AWS Tender Specifications:Lifecycle\_Management

# Air Temperature

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 17 | T.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 18 | T.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 19 | T.MST.3 | Maintenance/Support/Training | Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1099 | T.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Pressure

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 48 | P.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 49 | P.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 1104 | P.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Wind Direction

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 91 | WD.MST.1 | Maintenance/Support/Training | Access to the Instruments | It shall be possible for maintenance staff to have access to the installed sensors on top of the mast in a safe manner. Possibilities are, for example, a method to safely climb the mast, or a mast with a hinge so that the instruments can be lowered to ground level. If additional safety equipment is required, it shall be offered with the mast. | Inspection | Essential |
| 97 | WD.MST.2 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 99 | WD.MST.3 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 101 | WD.MST.4 | Maintenance/Support/Training | Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1111 | WD.MST.5 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Wind Speed

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 89 | WS.MST.1 | Maintenance/Support/Training | Access to the Instruments | It shall be possible for maintenance staff to have access to the installed sensors on top of the mast in a safe manner. Possibilities are, for example, a method to safely climb the mast, or a mast with a hinge so that the instruments can be lowered to ground level. If additional safety equipment is required, it shall be offered with the mast. | Inspection | Essential |
| 96 | WS.MST.2 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 98 | WS.MST.3 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 100 | WS.MST.4 | Maintenance/Support/Training | Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1112 | WS.MST.5 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Precipitation Amount

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 116 | PA.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 117 | PA.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 118 | PA.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate], software and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1105 | PA.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Relative Humidity

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 150 | U.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 151 | U.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 152 | U.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1110 | U.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# General

