**TECHNICAL SPECIFICATION**

**FOR**

**DN583321 - Global Navigation Satellite System (GNSS) Antenna & Receiver’s**

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[1. General Requirements 2](#_Toc420058888)

# General Requirements

This section details the technical specifications that the solution will be required to meet.

Each requirement is articulated in the form of a question, to which Bidders should respond using the boxes provided.

Bidders must provide responses to all the Technical Specification Questions.

Furthermore, your responses must provide explicit and comprehensive detail to give the Met Office confidence that you are able to meet each requirement. A statement of the form ‘this requirement will be met’ is not sufficient.

**Please note:** Bidders must submit a response that refers to one solution only. Where the Bidder has multiple potential solutions in its product range that may be suitable, it is for the Bidder to decide which solution to propose in their bid.

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| --- | --- | --- | --- | --- | --- |
| **Compliance to Specification** | | | | **50%** | |
| **1) Functional Requirements - Antenna & Receiver** | | | | | |
| The GNSS Antenna and Receivers will be expected to make satellite-based navigation system measurements for routine operations and must perform within the following specifications*.* | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 1.1 | Mandatory | | **Principle of Operation**  The GNSS devices shall have,   * very low noise GNSS carrier phase measurements with <0.5 mm precision * high precision advanced correlator techniques for multipath mitigation against pseudo-range measurements * excellent low elevation tracking down to zero degrees elevation * jamming resistant: ability to provide valid PVT in presence of jamming/interference that results in the loss of GNSS signals within a single band (L1, L2, L5, E6) | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 1.2 | Mandatory | | **Signals**  The GNSS devices shall,   * be able to receive all Global Positioning System (GPS), GLONASS, Galileo and BeiDou frequencies/signals without the need for additional licensing, costs, hardware, and software. Provide full details of exactly which GPS, GLONASS, Galileo and BeiDou current and future frequencies/signals can be received * have a minimum of 400 tracking channels * support the real-time streaming of RTCM3 MSM type 7 messages * be both IPv4 and IPv6 compatible * be remotely configurable via Transmission Control Protocol (TCP)/Internet Provider (IP) i.e., Web Interface, allowing full remote control and configuration, data retrieval, firmware update (these actions should be protected against unauthorised use through configurable security settings i.e., password protected) * in the event of a power failure, be capable of an auto start and return to the state it was in once power is resumed * be compatible with Ordnance Survey’s Network RTK software, specifically Trimble Pivot Platform (TPP) it must be in the TPP GNSS Receiver model list, which can be requested from Trimble Europe BV directly. | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 1.3 | Mandatory | | **Measurements**  The GNSS devices shall be capable of,   * fully independent code and phase measurements of all available frequencies. * GPS: carrier phase full wavelength,   Code (C/A, P, C Code).   * GLONASS: carrier phase full wavelength,   Code (C/A, P narrow Code).   * Galileo: carrier phase full wavelength, Code. * Beidou: B1, B2, B3 | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 1.4 | Mandatory | | **Antenna Design**  The Antenna shall,   * be a Commercial Off-The-Shelf (COTS) device * be of choke ring type design * be International GNSS Service (IGS) and EUREF Permanent Network (EPN) compliant. For this tender, IGS compliant is taken to be brands and models as described in the latest Receiver. and I14.atx file listings from Centre for Orbit Determination in Europe (CODE) * If an optional radome is available, then the I14.atx file should have entries for both with and without the radome. * have a proven track record of use within the IGS and/or EPN networks * have a phase centre accuracy of 2mm or better * have a phase centre repeatability of 1mm or better | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| **2) Service/System Conditions and Environment** | | | | | |
| The GNSS Antenna and Receivers will form a crucial part of a UK (United Kingdom) water vapour measurement network and with stringent criteria for availability of data. The Antenna must therefore be reliable working in continuous operation over the year, with an availability limited only by scheduled maintenance and calibration periods. Any problems resulting in interruption of operation must be capable of being resolved very quickly. | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 2.1 | Mandatory | | **Antenna & Receivers: Operating Conditions - Temperature**  The Antenna and Receivers shall function within the following range of environmental conditions of temperature,   * be capable of operating within the temperature range -30°C and +60°C. | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 2.2 | Mandatory | | **Antenna & Receivers: Operating Conditions**  The Antenna and Receiver shall function in its intended manner over the following range of environmental conditions of humidity during operation and storage.   * **Antenna & Receivers:** 100% Humidity proof. * **Antenna**: be suitable to operate in a coastal location (subject to high winds, rain, and airborne salt spray), and be expected to do so for a minimum of five (5) years. There should also be no requirement for periodic maintenance schedule to ensure continued environmental protection * **Antenna:** Materials used in the outer construction should be resistant to ultraviolet radiation and perform to IP67 with protection against blowing rain, and dust. | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 2.3 | Mandatory | | **Receiver: Construction**   * The Receiver should have in-band spectrum analyser and interference detection and mitigation (notch filters, auto or manual). This functionality must not impede on the Receivers’ ability to perform as a Continuously Operating Reference Station (CORS). The device must record such data, provide live streaming of raw spectrum data, and replay as required. | | Pass/Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 2.4 | Desirable | | It is desirable that all devices should be the current product which will not become outdated within at least twelve (12) months of the contract signing (unless an upgrade path is built into the contract)  **Antenna: Construction**   * The Antenna should be expected to perform in the field for minimum of ten (10) years (if the recommended maintenance schedule is followed).   **Receiver: Construction**   * The Receiver should have Ingress Protection rating of IP65 or better * The Supplier should confirm whether recorded data is in an open format or whether proprietary tools are required to view them.  If proprietary, the software must be supplied to export the recorded and analysed data to an open format. | | **3** |
| **Response** | [Bidder to enter text here] | | | | |
| 2.5 | Desirable | | **Antenna - Vibration**  It is desirable that the Antenna should be capable of withstanding strong vibration during operation,   * Compliance with ISO9022-36-08. | | **3** |
| **Response** | [Bidder to enter text here] | | | | |
| **3) Technical Specifications** | | | | | |
| The GNSS Antenna will form a crucial part of a UK water vapour measurement network and with stringent criteria for availability of data. The Antenna and Receivers must therefore be compatible with our current communications and power infrastructure. | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 3.1 | Mandatory | | **Antenna: Power Input and Consumption**  The GNSS Antenna shall have the following power inputs, impedance, gain, and noise figures,   * Power range must be in the range 3.3 to 12V DC * Nominal Impedance 50 ohms * Gain typically 40-50 dBi * Noise Figure <1.5 dBi | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 3.2 | Mandatory | | **Antenna: Ports and Connectors**  The Antenna shall have the following ports and connectors available,   * have either a TNC female or N-type female co-axial connector * the Antenna should have a standard 5/8” survey thread for mounting | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 3.3 | Mandatory | | **Receiver: Power Input and Consumption**  The GNSS Receiver shall have the following power inputs and consumption,   * Nominal 12V DC, range 10.5 – 28V DC * Power consumption should be in the region of 3.5W * capable of running off a UK mains power supply (~230V/50Hz) | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 3.4 | Mandatory | | **Receiver: Data Logging and Streaming**  The Receiver shall have the following data logging and streaming capability,  **Data Logging**   * Data Logging Data rates up to 50 Hz or better, supporting Receiver Independent Exchange format (RINEX), Hatanaka compression and formats including Zip compression * have a configurable elevation mask. * must support an epoch (independent carrier observation measurement) rate of a minimum 1Hz. * have local storage option of minimum 8GB. * have ability of local storage capable of storing data in a ring buffer (capable of deleting oldest files to prevent drive filling up completely). * be able to log data locally (either binary format or RINEX format) and stream real-time data concurrently.   **Streaming capability**   * be able to act as a Network Transport of Radio Technical Commission for Maritime Services (RTCM) data over IP (NTRIP) Server (sending real-time RTCM data) to a minimum of two separate NTRIP Casters concurrently. * be able to stream real-time data to a minimum of 5 concurrent TCP/IP connections. * Be able to concurrently stream real-time spectrum data for all GNSS bands, for external storage (e.g., cloud and local) and analysis (e.g., using common data analysis toolsets) * be capable of concurrently streaming real-time data and allowing remote access to local storage data files (for example, via ftp). | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 3.5 | Mandatory | | **Receiver: Remote and on-site Configuration**  The Receiver shall have the following capability,   * full control and configuration of the Receiver over a web browser through Ethernet or USB. * secure access using HTTPs, SSL certificates, access management and port blocking. * FTP (File Transfer Protocol) Server and FTP Client (push), * email notification * allow remote FTP access to local storage | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 3.6 | Desirable | | **Receiver: Function and Status Indication**  It is desirable the Receiver should have the following function buttons and external status indicators,   * ON/OFF button * Status indicators | | **2** |
| **Response** | [Bidder to enter text here] | | | | |
| 3.7 | Desirable | | **Receiver: Ports and Connectors**  It is desirable the Receiver should have the following ports and connectors available,   * RJ45 Ethernet * USB client (for connection to a PC or tablet) * External oscillator * UART serial & USB (for removable internal communication devices) | | **3** |
| **Response** | [Bidder to enter text here] | | | | |
| 3.8 | Desirable | | **Receiver: Expandable Communication**  It is desirable the Receiver should have the following communication slot,   * Exchangeable Radio/GSM/GPRS/UMTS devices supported | | **2** |
| **Response** | [Bidder to enter text here] | | | | |
| 3.9 | Desirable | | **Receiver: Cabling**  It is desirable the Receiver should be supplied with a 10m or longer antenna cable (exact lengths tbc when calling off requirements), and be capable of running a 60m length cable without need for a signal booster | | **1** |
| **Response** | [Bidder to enter text here] | | | | |
