**Requirement Specification**

**1 ea. GPS-based Sounding System with**

**50 ea. GPS based Radiosondes**

1. **Requirements**

**1.1. Description of the requirement**

The document states the requirements for a GPS based Sounding System to be used by the Royal Danish Air Force (RDAF).

The GPS based Sounding System will be used for daily routine measurements and for expeditionary purposes. The daily routine measurements are normally made every working day during the early morning hours. The sounding provides pressure, temperature and dew point profiles up to an altitude of about 30.000 m. In addition, the wind direction and wind velocity are determined. From the obtained data specific Bulletins / Messages are generated and transmitted in to the airbases and used for planning of the day’s air operations.

**System Architecture**



Tripod with GPS antenna and

Telemetry Antenna

Processing Subsystem

Tripod with GPS antenna and

Telemetry Antenna

**1.2. Description and definitions**

The requirement specification, cf. section 1.4, describes all the requirements for the acquisition and consists of six columns with the following information:

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| --- | --- |
| "#" | ID number |
| "Requirement" | Requirement description |
| "Classification" | The classification of the requirement as further described in section 1.3 |
| "DALO remarks" | Further information regarding the requirement |
| "Requirement compliance" | The tenderer's indication of compliance (YES or NO) |
| "Tender description" | Requirements regarding the tenderer's compliance description |

**1.3. Classification**

All requirements are mandatory requirements (SHALL) and shall be fulfilled by the tenderer. If just one of the mandatory requirements is not fulfilled, the tenderer's tender will not be taken into further consideration.