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 321 | G.MST.1 | Maintenance/Support/Training | Reliability detection of failures | The unavailability of either hardware or software parts that could prevent the execution of the systems primary function should not go by unnoticed. | Demonstration | Very Important |
| 322 | G.MST.2 | Maintenance/Support/Training | Subsystem failure shall not lead to overall system breakdown | Failure of a subsystem should not lead to a breakdown of the total system. | Demonstration | Very Important |
| 337 | G.MST.3 | Maintenance/Support/Training | Equipment design shall facilitate routine inspections | The design of equipment and cabinets shall facilitate routine inspections. | Inspection | Essential (Regional Input) |
| 338 | G.MST.4 | Maintenance/Support/Training | The system shall provide efficient maintenance procedures | The system may be designed in such a way that no scheduled preventive maintenance task require more than four hours of reduced operation within one year. | Inspection | Important |
| 339 | G.MST.5 | Maintenance/Support/Training | Replacement of components shall in general be possible within 45 minutes | System components may be replaceable within 45 minutes of arrival on site. | Inspection | Important (Regional Input) |
| 346 | G.MST.6 | Maintenance/Support/Training | Off-line test | The system allows for off-line testing in an isolated environment before and after installation. | Demonstration | Important |
| 347 | G.MST.7 | Maintenance/Support/Training | Pre-implementation test | The system allows for testing in the operational environment before implementation, without affecting the operation of the rest of the system. | Demonstration | Important |
| 358 | G.MST.8 | Maintenance/Support/Training | Standard components currently in use | It is customer’s policy to maintain uniformity in inspection and maintenance procedures for all meteorological facilities, and to keep a minimum level of spare parts. Therefore, it is recommended to consult the list of currently used makes for mechanical, electrical and software components.  List of component types currently in use by the customer: Item: Manufacturer:  Database management system [[xxx]] PCs [[xxx]] Servers [[xxx]] Network components [[xxx]] Modems [[xxx]] Routers [[xxx]] Cabinets [[xxx]] Rack equipment [[xxx]]  [[xxx to be completed by Customer]] | Inspection | Very Important (Regional Input) |
| 364 | G.MST.9 | Maintenance/Support/Training | On-line help | The system should provide built-in help facilities which are able to replace user documentation. The on-line help should be detailed enough to aid a user trained in the general principles of the system. | Demonstration | Very Important |
| 365 | G.MST.10 | Maintenance/Support/Training | Malfunctions notifications | In case of malfunction all delivered equipment should offer provisions for notification by means of a potential free contact. | Demonstration | Very Important (Regional Input) |
| 366 | G.MST.11 | Maintenance/Support/Training | Malfunction signalling | In case of malfunction all delivered equipment contains sufficient signalling functions. These functions enable the detection of malfunctioning parts. | Demonstration | Very Important (Regional Input) |
| 948 | G.MST.12 | Maintenance/Support/Training | Sensors not affixed to cables | To enable ease of maintainence, the sensor and associated cables should not be integrated together | Inspection | Very Important |
| 1118 | G.MST.13 | Maintenance/Support/Training | Recommended Spare Parts List | The Contractor shall submit a Recommended Spare Parts List (RSPL) based upon the Maintenance Conditions as specified in the Maintenance Conditions document and the required availability (MTBF, MTTR) as specified in the Requirement Specifications document. This list shall contain spare parts recommended by the Contractor to support/maintain the System and System Components during their respective lifetimes regarding the following: • For consumables the Contractor shall recommend an amount of spare parts sufficient for two years for the System and System Components. • For repairable System Components (or modules of System Components, if applicable), the Contractor shall recommend a number of spares based on the mean time between failure (MTBF) for that specific System Component. • For modules that can only be replaced as a whole in case of malfunctioning, the Contractor shall recommend a number of spares based on the lifetime of the System and on the MTBF as provided in the Requirement Specifications document. • The Contractor shall make a recommendation for COTS-items. | Inspection | Essential |
| 213 | G.CPP.1 | Capacity/Planning/Performance | Parameter and/or configuration changes | Activation of new or modified MIPS parameters and/or configuration settings, should not cause a decrease of the MIPS performance for longer than 10 seconds. MIPS parameters and/or configuration settings can be changed from the MIPS by a system administrator. For changing parameters and/or configurations and activation of the new parameters, a system operator password is required. | Demonstration | Very Important |
| 289 | G.CPP.2 | Capacity/Planning/Performance | Number of MIPS systems within the measurement network | The number of MIPS systems in an observation network should not be limited. It should be possible to set up several regional data collection sites that each have their own MIPS, collecting data from their own set of AWS’. Each MIPS should be able to connect to the MSS using TCP/IP, for dissemination of the meteorological reports. | Demonstration | Very Important |
| 302 | G.CPP.3 | Capacity/Planning/Performance | New equipment in new cabinets and racks | All new equipment that must be installed in cabinets or racks, shall be installed in new cabinets and racks, unless the customer wants to re-use existing equipment racks/cabinets. | Inspection | Essential (Regional Input) |
| 303 | G.CPP.4 | Capacity/Planning/Performance | Filling rate for new cabinets shall not exceed 70% of available space | Filling rate for new cabinets should not exceed 70% of available space. The remaining space should be available for future extensions. | Inspection | Very Important |
| 306 | G.CPP.5 | Capacity/Planning/Performance | Design life for the systems is 10 years | The system should be designed for a life cycle of at least 10 years. | Inspection | Very Important |
| 332 | G.CPP.6 | Capacity/Planning/Performance | Operational hours of system components | Under normal circumstances, system components shall perform their primary functions 24 hours a day and 7 days a week. | Inspection | Essential (Regional Input) |
| 351 | G.CPP.7 | Capacity/Planning/Performance | COTS materials are desirable and preferred | The use of Commercial Of The Shelf products (hardware, software, network components, etc.) is desirable and preferred. | Inspection | Very Important |
| 352 | G.CPP.8 | Capacity/Planning/Performance | Use of multi-sourcing products is desirable | The use of multi-sourcing products (like PCs) is desirable and preferred. | Inspection | Very Important |
| 353 | G.CPP.9 | Capacity/Planning/Performance | Use of [[NMHS Designated Character Set]] | The [[NMHS Designated Character Set]] character set shall be used for presentation. | Inspection | Essential (Regional Input) |
| 356 | G.CPP.10 | Capacity/Planning/Performance | Standard software | The use of standard software already in use by the customer is mandatory. Using non-standard software is only allowed after written approval of the customer. | Inspection | Essential (Regional Input) |
| 357 | G.CPP.11 | Capacity/Planning/Performance | Requirements for materials and components | All materials and components furnished shall be new and designed to meet the customer’s requirements. The supplier has to take into consideration that the installation shall not cause any damage to installations and systems. | Inspection | Essential (Regional Input) |
| 1085 | G.TR.1 | Tender Requirements | Tender Language | All Tender documents with be in [[insert Customers' preferred language]] | Inspection | Essential (Regional Input) |
| 1088 | G.TR.2 | Tender Requirements | Project/Tender Shedule | The Tenderer shall provide a Project Schedule/Implementation Plan with the offer. | Response | Essential |

