enclosure

Area of the AWS enclosure should be ideally8 m x 10 m. The approach to the AWS Platform should be made free of obstacles like bushes; trees etc and a suitable cement path form must be laid to approach the site. Detail guidelines for AWS site selection is enclosed as ANNEXURE-III

Imp Note: "In case of any practical problem regarding the site preparation, the decision of DES official will be final & binding".

2. Fencing for the AWS site

i. The height of the fencing for the AWS site enclosure must be 2 meters from the ground level.

ii. Fencing angle should be of size 50mm x 50mm x6mm and pre coated with red-oxide. Length of the angle shall be 2.8 meters i.e. (2.0m above ground level + 0.8m below ground level)

iii. Each fencing angle must be erected over a concrete pillar of dimension 1'x1'x2'9". The pillar must be 2' below the ground & 9" above the ground. Fencing angles must be mounted within the concrete and chain-link fixed around it.

iv. Two MS angles must be used diagonally at each of the four corner angles of the sites. The angles can be attached (with welding or the other appropriate means) from the middle of the existing corner angle to the ground. The depth of the support will remain the same as of main angle.

v. Distance between each fencing angle should be not more than 1m.

3. Chain-link

i. Dimensions of GI Chain-link: 3 inches x 3 inches and of gauge: 10 (3 mm diameter)

ii. GI chain-link mesh must be stretched and welded/fixed properly on the fencing angles.

iii. An iron angle must be fixed on the upper part of the fencing to have a neat finishing and at the same time to avoid loosening of the fencing over a period of time. The angle should be of 50mm x 50mm x 6mm & should have suitable length (so that it can be easily connected between two consecutive fencing angles).

4. GATE

i. Dimensions: 2 m X 1 m X 6 mm (Length x Width x Thickness) with locking facility.
ii. The gate must be fabricated by MS Angle whose dimensions should be minimum 30mm X 30mm X 6mm

iii. Suitable locking facility with 3 keys for safety purposes is mandatory Standard rust-proof locks like Godrej shall be used.
iv. Make sure that tower foundation and the gate are in a straight line.
v. Gate and MS Angle must be well painted with white/silver colour.

vi. Gate should have proper support of MS angles with additional Support of crossed MS angles.

5. Tower Foundation

Wind data is required to be measured at a height of 10 m. Hence the tower of height 10 m is required to be installed at all field sites. The tower must be tilt able& it should be possible to do all types of required maintenance work by tilting the tower.

The foundation of the tower should be built as per the existing CPWD procedure so that it can withstand a wind speed of 60m/s including all its enclosures.

6. Rain Gauge foundation

The Rain gauge foundation must be dimensions 1.5 ft X 1.5 ft (length X width) and 3 ft deep. The raised platform should be six inches above the ground level. The base plate of rain gauge should be 1.0 ft. above ground level. In the case of flood prone areas the base plate on which the rain gauge is mounted should be placed 1.0 metre above ground level. Such locations are to be decided based on the suggestion of respective DES's office.

The rain gauge should be mounted on a GI pipe of internal diameter 1.5"& thickness 3mm. It should have a minimum length of 3.5' which may be increased as per requirement in flood prone areas. 2.5' will remain inside the ground & remaining 1' will remain outside the ground. On the lower end of the pipe, a rod of length 6" & diameter 0.5" should be welded at an angle

0

pf 90. On the upper end where the rain gauge will be installed, a plate of diameter 9" & thickness 4mm should be welded in the middle of the GI pipe to make a suitable platform for the rain gauge.

7. Anchor Rod and Guy rope

The foundation for the Anchor Rod which holds the guy rope must be of dimensions 1.0 ft X 1.0 ft (Length x width) at the ground level and 3 feet deep.

i. The anchor rod (rusting resistant iron) should be of length 3 feet & diameter 0.75"

ii. One of its ends should be folded by 900 at a distance of 6 inches from the end (which will remain inside the ground

iii. The other 1' of the rod should remain outside the foundation & should be tilted by 30from the vertical towards the tower of the rod & should have a hook type structure to support the guy rope.

iv. Guy wire of suitable length (which may vary from site to site, made up of rusting resistant iron) & diameter 0.5" should be used.

v. Three guy wires are to be tied at an angle of 120from one another.

