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| **Page no.** | **RFP Reference** | **Requirement** | **Compliance** | **Remark** |
| 3 | 4 | OVERALL REQUIREMENTS |  |  |
| 3 | 4.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. |  |  |
| 3 | 4.II | All equipment should be qualified for MIL STD-454K Specifications and suitable for outdoor applications. |  |  |
| 3 | 4.III | The AWS must be housed in weather-proof enclosure and shall meet all specified environment specification of international standards. |  |  |
| 3 | 4.IV | Data logger must have certification from IMD/WMO for functional operation. |  |  |
| 3 | 4.V | AWS system should have in-built memory of storing data for at least 12 months period. |  |  |
| 3 | 4.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. |  |  |
| 3 | 4.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 and its laying should be given on per meter basis which will be used for cost comparison for cable component. |  |  |
| 3 | 4.VIII | Facility to give manual commands to transmit data for testing as well as for manual operation purposes shall be provided. |  |  |
| 3 | 4.IX | Facility for standard positioning system(SPS) with GPS(location and time) receiver.(L1 frequency) shall be provided. |  |  |
| 3 | 4.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. |  |  |
| 3 | 4.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. |  |  |
| 3 | 4.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. |  |  |
| 4 | 4.XIII | Necessary software for communication purpose for submitting data to the central server is required. |  |  |
| 4 | 4.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. |  |  |
| 4 | 4.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 desired credentials.Directorate has right to split the tender at the lowest (l1) rate. |  |  |
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| 4 | 5 | GSM/GPRS COMMUNICATION REQUIREMENTS |  |  |
| 4 | 5.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. |  |  |
| 4 | 5.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. |  |  |
| 4 | 5.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. |  |  |
| 4 | 5.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. |  |  |
| 4 | 5.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 be programmed via SMS. |  |  |
| 4 | 5.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. |  |  |
| 4 | 5.VII | Facility to automatically gather data as & when needed at user-defined time interval and store in the server for later analysis. |  |  |
| 5 | 5.VIII | Respond to an SMS requesting for current weather data. |  |  |
| 5 | 5.iX | Automate SMS alarms at programmable levels for low/high temperature,strong wind,heavy rain and other adverse weather. |  |  |
| 5 | 5.X | The GSM/GPRS stations must be configured to call the Server phone number at a user-specified time. |  |  |
| 5 | 5.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. |  |  |
| 5 | 5.XII | Software to manage a GSM/GPRS network for auto troubleshooting and making the systems functional with minimum down time. |  |  |
| 5 | 5.XIII | Facility to transmit using both GSM and GPRS mode. |  |  |
| 5 | 5.XIV | Facility to display data,export to Excel, Mat lab or similar applications for graphical representation of weather data,Etc. |  |  |
| 5 | 5.XV | Provide data on sudden development like gust,threshold,rainfall etc. |  |  |
| 5 | 5.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. |  |  |
| 5 | 5.XVII | In GSM/GPRS AWS, there has to be an Omni directional antenna which transmits the signal to GSM/GPRS network. |  |  |
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| 5 | 6 | SPECIFICATIONS OF SENSORS |  |  |
| 5 |  | 1. 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. |  |  |
| 5 |  | 2. The Sensors along with the accessories shall be fully compatible with the data logger and transmission system specified below |  |  |
| 5 |  | 3.Optional features available with the sensors may also be clearly specified by the bidder. |  |  |
| 5 |  | **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 30 days. |  |  |
| 5 |  | **Solar Panel:** The solar panel should be enough rating to charge the battery during sun. |  |  |
|  |  |  |  |  |
| 6 |  | 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 |  |  |
|  |  |  |  |  |
| 6 |  | Wind Speed |  |  |
|  |  | Range(Operation): 0 to 60 m/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) |  |  |
|  |  |  |  |  |
| 6 |  | 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 |  |  |
|  |  |  |  |  |
| 6 |  | Pressure Sensor |  |  |
|  |  | Range(With single sensor): 600 to 1100hPa |  |  |
|  |  | Accuracy: +-0.2 hPa or better |  |  |
|  |  | Resolution: 0.1 hPa |  |  |