# AWS Network Management

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 125 | ANM.MST.1 | Maintenance/Support/Training | Recovery from error situation | After an error situation the AWS Network Controller should automatically restore the situation before the error occurred, if this does not lead to repetition of the error.  Unfinished actions will be completed as much as possible, before operations are started again.  When after a certain configurable number of retries recovery still fails [[configurable by the NMHS]], the system component or system part should stop the recovery process and the place the system into 'hold'. | Demonstration | Very Important |
| 214 | ANM.MST.2 | Maintenance/Support/Training | Recovery mechanism | The MIPS should have a recovery mechanism to recover data that is missing from the AWS. For example, if due to data communication problems the MIPS was unable to connect to an AWS for some time, the data buffered at that AWS should be recovered when data communication becomes available again.   The recovery mechanism can work by identifying the time stamps of the last available data in the MIPS. The MIPS should retrieve the data from the AWS from the current time back to the time of the last available data in the MIPS. The newest data should be retrieved first, because the most recent data may be required for generating and disseminating reports.  Recovery should not disturb acquisition of new data in any way [that is, recovery runs at a lower priority to new data acquisition]. The period for which data should be recovered should be configurable up to the storage period of data in the AWS. The recovery mechanism should determine when no further data is available from the source, and then cease retrieval. | Demonstration | Very Important (Regional Input) |
| 218 | ANM.MST.3 | Maintenance/Support/Training | Tasks of administrators | The list below shows the minimum set of tasks that should the responsibility of the meteorological administrator:  AWS, meteorological administrator  • The number of days that data is stored  • The data to be stored  • Enabling and disabling of sensors  • Station configuration (what instruments present, parameters measured, calibration factors)  • Sampling rate  • Metadata (station ID, lat/long, station height, height of instruments,…)  • Switching on/off of logging information  • Choice of back-up sensors (if applicable)  • Algorithms for the basic processing of the (raw) data (for example, dewpoint temperature from ambient temperature and relative humidity, station pressure from measured pressure and height of barometer)  • Analysis of Inspection Reports | Demonstration | Very Important (Regional Input) |
| 964 | ANM.MST.4 | Maintenance/Support/Training | Tasks of AWS Technicians | The list below shows the minimum set of tasks that should be the responsibility of AWS Technicians:  • AWS, technicians  •Monitor the error reports  • Analyse all incoming errors and define corrective actions   •Solve all technical problems related to AWS’ and instruments that can be solved via remote access to the station  • Handle the alarm list administration, i.e. acknowledge alarms, change alarm status after corrective action, etc | Demonstration | Very Important (Regional Input) |
| 286 | ANM.CPP.1 | Capacity/Planning/Performance | Number of AWS’ in an observation network | The number of AWS’ should not be limited in an observation network. To add or remove an AWS in the network only ANM needs to be re-configured. | Demonstration | Very Important |
| 287 | ANM.CPP.2 | Capacity/Planning/Performance | Number of AWS on a measurement site | The number of AWS’ at one measurement site should only be limited for practical reasons. | Demonstration | Very Important |