8. Proportions for concrete for foundations

Concrete pillar foundations for the AWS tower, fencing angle, anchor rod should be made in the volumetric mixing proportions as follows

I	Concrete Foundation	1(Cement): 2(Sand): 4 (Metal)
ii	Fine plastering	4 (Cement) : 1 (Sand)
iii	Concrete Pillar must be cemented to achieve smooth finish above the ground level	
iv	After 8 hours, these foundations should be cured with water at least 3 times a day for four days	

9. Local Earthing

i. The lighting arrestor rod is mounted on the top of the mast (Length: 1m Diameter 12mm. It must be pointed at the upper end)

ii. A copper wire should be welded to the lightening arrestor rod (Length: 15m, Diameter 8mm)

iii. The other end of the copper wire should be welded earthing rod (Length: 1.8m, Diameter: 15mm)

iv. The other end of the earthing rod should be welded in the middle of the copper plate (Dimension: 1'x1'x0.5)

Earthing Procedure

i. The earthling pit must be at least of 1.9 m depth & at least 2'x2' wide at bottom & 4'x4] wide at the top... it should be levelled & the copper plate should be buried in the earthing pit.

ii. The copper rod should be in the middle of the pit. The earthing pit has to be filled in the sequence of "6 inches of salt + 6 inches of charcoal + 6 inches of sand". This sequence has to be repeated till the pit is filled to the top.

iii. A GI Pipe of internal diameter 1" thickness 3 mm & length 2m (bent at 30at lower end at 6" from the end) must be buried parallel to the Copper rod (At some distance from it), to pour water inside the pit during dry season.

Note. The earthling of the tower & the instrument must be done separately.

10. Painting

i. The AWS tower is painted in equal sections of alternate colours of red and white.
ii. The fencing angles, chain-link fencing and gate should be properly painted in silver colour to avoid rusting. All concrete foundation shall be painted using white cement.

The relevant figures are shown in Fig I& II

Note: The tower height shall be 10 m. The successful bidder shall provide detail procedure to mount different components/units of the AWS on the mast.