**1.4. Requirement and response sheet**

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| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Classification** | **DALO remarks** | **To be filled out be the tenderer** | | |
| **Requirement compliance**  **(tick a box)** | | **Tenderer's description** |
| **YES** | **NO** |
| **1** | The vendor SHALL supply one GPS Sounding System including:   * One Tripod * One UHF antenna * One GPS antenna * One Ground Check Device * One Processing subsystem/unit * One Operator Working Position ( Laptop including dockingstation, Keyboard and mouse) * Light weight Transport cases for the Tripod part including UHF/GPS antennas * Light weight Transport cases for the indoor unit including the Processing Subsystem and PC * All necessary software * All hardware and software shall support use of the Danish or English character set * All necessary software licenses | SHALL |  |  |  |  |
| **2** | The vendor SHALL supply one portable balloon filling launcher | SHALL |  |  |  |  |
| **3** | The vendor SHALL supply EA 50 GPS based Radiosondes | SHALL |  |  |  |  |
| **4** | The Radiosonde SHALL be complient to the following standards and recommendations:   * Recommendations for Radiosonde accuracy defined in Annex 12.A of the 2014 revision (or newer) of the WMO Guide to Meteorological Instruments and Methods of Observation * Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC (or newer) * ETSI EN 302 054 V1.1.1 (or newer) of Harmonised European Standard regarding Meteorological Aids: Radiosondes to be used in the 400MHz band * ETSI EN 301 489-1 V1.9.1 (or newer) of Harmonised European Standard regarding Electromagnetic compatibility and Radio spectrum Matters (ERM) and Electro Magnetic Compatibility (EMC) for radio equipment and services * RoHS Directive 2011/65/EC (or newer) regarding the restriction of the uses of certain hazardous substances in electrical and electronic equipment * EU battery Directive 2006/66/EC (or newer) on batteries | SHALL |  |  |  |  |
| **5** | The vendor SHALL as a part of the offer provide a detailed technical assessment (White Paper) regarding the accuracy and reliability performance of the offered Radiosondes | SHALL |  |  |  |  |
| **6** | The vendor SHALL as a part of the offer provide Product Descriptions regarding the offered Sounding system and the offered Radiosondes | SHALL |  |  |  |  |
| **7** | The vendor SHALL as a part of the offer provide a detailed user guide in how to use the Sounding system regarding at least the following subjects:   * How to use the Sounding SW * Preparing the Radiosonde for sounding * Entering surface data * Launching the Radiosonde * Monitoring and terminating a sounding * Creating, viewing, editing and sending messages * Importing and exporting archive Sounding data * Troubleshooting | SHALL |  |  |  |  |
| **8** | The Radiosonde SHALL include an unwinder | SHALL |  |  |  |  |
| **9** | When installed the Sounding System SHALL function without degradation under the following environmental conditions for the Outdoor equipment:   * Operating temperature from -40° C to +55° C * Operating relative humidity for the mentioned temperature range, 0 – 100% * Operating precipitation, unlimited * Operating wind speed from 0 to 65 m/s | SHALL |  |  |  |  |
| **10** | The Sounding System SHALL have the following Mains Supply tolerances:   * Mains Voltage: 240 VAC ± 10%, 1 phase and 110 VAC ± 10%, 1 phase | SHALL |  |  |  |  |
| **11** | It SHALL be possible to:   * Fix the Tripod to the ground * Install the GPS antenna on the Tripod * Install the UHF Telemetry antenna on the Tripod | SHALL |  |  |  |  |
| **12** | The GPS antenna SHALL:   * Be used for reception of local GPS signals * Be immune to interference from other radiation signals * Have a Azimuth coverage of 360 ° * Have a Elevation coverage of 90 ° | SHALL |  |  |  |  |
| **13** | The Telemetry antenna SHALL:   * Be used for reception of radiosonde signals in the 400 MHz meteorological band * Be able to receive radiosonde signals from radiosondes up to 300 km away * Have a Azimuth coverage of 360 ° * Have a Elevation coverage of 90 ° | SHALL |  |  |  |  |
| **14** | The Processing subsystem SHALL:   * Be able to process data received from the Telemetry antenna and the GPS antenna * Be able to process data from the GPS radiosondes * Be able to communication with the OWP by a network cable (TCP/IP) | SHALL |  |  |  |  |
| **15** | The Sounding system SHALL:   * Be able to send the Bulletins / Messages in both the WMO format and the AFTN format * Be able to generate Bulletins / Messages automatically, when user specified pressure levels (hPa) have been reached during a sounding * Be able to send the automatically generated Bulletins / Messages automatically - if this functionality is chosen (Adjustable System Parameter (ASP) | SHALL |  |  |  |  |
| **16** | The Sounding system SHALL be generate at least the following Bulletins / Messages:   * FM 35-XI Ext. TEMP, Part TTAA,BB,CC,D * FM 38-XI Ext. TEMP MOBIL,   Part TTAA,BB,CC,DD   * FM 32-XI Ext. PILOT, Part PPBB * FM 34-XI Ext. PILOT MOBIL, Part PPBB * METB2/B3 (STANAG 4061) * METCM (STANAG 4082) * METFM (STANAG 2103) * METTA (STANAG 4140) * METEO 11 * TEMP SHIP FM36-XI * PILOT SHIP FM 33-XI * BUFR messages * 3`09`050 * 3`09`051 * 3`09`052 * 3`09`057 * 3`09`056 * 3`09`053 * CLIMATE TEMP FM 75-X | SHALL |  |  |  |  |
| **17** | It SHALL be possible for an Operator to:   * Edit the Bulletins / Messages manually during or after a sounding * Print the Bulletins / Messages * To choose if the Bulletins / Messages shall be generated automatically or by intervention of the operator * To view stored soundings (raw data) * To process stored soundings just like a real time sounding | SHALL |  |  |  |  |
| **18** | The GPS based Radiosondes SHALL:   * Be GPS based radiosondes * Be delivered properly wrapped so they can be stored for at least 2 years without any deterioration in functionality * Have a weight of max 150 g including battery * Have a size of max 225 x 90 x 90 mm * Be able to be tested before the launch | SHALL |  |  |  |  |
| **19** | The GPS based Radiosondes SHALL have a Temperature sensor with the following resolutions and accuracy:   * Measuring range from + 60° C to   -90° C   * Resolution better than or equal to 0,05° C * Accuracy better than or equal to   0,2° C >= 100 HPa  0,3° C < 100 HPa | SHALL |  |  |  |  |
| **20** | The GPS based Radiosondes SHALL have a heated humidity sensor in order to have a de-icing functionality when flying trough layers with freezing conditions | SHALL |  |  |  |  |
| **21** | The GPS based Radiosondes SHALL have a humidity sensor with the following resolutions and accuracy:   * Measuring range from 0 to 100% * Resolution better than 0,15% * Accuracy better than 2 to 4% | SHALL |  |  |  |  |
| **22** | The GPS based Radiosondes SHALL for communication with the Sounding System at ground use a transmitter which operates in the meteorological 403 MHz band (400,15 to 406 MHz) | SHALL |  |  |  |  |
| **23** | The Transmitter in the GPS based Radiosondes SHALL:   * Be Synthesized * Have a frequency stability according to EN 302 054 or equivalent * Have a bandwidth according to EN 302 054 or equivalent | SHALL |  |  |  |  |