# Measurement Data Archive

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 962 | MDA.MST.1 | Maintenance/Support/Training | Tasks of administrators | The list below shows the minimum set of tasks that should be handled by a meteorological administrator and system administrator:  MIPS, meteorological administrator  • The structure of the reports  • For all regular reports the generation time  • The time window in which specific reports have to be disseminated, and the action to take when there is delay  • The destination of reports. Multiple destinations should be possible, but at least to a MSS  • The number of days that reports are stored  • The levels, the algorithms and the actions for warnings  • The configuration of screen lay-out (this includes pre-defined graphs, the geographical map and all screens for making reports)     • Structures of the data fields that can be filled in manually   • Algorithms for the further processing of the (raw) data (for example, hourly and daily totals of radiant exposure, hourly totals of precipitation amount) | Demonstration | Very Important |
| 166 | MDA.CPP.1 | Capacity/Planning/Performance | Tools for data management | It should be possible to interactively access the data for data management tasks. The data/system manager should be provided with tools to execute search routines with standard queries or queries composed by the data/system manager himself, within all available data (bases), such as original data, processed data, metadata and the logs. | Demonstration | Very Important |
| 341 | MDA.CPP.2 | Capacity/Planning/Performance | Logging of external interfaces | The system should log all configured external interface data on the specified location. | Demonstration | Very Important |
| 343 | MDA.CPP.3 | Capacity/Planning/Performance | Logging retention period | The system shall retain logged data for a period of [[Time period to be determined by Customer, at least 7 days is recommended]]. The retention period shall be configurable. | Demonstration | Essential (Regional Input) |

# National Message Generation

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 336 | NMG.CPP.1 | Capacity/Planning/Performance | Report transfer time | The time required from reports becoming available on the NMG to being available on the message switch (MSS), should be no longer than 3 minutes. Since the MSS is connected to a LAN, this has to be arranged with the customer. | Demonstration | Very Important (Regional Input) |

# GUI

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 239 | GUI.CPP.1 | Capacity/Planning/Performance | Data on display | It shall be possible for all the data that is available/stored on any aspect of the MIPS to be displayed on the display. The data shall be displayed in client software or in a web browser. It shall be possible to display information on as many systems as desired without additional costs. | Inspection | Essential |
| 241 | GUI.CPP.2 | Capacity/Planning/Performance | Multiple active display windows | It should be possible to open multiple active display windows, where an active display window is a window on the screen in which the presentation is updated with the latest available data. The display-update frequency should be configurable per displayed meteorological element, the highest frequency being ‘real-time’ presentation It should be possible to have at least four active displays windows open at the same. | Inspection | Very Important |
| 288 | GUI.CPP.3 | Capacity/Planning/Performance | Number of displays connected to the MIPS | The number of display systems connected to any aspect of the MIPS, independent whether used by a system administrator, meteorological administrator or a technician, shall not be limited. This is valid for both options of a web based system or client software. | Demonstration | Essential (Regional Input) |
| 313 | GUI.CPP.4 | Capacity/Planning/Performance | Timeliness | Unless specified otherwise, actual information presented on-screen must be:  • in 95% of time, either current or not older than 60 seconds • in 100% of time, not older than 70 seconds. | Demonstration | Very Important |
| 335 | GUI.CPP.5 | Capacity/Planning/Performance | Transfer time data – to display systems | The time required from data becoming available on any aspect/part of the MIPS to being displayed on the displays (web based or client software), should be no longer than 3 seconds, independent of the numbers of displays that have to show the data. | Demonstration | Very Important (Regional Input) |