|  |  | Sensor Type: Solid state |  |  |
|  |  | Response Time: 10 sec or better |  |  |
|  |  |  |  |  |
| 7 |  | 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 |  |  |
|  |  |  |  |  |
| 7 |  | Rainfall Sensor |  |  |
|  |  | Range: Unlimited |  |  |
|  |  | Accuracy: +-5% |  |  |
|  |  | Resolution: 0.5 mm |  |  |
|  |  | Sensor Type: Tipping bucket rain gauge or any other suitable sensor |  |  |
|  |  |  |  |  |
| 7 |  | 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 sensory upkeep by the observational staff. |  |  |
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| 7 | 7 | DATA LOGGER SPECIFICATION |  |  |
| 7 |  | 1. 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. |  |  |
| 7 |  | 2. 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. |  |  |
| 7 |  | 3. The number of analog/digital SDI channels in the data logger must be compatible to the sensors being supplied. |  |  |
| 7 |  | 4. 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. |  |  |
| 7 |  | 5. The sensor's signal conditioning unit should be an integral part of the data logger. |  |  |
| 7 |  | 6. 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. |  |  |
| 7 |  | 7. 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. |  |  |
| 8 |  | 8. 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. |  |  |
| 8 |  | 9. 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. |  |  |
| 8 |  | 10. 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. |  |  |
| 8 |  | 11. 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. |  |  |
| 8 |  | 12. Storage of observed data along with time for all the parameters in the memory. |  |  |
| 8 |  | 13. 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. |  |  |
| 8 |  | 14.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. |  |  |
| 8 |  | 15. 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. |  |  |
| 8 |  | 16. 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. |  |  |
| 8 |  | 17.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. |  |  |
| 8 |  | 18. 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. |  |  |
| 8 |  | 19.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. |  |  |
| 8 |  | 20. The data logger should have capability to sample and log the data for specified parameter at user defined intervals in multiple log files. |  |  |
| 8 |  | 21. It must be configurable at the user end. |  |  |
| 8 |  | 22. The user must be able to reload/upgrade the software of the data logger in the field using a laptop. |  |  |
| 9 |  | 23. It must be remotely programmable. |  |  |
| 9 |  | 24. It must have open architecture to connect any commercially available sensor. |  |  |
| 9 |  | 25. It must have its own operating system and compiler. |  |  |
| 9 |  | 26. The software of the data logger should be able to check the quality of the data collected by the sensors. |  |  |
| 9 |  | 27. The data logger should be fully compatible with a laptop at the site level. |  |  |
| 9 |  | 28. 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. |  |  |
|  |  |  |  |  |
| 9 |  | DATA LOGGER SPECIFICATIONS:- |  |  |
|  |  | i.ADC Resolution : 32 bit or better ii.Conversion accuracy +/- lLSB Systemclock iii.Stability Long-term : 1 ppm/year or better iv.Stability (Temprature) : 3 ppm or better from-10 deg C to 55 deg C v.Operating Temprature range : -10 deg C to +60 deg C vi.Internal Memory : As required for storing of 1 year data vii.Battery Backup(Internal):Lithium Battery,Storage:2 years viii.Real-time Clock : GPS Synchronized ix.Watchdog Timer : System Reset upon microprocessor failure x.Samples Interval : 1 sec to 24 hr in 1 second increments(user selectable0 xi.Visual display : 16 character or more,alphanumeric LED/LCD to operate in temp,range -10 deg C to +55 deg C xii.Power consumption : Average over an hour shall be less than 0.5 at 12V D C including that of sensor,GPS and GSM/GPRS Modem **Power Supply** : i.Battery : Single 12V chargable maintenance-free battery 65 Ah capacity ii.Charge controller : Internal External iii.Solar panel : Rated capacity 30W,Open circuit Voltage:21 V,short circuit current 2.4A |  |  |
|  |  |  |  |  |
| 10 | 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 as SMS of weather data over GSM network ,GPRS communication feature 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. |  |  |
| 10 | 9 | GSM/GPRS MODEM |  |  |