| **4) Maintenance, Documentation and Training** | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 4.1 | Mandatory | | **Antenna & Receiver: Documentation and Training**  Documentation required for installation, use, maintenance, and troubleshooting. | | Pass / Fail |
| **Response** | [Bidder to enter text here] | | | | |
| 4.2 | Mandatory | | **Antenna: Routine Maintenance**  Please outline the recommended maintenance for the GNSS Antenna, for each level of routine maintenance please state the following   * Recommended frequency of maintenance for each procedure. * Average downtime of instrument required for each level of maintenance. * What consumables will be required to be held to perform routine maintenance, and details of any necessary health and safety and COSSH assessment required. * Mean Time between failures of components that the Met Office may need to hold as spares. * List of components that may need replacing within the lifetime of the instrument. * What training will be required to perform routine maintenance. (Including any need for specialist tools)   **Receiver: Routine Maintenance**  Please outline the guideline maintenance regime: Receivers should not require field maintenance visits more frequent than yearly. | | Pass / Fail |
| 4.3 | Desirable | | **Receiver: Routine Maintenance**  The Receiver should qualify for free firmware updates for lifetime of the device | | **2** |
| **Response** | [Bidder to enter text here] | | | | |
| **5) Conformance Testing and Selection** | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 5.1 | For Reference Only | | **Receiver: Conformance Testing**  The conformance testing will evaluate the Receiver against the specifications defined above. | | N/A |
| **Response** | [Bidder to enter text here] | | | | |
| **6) Sustainability Requirements** | | | | | |
| **Question number** | **Question type** | | **Requirement** | | **Weighting** |
| 6.1 | Desirable | | **Packaging**  It is desirable that the packaging the solution (and any subsequent orders of spares and consumables) is delivered in is either:   * Made of recyclable or biodegradable materials, or. * Reusable by the supplier/manufacturer as part of a take-back scheme     Please confirm whether you can achieve this and, where you do, please explain how. | | **2** |
| **Response** | [Bidder to enter text here] | | | | |
| 6.2 | Desirable | | **Safe and Secure supply chains**  Please describe how you ensure that components used in the manufacture of your solution are sourced in a manner that minimises the risks of modern slavery and non-compliance with International Labour Organisation (ILO) conventions.  Your response should provide The Met Office with confidence that you have taken reasonable proactive steps in addressing these risks in your (or the manufacturer’s) supply chain. | | **2** |
| **Response** | [Bidder to enter text here] | | | | |
| **Social Value 10%**  [Procurement Policy Note 06/20 – taking account of social value in the award of central government contracts - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/procurement-policy-note-0620-taking-account-of-social-value-in-the-award-of-central-government-contracts)  The Social Value Model (‘the Model’) sets out government’s social value priorities for procurement.  It includes a menu of social value options, there are 5 themes and 8 policy outcomes which flow from these themes.  Social value legislation requires buyers of public sector services to consider whether there are related social, economic, or environmental benefits that can be delivered through the contracts they award. | | | | | |
| **Theme 2: Tackling economic inequality**  **Policy Outcome: Create new businesses, new jobs, and new skills** | | | | | |
| **Question number** | Question Type | **Requirement** | | **Weighting** | |
| **SV1** | **Award Criteria** | Demonstrate collaboration throughout the supply chain, and a fair and responsible approach to working with supply chain partners in delivery of the contract.  Using a maximum of 1000 words describe the commitment your organisation will make to ensure that opportunities under the contract deliver the Policy Outcome and Award Criteria.  Please include:   * your ‘Method Statement,’ stating how you will achieve this and how your commitment meets the Award Criteria, and * a timed project plan and process, including how you will implement your commitment and by when. * also, how you will monitor, measure and report on your commitments/the impact of your proposals.   You should include but not be limited to:   * timed action plan * use of metrics * tools/processes used to gather data * reporting * feedback and improvement * transparency   ● how you will influence staff, suppliers, customers, and communities through the delivery of the contract to support the Policy Outcome, e.g., engagement, co-design/creation, training, and education, partnering/collaborating, volunteering. | | **1** | |
| **Response** | [Bidder to enter text here] | | | | |
| **Theme 3: Fighting Climate Change**  **Policy Outcome: Effective stewardship of the environment** | | | | | |
| **SV2** | **Award Criteria** | Deliver additional environmental benefits in the performance of the contract including working towards net zero greenhouse gas emissions.  Using a maximum of 1000 words describe the commitment your organisation will make to ensure that opportunities under the contract deliver the Policy Outcome and Model Award Criteria.  Please include:   * your ‘Method Statement,’ stating how you will achieve this and how your commitment meets the Award Criteria, and * a timed project plan and process, including how you will implement your commitment and by when. * also, how you will monitor, measure and report on your commitments/the impact of your proposals.   You should include but not be limited to:   * timed action plan * use of metrics * tools/processes used to gather data * reporting * feedback and improvement * transparency | | **1** | |
| **Response** | [Bidder to enter text here] | | | | |