# IT Infrastructure

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 318 | IT.MST.1 | Maintenance/Support/Training | System Reliability | The system should use general purpose industrial computers as the main platform component for process control.The system should be designed for a yearly 99.97% availability (MTBF, MTBR < 2 hours). | Demonstration | Very Important (Regional Input) |
| 320 | IT.MST.2 | Maintenance/Support/Training | Reliability impact of single component failures | The failure of any single hardware component should have no significant consequences for the execution of the system’s primary function. | Demonstration | Very Important |
| 326 | IT.MST.3 | Maintenance/Support/Training | Reboot of Systems Components | The system should use general purpose industrial computers as the main platform component for process control.The reboot of any system component should not effect or disturb other processes in the observation network. | Demonstration | Very Important (Regional Input) |
| 328 | IT.MST.4 | Maintenance/Support/Training | Activate a new software release | All systems may be able to activate a new application software release within 10 minutes. The activation period denotes the start-up of an installed software release up to the moment that the software is ready for operational use. Application software does not include operating systems and package based software systems. | Demonstration | Desirable (Regional Input) |
| 329 | IT.MST.5 | Maintenance/Support/Training | Activate a previous software release | All systems may be able to activate a previously active software release within 10 minutes. The activation period denotes the start-up of an installed software release up to the moment that the software is ready for operational use. Application software does not include operating systems and package based software systems. | Demonstration | Important |
| 330 | IT.MST.6 | Maintenance/Support/Training | Recovery from failure | All system components may recover from failure without threatening the primary function of the system within 10 minutes. | Demonstration | Desirable (Regional Input) |
| 349 | IT.MST.7 | Maintenance/Support/Training | Installation tool | Software/configuration installation may be done by usage of a standard tool. The tool being used may be generally accepted for the applied computer system environment, or the tool may be built in to the software supplied. | Demonstration | Important (Regional Input) |
| 363 | IT.MST.8 | Maintenance/Support/Training | Define system users | An authorised user (system administrator) should be able to add new users to the systems, to configure permissions for users, and to remove users. | Demonstration | Very Important |
| 968 | IT.MST.9 | Maintenance/Support/Training | Availability of System Components | The availability of the single hardware components is as follows:  Component Availability MIPS 99,98%, ased on a MTBF of 12 months and a MTTR of 1 hour. | Inspection | Important |
| 308 | IT.CPP.1 | Capacity/Planning/Performance | Spare capacity | The system should be designed so that during events of peak loads, the resources of the system (CPU, memory, external memory, network access) are not loaded for more than 50% of the total capacity. | Inspection | Very Important |
| 312 | IT.CPP.2 | Capacity/Planning/Performance | Response time overviews | Response times for historic overviews/data retrievals should be 3 seconds or less. | Demonstration | Very Important (Regional Input) |
| 319 | IT.CPP.3 | Capacity/Planning/Performance | Reliability protecting data against loss | All data that cannot be reconstructed from external sources requires protection against loss.  [[The Customer may nominate a minimum time period for which data will be kept]] | Demonstration | Essential (Regional Input) |
| 965 | IT.CPP.4 | Capacity/Planning/Performance | Environment: temperature | The MIPS and display systems shall be able to operate in an environment with temperatures ranging from +5C to +50C. MIPS server equipment shall be placed in conditioned equipment rooms. | Inspection | Essential (Regional Input) |

# Communications

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 333 | C.CPP.1 | Capacity/Planning/Performance | Data communication capacity MIPS | The AWN shall collect data from the AWS/Smart Sensor at regular intervals. What data and the intervals shall be configurable. The NMHS shall specify whether data is pushed or pulled from the AWS station/Smart Sensor. The supplier shall define the requirements for the data communication speed and quantities to guarantee that the data will be available in the AWN on time.   The data communication capacity requirement shall be provided for regular operation and for peak load handling for the total number of AWS station in the observation network.  If data communication equipment is part of the project delivery, it shall be dimensioned so that no more than 50% is in use for regular operations, or no more that 75% for peak operation, whichever is more. | Demonstration | Essential (Regional Input) |
| 334 | C.CPP.2 | Capacity/Planning/Performance | Data communication capacity AWS | The AWS data communication equipment should be able to handle the transfer of regular data to the MIPS in less than 1/10th of the data collection interval. For example, if the data from the AWS is transferred to the MIPS at regular intervals of 10 minutes, the data transfer itself should take no longer than 1 minute. If data recovery is necessary, the remaining time can be used for that. | Demonstration | Very Important (Regional Input) |
| 961 | C.CPP.3 | Capacity/Planning/Performance | Data Transferral to Meta/Measurement Data Stores | The NMHS may have a primarily PUSH or PULL AWS architecture.  If PUSH, then at [Interval determined by NMHS, but shall not more than 10 minutes] the AWS/Sensor shall push all relevant Measurement and Meta Data to the relevant storage locations.  If PULL, then at [Interval determined by NMHS, but shall not more than 10 minutes] the AWS/Sensor shall have all measurements ready for a PULL request from the relevant Measurement and Meta Data storage locations. | Inspection | Essential (Regional Input) |
| 970 | C.CPP.4 | Capacity/Planning/Performance | AWS’ consist of identical hardware and software components | All AWS’ should consist of identical hardware and software components. However, the data communication equipment may be different for the AWS’ depending on what data communication is used for a particular observation site. | Inspection | Very Important (Regional Input) |
| 315 | C.F.1 | Financial | Communication costs | Communication between the AWS’ and any aspect of the MIPS, should take place against minimum costs. If the customer does not define what solution is to be employed, the Tenderer should investigate and offer the most cost effective solution. | Demonstration | Very Important |