|  |  | GSM and GPRS facility with fast and reliable wireless data communication 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 to be included for power supply in addition to the 12 V/65 AH battery specified).The bidder has to ensure that a turnkey solution is provided.i. Frequency range: 900 and 1800 MHzii.GSM and GPRS facility with fast and reliable wireless data communications.iii.Remote dial-up facilityiv.Shall support Voice,SMS and datav.Quad Band GSM transmissionvi.Accept standard SIM card with built-in holdervii.Operating Temperature :-10 to + 60 degrees Celsiusviii.RS 232 interface with data cableix.PC communication via RS232/485/USB/Ethernet Portx.Facility for fixed IP and domain transfer of data through GPRSxi.Support standard AT command set xii.Full voice call,SMS supportxiii.Compatibility for standard GSM/GPRS Network available in Indiaxiv.Suitable power supply battery to function during alarm situation like fog,thunder,rainfall etc.xv.If required additional power supply supported by solar panel needs to be included for power supply |  |  |
| 10 | 10 | GSM/GPRS ANTENNA |  |  |
|  |  | i.Frequency range : 900MHz :842-960 MHz/1800 MHz:1710-1800MHz ii.Impendence : 50 Ohms iii.VSWR : <=2.0 iv.Radiation : Omni directional  v.Operating temperature : -10 to +60 degrees Celsius vi.Connector : SMA adaptable to GSM/GPRS modem vii.Cable length : As required  viii.Max Power : To be specified |  |  |
| 11 | 11 | GPS ANTENNA |  |  |
|  |  | Centre Frequency :1575.42 MHz Band width : +/-1,023MHz SWR:2.0 MAX Impendence :50 Ohm. Current consumption:standard rating in MA  Supply voltage:3-5 volts Operating Temperature : -10 C to +60 C |  |  |
| 11 | 12 | HAND HELD GPS |  |  |
|  |  | i.Display: 256 TFT displayii. Tacking : Automatic tracking with a log facilityiii. Position : Lat/Longiv.GPS receiver: More than 10 parallel channel GPS receiverto continuously track and updatev. Acquisition Time: 10-20 secvi. GPS accuracy Position : Less than 20 meter Velocity : Less than 0.1 m/svii.Compass : In built electronic compass with resolution 1viii.Barometric Aliter : Accuracy :Less than 20 feet Resolution:1 foot,Range:0-25000 feetix.Pressure: In mbarx.Operating temperature: -30 to 50 degree Celsiusxi.Power : Rechargeable battery with charger(Battery life more than 24 hrs)xii.Memory : SD card slot,USB interface ,4GB SD cardxiii. Case : Carrying case |  |  |
| 11 | 13 | REQUIREMENTS FOR ONSITE DISPLAY/UNIT |  |  |
|  |  | External slave display unit to display the values of eight or more meterogical parameters near the premises of the AWS site are required. The following facilities are to be provided by the bidder i.Option for selection of sensor whose data is to be displayed is to be provided ii.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 iii.Provision to display hourly and daily maximum/minimum temperature and hourly,daily and daily cumuative rainfall  shall be provided. The daily cumulative rainfall shall be reset at every 03 UTC vi.One remote display unit is required for every location. On-side display unit is required to be installed at indoor  location ,not outdoor. v.Selection required in the configuration and set up files to  be provided. vi.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 vii.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 23 characters at a time viii.The display unit can be software programmable with a PC, if required ix.The design of the display unit should be universal with compatibility to interface any type of data logger. x. Display unit should have independent power supply  (AC MAins/Battery) xi.Provision for onsite display for user selected parameters at desired time interval. |  |  |
| 12 | 14 | DETAILS OF WEATHER PARAMETERS |  |  |
|  |  | The following weather parameters are required form thesensor interface with the data logger through GSM/GPRStransmission.i.Instantaneous sampled value of air temperature in deg C atevery 10 minute interval.Ii.Max. air temperature of the hour(samples taken every min)iii.Minimum air temperature of the hour (samples taken everyminute)iv.Daily maximum temperature(at 12 and 03UTC)v.iv.Daily maximum temperature( 03UTC)vi.Wind speed in Knots at every 10 minute interval with 3 minuet vector averaging.vii.Wind direction in degrees at every 10 minute interval with3 minute vector averaging.viii.Wind speed in Knots(3 minute vector averaging)ix.Wind direction in degree(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 values of RH at the end of every 10 minutes.xiv.Daily minimum and maximum value of relative humidityxv.Dew point temperature at every 10 minute interval.xvi.Cumulative rainfall since last reset(reset at 03UTC everyday)xvii.Hourly rainfall(reset every full four UTC)xviii.Battery voltage(hourly). |  |  |
| 13 | 15 | SPECIFICATIONS OF SERVER FOR THE GSM NETWORK(INDICATIVE) |  |  |