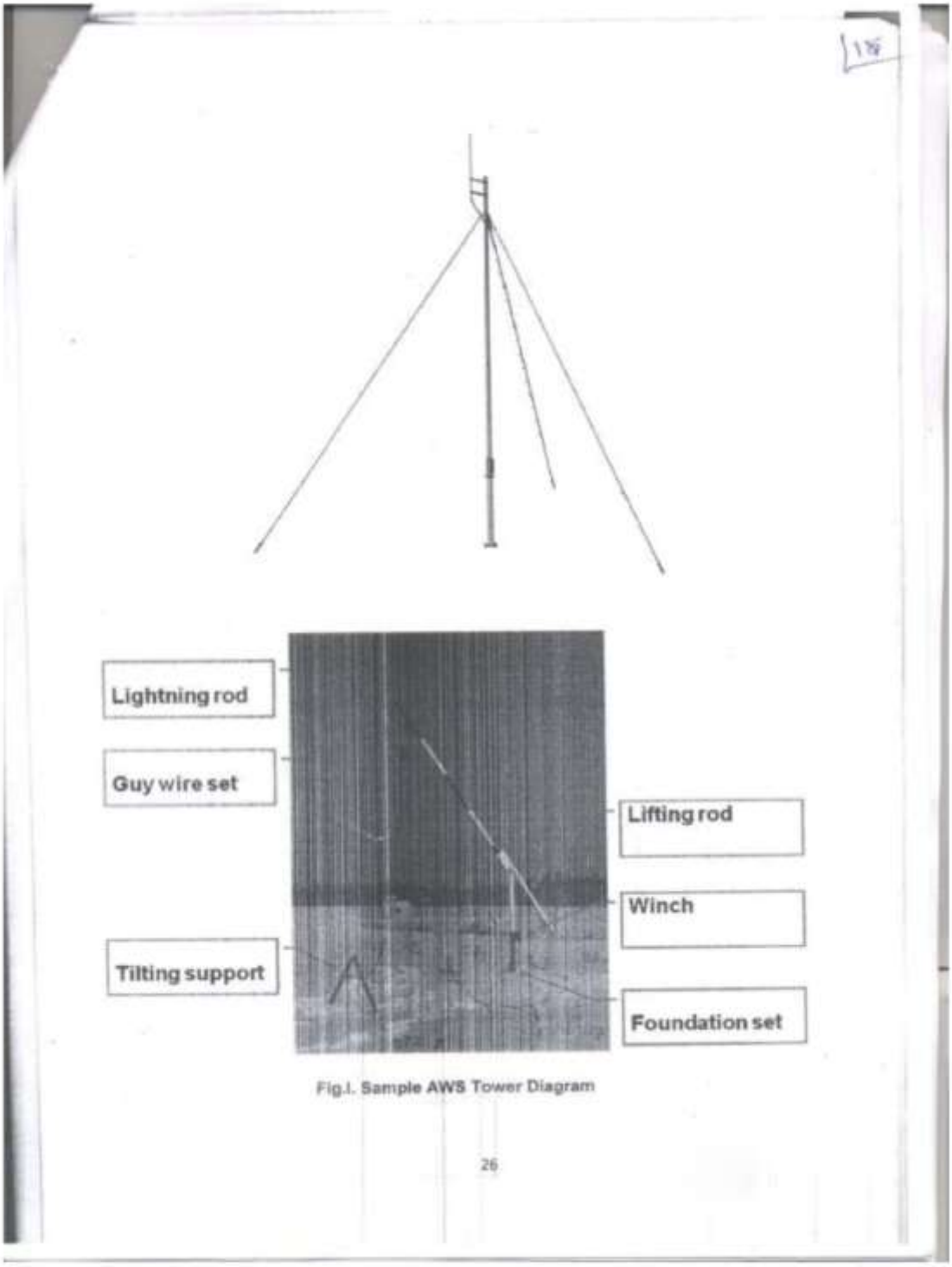

Fig.I. Sample AWS Tower Diagram

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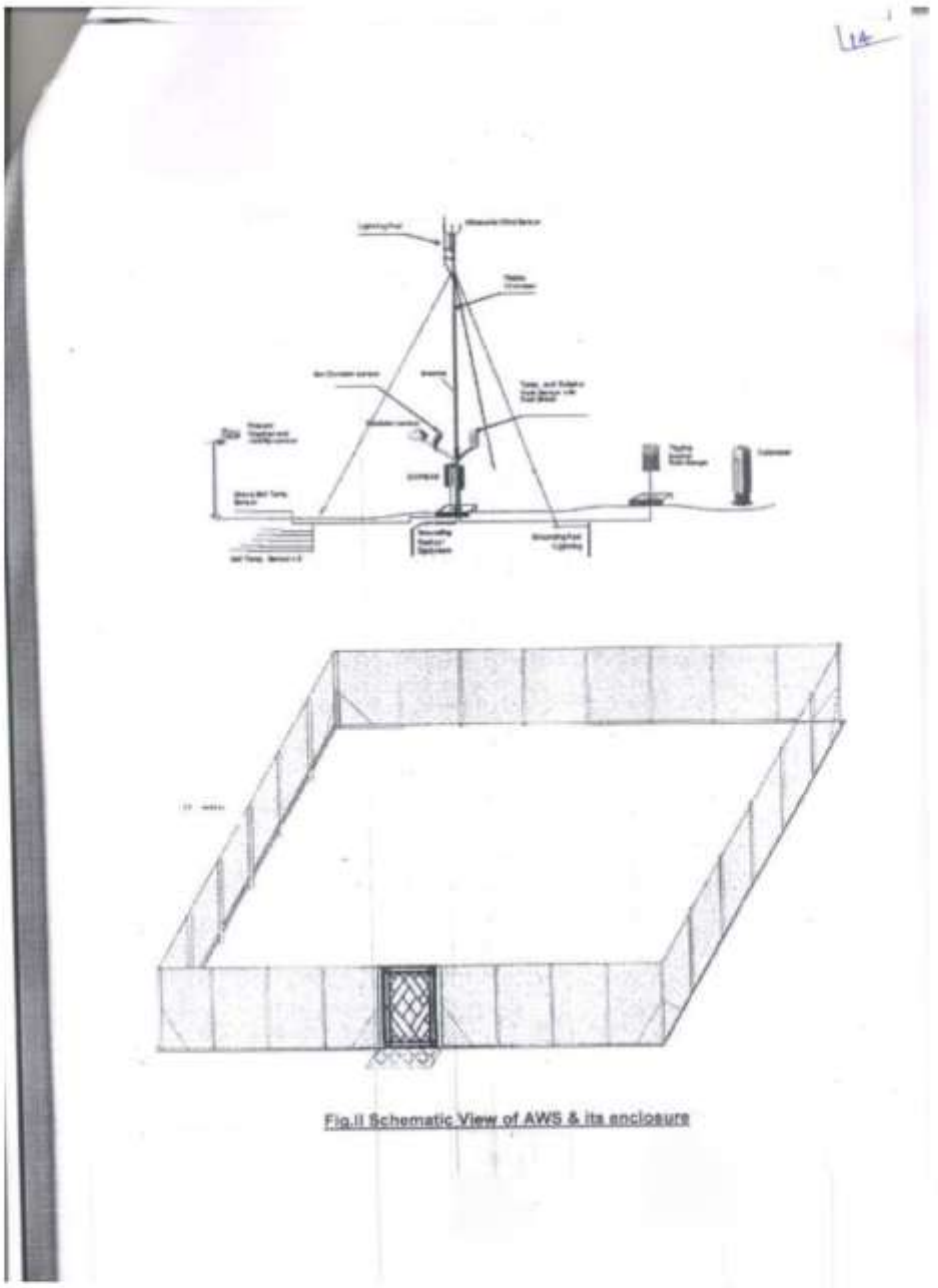


Fig.II Schematic View of AWS & its enclosure

ANNEXURE-III GENERAL GUIDELINES FOR SELECTION OF AN AWS SITE

In general, the guidelines to be followed while selecting a site for installing an AWS should be the same which have been prescribed by WMO for selecting a site for establishing a Meteorological Observatory.

Norms for site selection

1 The AWS is to be located on a level piece of ground, covered with short grass or natural earth approximately 15 metres X 12 metres in dimension. In the case of an Automatic Rain gauge Station (ARG) the size of the plot may be 5m X 7m. However, some relaxation may be given if enough space is not available.

2 The proposed AWS sit must be free from obstructions like tall buildings. Trees, etc.

3 The site should be free from any encumbrance.

4 Surroundings should be assessed for potential obstruction to selected sensors. Potential sensor contaminants (e.g. water and dust sources) should be identified)

5 Security aspect has to be given due consideration so as to avoid theft of AWS equipments

6 The site should preferably be located on the same level as the surrounding area of the station.

7 The site must be selected in such a way that the distance between the fencing of the site and the proposed AWS should be at least 15 feet (5 meters). This distance is recommended to minimize the effect of the fence on the sensors readings especially when weeds and/or debris on the fence act as a horizontal obstruction.

Conditions to be AVOIDED

8. Obstructions like tall buildings, trees etc

1 Location of the site on the edge of a slope, hillocks, cliff or inside a valley

2 Large industrial heat sources

3 Location near high-tension power lines.

4 Rooftops, Steep slopes, sheltered hollows, high vegetation, shaded areas or swamps

5 Low places holding standing water after rains

6 Underground obstructions like buried cables or conduits.

7 Pollution influence from surrounding farms and towns

Cont. Annexure -II1

Exposure conditions for sensors of meteorological parameters Wind speed and direction

The wind speed and direction sensors are required to be installed on a mast, at a height of 10m from ground level.