# AWS/Smart Sensors

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 195 | AS.MST.1 | Maintenance/Support/Training | AWS/Smart Sensor-configurations from a remote location | Configuration (or changes of a configuration) of an AWS/Smart Sensor should be possible from a remote location and downloaded to the AWS/Smart Sensor. In addition, they can be made on the AWS/Smart Sensor itself through a local service connection. For both methods the AWS Network Controller should be used to actually perform the configuration or changes of the configuration. [[The NMHS may add additional security measures]] | Demonstration | Very Important (Regional Input) |
| 196 | AS.MST.2 | Maintenance/Support/Training | New AWS/Smart Sensor-software installed from a remote location | It should be possible to install new software versions from a remote location, using the AWS Network Controller. The old version of the software should not be removed until the newly downloaded software has been tested on the AWS/Smart Sensor and proven to be working correctly. To perform this action, a password [or other NMHS determined security] is required. | Demonstration | Very Important (Regional Input) |
| 197 | AS.MST.3 | Maintenance/Support/Training | Maintenance from a remote location | The AWS/Smart Sensor should support maintenance from a remote location using the AWS Network Controller. At least the following functions are supported: • inspection of the real time meteorological observations that are ingested/recorded by the AWS at its input (raw data) • inspection of the real time meteorological observations that are ingested/recorded by the AWS as it is stored in the AWS • inspection of log records • AWS system operator functionality as included in the AWS operating system • facilities to change parameter settings and/or station configuration  To perform these maintenance functions, a system operator password [[or other NMHS determined security]] is required. | Demonstration | Very Important (Regional Input) |
| 198 | AS.MST.4 | Maintenance/Support/Training | Direct maintenance access to the AWS | When the AWS/Smart Sensor is accessed for maintenance, this access shall not in any way interrupt the primary task of data acquisition, unless the data acquisition is explicitly stopped as planned.  The AWS/Smart Sensor shall have a separate extra physical port/interface for local connection to a computer for maintenance/configuration tasks. This may be a RS232, USB or other serial port/interface based on a standard protocol. Other options are allowed as long as all connection tools are supplied in case this port is not a standard port/interface. | Demonstration | Essential (Regional Input) |
| 331 | AS.MST.5 | Maintenance/Support/Training | Availability of System Components | The availability of the single hardware components is as follows:  Component Availability  AWS/Smart Sensors 99.98%, based on a MTBF of 12 months and a MTTR of 2 hour. | Inspection | Important |
| 1092 | AS.MST.6 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 1093 | AS.MST.7 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 1098 | AS.MST.8 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1100 | AS.MST.9 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |
| 171 | AS.CPP.1 | Capacity/Planning/Performance | AWS’ consist of identical hardware and software components | All AWS’ shall consist of identical hardware and software components. However, the data communication equipment may be different for the AWS’ depending on what data communication is used for a particular observation site. | Inspection | Essential (Regional Input) |
| 178 | AS.CPP.2 | Capacity/Planning/Performance | Interfaces for instruments and other sources | The AWS shall be equipped with all interfaces, physical interfaces and protocols, that are required to connect the selected instruments and other data sources to the AWS. | Demonstration | Essential (Regional Input) |
| 188 | AS.CPP.3 | Capacity/Planning/Performance | The AWS shall be able to handle data from multiple instruments of the same type | In the most extreme case, all instruments connected to an AWS could be of the same type. Unique identifiers should be used for all observed parameters. | Demonstration | Very Important (Regional Input) |
| 189 | AS.CPP.4 | Capacity/Planning/Performance | The AWS shall be able to handle data from at least N instruments | The AWS should be able to process and store data for all specified sensors, and have additional capacity [[NMHS to specify here]] for additional sensors. | Demonstration | Very Important (Regional Input) |