|  |  | i.CPU: Intel Xeon Six Core Processor or better (or any latest available at the time of supply without financial implication)with1 MB L2 cache memory per core or better.Ii.Mother board :Intel or better Original Mother Board Capable of800 MHz FSB or better.iii.Slots: 3PCI Express and 3 PIC 64 bit or 6PCI Express(64 bit)iv.Memory:16 GB 64 DIMM slots.v.Hard Disk Dirve:3\*160GB or more 10000rpm SCSI controller ultra320 hot plug.vi.Networking features:Dual LAN (10/100/1000)Network cardwith security management.vii.DVD(R/W) drive : Read/Write CD ROM/DVD with 52x or better.viii.Monitor : 21" colour LCD monitorix.Keyboard: 104 keysx.Mouse : Optical Mouse(three button)xi.Speakers : In-built/320 W with multimedia compatibility.xii.Sound card : AGP and Sound card.xiii.Video controller : On-board 8MB dynamic video memoryxiv.USB port : 6 USB ports(at least two in front)xv.Printer port(parallel port) : 1 NOxvi.RS 232 port(serial port) : 1 NOxvii.Power supply : Redundant Power supplyxviii.Fan : Redundant fanxix.PCMCIA card drive : In-built PCMCIA card drive xx.DAT drive : USB based plug-in type or built-in for taking back-upxxi.Modern: Internal 56.6Kbps(or more)xxii.Certification : Windows/Linux/Novell certifiedxxiii.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 networksxxiv.RDBMS package: Oracle or equivalent latest version.The platform for RDBMS package should be mentioned.xxv.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.xxvi.UPS on line with inverter and Maintenance-free batteries 12hour back-up at full load (input 160-270v); 220-230 output.xxvii.Additional software: Customized Application Software to process the AWS and 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 communication. |  |  |
| 14 | 16 | APPLICATION SOFTWARE |  |  |
|  |  | i.The central server shall have application software which shall have option 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 message to DES ,Bihar through standard TCP/IP socket communication.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 message through the application software in the server.iii.GIS based software in the central server Located at Patna(Bihar) to message the GSM network for troubleshooting and making the system functional with minimum down time.Options to indicate sensor that are non-functional in each of the sites may be provided.iv.The data received at the central 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 selected.The coded data will be used as an input to numerical weather prediction 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. |  |  |
| 15 | 17 | TRAINING |  |  |
|  |  | The manufacturer/supplier should provide in-depth training in hardware,software and integration to at least Ten DES officials in India or abroad for 10 working days in installation,operation and maintenance of the system. |  |  |
| 15 | 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 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 station 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 station allows maintenance to take place in the field, or at centre.i.The bid should include cost of the comprehensive warrenty 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 or central server.If the down time in more specified time the warranty period will be presumed to be extended by a period six timers the down time.ii.Penalty on the vendor will be imposed if he fails to replace the defective data logger, transmitter or sensor.GSM/GPRS modern within a fortnight.Cost of AWS a (@ 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.iii.The amount will be calculated at the end ofeach quarter and will be deducted from the final instalment of amount which will be pending with DES towards payment of installation and commissioning the last 50AWS.Remaining amount pending with DES towards installation charges of last AWSs will be paid to the vendor after the completion of year warranty period.iv.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.v.Reports of maintenance visits should be submitted on a quarterly basis to the DES,Bihar,Patna.vi.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 standard must be calibrated with standard available in DES .Hand-held GPS should be carried to the sites to get the correct geographical coordinates of the site.vii.If any part of the AWS a system is to be carried away for repairs then it should be replaced with a working part.viii.No advance payment will be made towards installation charges.Payment will be made after every 50 AWS are commissioned and accepted.ix.Incase of accidental or theft the bidder will be responsible to replace the spare within 5 days for the issue of spare from department.Spare 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 bidderAfter the end of five years of comprehensive maintenance the bidder will be paid the annual maintenance charges as per IMD norms |  |  |