The sensors are required to be located on the mast, which is installed at a distance of at least ten times the height of nearby buildings, trees or other obstructions.

Air Temp & Relative Humidity

1 The standard measurement height for temperature and relative humidity sensor is 1.25 to 2m. It will be placed in a radiation shield provided with the sensor

2 The sensor is to be located at a distance of at least four times the height of obstructions like trees, building etc.

3 The sensors are generally located in an open level area that is at least 9m in diameter

4 The site enclosure should be covered by short grass or natural earth.

5 Large paved areas, bitumen surfaces in the vicinity of at least 30m have to be avoided.

Atmospheric pressure

The atmospheric pressure being an important meteorological parameter, the elevation of the station to which the station pressure relates is very important and hence the chosen site must be located in a flat terrain.

Rainfall

1 The rainfall sensor (tipping bucket) is placed in an open area as far as possible at a minimum distance of four times the height of any obstruction.

2 The standard measurement height is 30cm above ground level

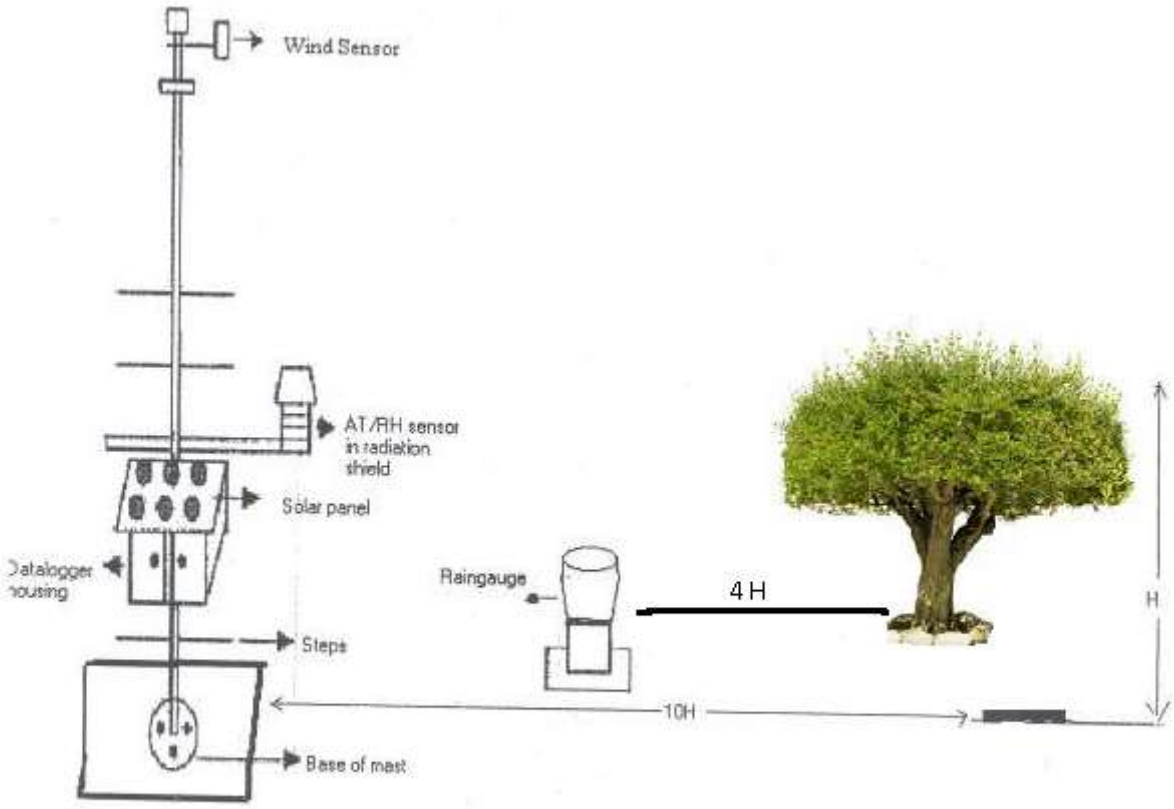
Solar radiation

Solar radiation sensors to be mounted at a minimum height of 3m to ensure easy levelling and cleaning

Data Logger

It will be housed in a weatherproof enclosure. The enclosure will be mounted on the tower at a height of about 1.5m

A pictorial representation of the AWS site is given. The figure is broadly suggestive and not exhaustive in nature.