# MIPS All

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 235 | MIPS.MST.1 | Maintenance/Support/Training | Access to the MIPS for system management | The MIPS has three types of users with the following access rights:  • Technician access rights The technician is responsible for monitoring the technical status of the meteorological equipment. The technician has access rights to view certain displays and to take limited actions such as described in MIPS\_014.  • Meteorological administrator access rights The meteorological administrator is responsible for meteorological configuration of the AWS and MIPS, the algorithms, the instruments, etc.  • System administrator access rights The system administrator is responsible for the technical condition of all computer equipment, data communication equipment, and the ICT configuration of the systems (IP configuration, hardware and software configuration). The system administrator has access rights to all functions within the MIPS, but he should not change the meteorological configuration without approval from the meteorological administrator. | Demonstration | Very Important (Regional Input) |
| 963 | MIPS.MST.2 | Maintenance/Support/Training | Tasks of administrators | The list below shows the minimum set of tasks that should be handled by a meteorological administrator and system administrator: • MIPS, system administrator  - Adding/removing of users  - Defining user permissions  - Definition of user-groups and user-profiles  - Options related to automatic or manual generation/dissemination of reports  - Configuration of all data communication equipment  - System level configuration of all computers in the observation network system | Demonstration | Very Important |
| 1097 | MIPS.MST.3 | Maintenance/Support/Training | Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on all aspects of operation of the MIPS systems installed by the Tenderer. | Inspection | Very Important (Regional Input) |

# Software

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 1090 | S.MST.1 | Maintenance/Support/Training | Software Updates/Bug Fixes in Warranty Period | The successful Tenderer shall deliver Software Udpates/Bug Fixes without charge during the Warranty Period | Response | Essential |
| 1087 | S.TR.1 | Tender Requirements | Software Licenses | All software licences required for operation of the system delivered by the Tenderer shall be supplied to [[Insert Customers Officer Responsible]]. This Contractor shall be response for any issues regarding software licences and licensing. | Demonstration | Essential (Regional Input) |

# Soil Temperature

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 440 | ST.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 441 | ST.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 442 | ST.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1109 | ST.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Sunshine Duration

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 919 | SD.MST.1 | Maintenance/Support/Training | Access to the Instruments | It should be possible for maintenance staff to access to the sensors for regular cleaning of the domes. | Inspection | Very Important |
| 938 | SD.MST.2 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 939 | SD.MST.3 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 940 | SD.MST.4 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1107 | SD.MST.5 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Direct Solar Radiation

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 797 | DSR.MST.1 | Maintenance/Support/Training | Access to the Instruments | It should be possible for maintenance staff to access to the sensors for regular cleaning. | Inspection | Very Important |
| 818 | DSR.MST.2 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 819 | DSR.MST.3 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 820 | DSR.MST.4 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate], software and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1101 | DSR.MST.5 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Global/Diffuse Sky/Reflected Radiation

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 719 | GDR.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 720 | GDR.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 721 | GDR.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1102 | GDR.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Long Wave Radiation

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 861 | LWR.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 862 | LWR.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 863 | LWR.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1103 | LWR.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Precipitation Intensity

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 578 | PI.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 579 | PI.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 580 | PI.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate] and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1106 | PI.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |

# Snowfall/Snow Cover

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| ID | WMO Tag | Functionality | Requirement Heading | Requirement | Test | Importance |
| 604 | SSC.MST.1 | Maintenance/Support/Training | Calibration Instructions | Each instrument should be provided with a paper and electronic (pdf) copy of clear calibration instructions. | Inspection | Very Important |
| 605 | SSC.MST.2 | Maintenance/Support/Training | Calibration Equipment | If requested, a proposal should be provided for equipment to execute calibrations. | Inspection | Very Important |
| 606 | SSC.MST.3 | Maintenance/Support/Training | Calibration Training | Customer technicians should receive training onsite or at a location designated by the NMHS, on calibration, installation, maintenance, software, QC/inspection [if appropriate], software and operational procedures for the instrument. | Inspection | Very Important (Regional Input) |
| 1108 | SSC.MST.4 | Maintenance/Support/Training | Documentation | The Tenderer should provide documentation in electronic format [with permission for the Customer to reproduce for internal use] outlining:-   - basic theory/principles of operation of equipment</   - step by step instructions on the required maintenance and the frequency with which this maintenance is recommended to be performed.  - recommended spare parts and test equipment (for maintenance and repair) | Inspection | Very Important |