The AWS mast should be located within a chainlinked fencing enclosure over an area of 15 metre x 12 metres which satisfies all the exposure conditions for sensors.

Documentation:

1 The site location should be documented with maps and photographs.

2 Information as to the location of the site, corresponding to cardinal directions on the compass, descriptions of obstructions (height, distance and breadth), vegetation and soil characterization are to be documented.

3 A site diagram with all the requisite details and a database about the station shall be prepared.

4 Indications of land use in the nearby areas will be useful for study of variations in meteorological parameters.

5 Permission (No Objection Certificate) from the land-holder of the site for installation of a semi-permanent AWS/ARG installation has to be obtained and documented

The coordinates of a station have to be recorded as under.

- The latitude to the nearest minute.
- The longitude to the nearest minute.
- The height of the station above mean sea level, i.e. elevation of the station to the nearest metre (height of pressure sensor which is located in AWS enclosure)
- Details regarding accessibility to the site by rail/road, modes of communication, boarding and lodging facilities, important Govt. /private offices in the vicinity are to be recorded.

ANNEXURE-IV Table for Comparison of the data

Time: In UTC (To be prepared for at least for 3 different UTCs (at an interval of minimum 12 hrs) before accepting the site.

Parameter		Data received in Data Logger	Data of Standard Sensor	Data received at Server at H.Q
Pressure				
Temperature	DP			
	WP			
WD				
WS				
Solar Radiation				
Rain*(Hourly)				
Rain*(Cumulative)				
Max Temperature				
Min Temperature				
Battery Voltage				

This will be tested by artificially pouring water into the sensor.

ANNEXURE-V

SITE ACCEPTANCE FORMAT		
1	Name of AWS	
2	Station ID	
3	Latitude	
4	Longitude	
5	Height a.m.s.l (meters) (Using hand held GPS the exact lat/long etc to be recorded)	
6	Datum pressure of the place	
7	Whether site selection conditions are satisfied, if not fetch details with reason	
8	Date of commissioning the site	
9	Address of site	
10	Availability of site keys with local officer in-charge (key number to be provided)	
11	Nearest distance at which AC power supply is available	
12	Whether computer is available with the observatory /organization in whose premises AWS is located?	
13	Whether permission for retrieval of data has been granted, if AWS is in the campus of other organizations?	
14	Provision of PCMCIA card/data cartridge/card reader for data retrieval.	
15	Whether software has been loaded in their PC for extraction of the data?	
16	**Details of civil work at AWS site**	
	Layout plan of the site	
	Foundation for the mast	
	Foundation for Guy ropes/support	
	Foundation for rain gauge	
	Earthing/Lighting protection	
	Photographs of the AWS site	

17	**Details of AWS** (Serial Number/Make)	
	Data Logger	
	GPS	
	Solar Panel	
18	**Sensors**	
	Air temperature	
	Relative Humidity	
	Wind Speed/Direction	
	Atmospheric Pressure	
	Rain gauge	
	Any other sensor (if any)	
	Check whether Tx are received at Server at H.Q	
	Transmission Power	

Name and signature of Name (with designation) and Signature of the Company's Representative Commissioning officer

Important Note:

The report duty filler in may be forwarded to O/o DES, Bihar, Patna along with remarks regarding problems faced in the site and other technical details required for future correspondence with the respective sites. A copy may be retained with District Statistical officer. Wherever possible, the officials of the local campus where AWS is installed must be involved in the supervision of the installation work and signatures are to be obtained to the effect that the work was done under their supervision and knowledge. The site will be treated as officially commissioned based upon the clearance from the local DES Office and subsequently by O/o the DES, Bihar, Patna.

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