TERMS OF REFERENCE
for
SUPPLY, DELIVERY, TESTING AND TRAINING OF 1 UNIT GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS Base and Rover Interchangeable Survey Equipment Compatible with the Existing RTK GPS)

A. Overview

One of the components of the Optimization Project is to conduct Hydrographic Surveys on identified river basins. In accordance to this, the acquisition of a Differential Global Positioning System (DGPS) will provide greater accuracy and efficiency on procuring the necessary data on the field. A DGPS is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.

DGPS uses a network of fixed, ground-based reference stations to broadcast the difference between the positions indicated by the GPS satellite systems and the known fixed positions. These stations broadcast the difference between the measured satellite pseudoranges and actual (internally computed) pseudoranges, and receiver stations may correct their pseudoranges by the same amount. The digital correction signal is typically broadcast locally over ground-based transmitters of shorter range.

B. Approved Budget for the Contract

The Approved Budget for the said item is Three Million Pesos (PhP 3,000,000.00).

C. Qualifications of Bidder

The complete requirements for a prospective bidder to qualify may be referred to in Section II Instructions to Bidders; the Bid Data Sheet; and the Checklist of Eligibility and Technical Requirements of the Bidding Documents. Specific mentions herewith are the following:

1. Prospective bidders who are not manufacturers or producers and acting merely as suppliers, distributors and the like of the goods and services that is subject of this bidding must be duly authorized by the manufacturer or producer of the goods and services and must be able to show valid proof of such authorization during the opening of bids (See manufacturer's certificate form);

2. Prospective bidders shall have the technical and financial capability as well as qualified technical personnel necessary to deliver the goods and services required for the project, if awarded the contract.

D. Period and Place of Delivery

The winning bidder shall supply, deliver and test the equipment within sixty (60) calendar days commencing from the date of receipt of the Notice to Proceed (NTP**)**. Delivery will be at 2nd floor, Planning and Project Management Office, PAGASA WFFC Bldg., BIR Rd., Diliman, Quezon City

E. Bid Proposal Contents

The prospective bidder is expected to comply and respond accordingly to the specific instructions and submit all the documentary requirements under the Checklist of Eligibility, Technical and Financial Requirements. The submission of the requirements must be properly arranged in order and with label, using only the prescribe forms.

The prospective bidder shall respond paragraph by paragraph and shall clearly indicate compliance to all the required specifications (*Please see Section VII. Compliance Matrix*) and shall specify the number of days or schedules within which to complete the delivery of all the goods required (*Please see Section VI Schedule of Requirements*).

It is likewise expected that the prospective bidders shall include in its submission the following documents:

1. The original descriptive literatures and unaltered brochures of all equipment/materials to be supplied.

2. Engineering Drawings and Diagrams submit detailed methodology of installation of the equipment with their corresponding system and network diagrams; and

3. List: The list of equipment to be supplied and breakdown of their corresponding prices using the required bidding forms (Please refer to Financial Component).

These details will enable the **PAGASA-Bids and Awards Committee** to fully evaluate and determine the bidder's compliance with the requirements of the project.

On the other hand, should there be any material and/or activities needed which were not specified or mentioned herein but are necessary to complete the project, the winning bidder shall immediately inform the end-user of the project for immediate action.

F. Technical Specifications

I. Base and Rover Station

1. Minimum 672 channels - Rover with correction back-up feature for RTK up to 5 minutes
2. Satellite signals tracked simultaneously

a. GPS: L1 C/A, L1C, L2C, L2E,L5

b. GLONASS: L1C/A, L5, L1P,L2C/A,L2P,L3

c. SBAS: L1C/A, L5 (for SBAS satellites that support L5)

d. Galileo: E1, E5a,E5B

e. Beudiu (Compass): B1, B2

3. Positioning Rates: 1Hz, 2Hz, 5Hz, 10Hz and 20Hz

4. CODE DIFFERENTIAL GNSS POSITIONING

   a. Horizontal = 0.25 m to 1 ppm RMS

   b. Vertical = 0.50 m to 1 ppm RMS

   c. SBAS differential positioning accuracy = typically<5m 3DRMS

5. STATIC GNSS SURVEYING

   a. High Accuracy Static

      - Horizontal = 3mm + 0.1 ppm RMS
      - Vertical = 3.5mm + 0.4 ppm RMS

   b. Static and Fast Static

      - Horizontal = 3mm + 0.5 ppm RMS
      - Vertical = 5mm + 0.5 ppm RMS

6. REAL TIME KINEMATIC SURVEYING

   a. Single Baseline <30km

      - Horizontal = 8mm + 1ppm RMS
      - Vertical = 15mm +1ppm RMS

   b. Network RTK

      - Horizontal = 8mm + 0.5 ppm RMS
      - Vertical = 15mm +0.5 ppm RMS
      - RTK start up time for specified precisions = 2 to 8 seconds

7. Capable of simultaneously do RTK survey and logging of raw data
8. Cellular Capable
9. WiFi capable
10. Data Formats: CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0,

    RTCm 3.1 inputs and outputs 24 NMEA outputs, GSOF, RT17 and RT27 outputs, supports BINEX and smoothed carrier
11. WebUI: offer simple configuration, operation, status and data transfer accessible via WiFi, Serial, USB and Bluetooth
12. Physical
    a. Dimensions (W X H): 11.9 cm x 13.6 cm (4.6 in x 5.4 in)
    b. Weight: 1.12 kg (2.49 lb) with internal battery, internal radio with UHF antenna
13. Operation Time on Internal Battery
    a. Base Station 450MHz systems: receive/transmit option (2.0 W) 5.5 hours
    b. Transmit Power: 2 W
    c. Observables: RT17, RT27, RTCM 3.x
    d. Position/Status I/O: NMEA-0183 v2.30, GSOF
14. Communication and Data Storage
    a. Ethernet: through a multi-port adaptor
    b. Bluetooth wireless technology: fully integrated, fully sealed 2.4 GHz Bluetooth module
15. Data Formats: CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCm 3.1 inputs and outputs 24 NMEA outputs, GSOF, RT17 and RT27 outputs, supports BINEX and smoothed carrier
16. Radio Modem
    a. Frequency: range of 403MHz to 473MHz
    b. Range: 3-5km typical/ 10km optimal
17. Sure point feature: Tilt compensation

II. Controller

1. Environmental specifications: IP68
2. Processor speed: minimum of 64-bit quad-core
3. Storage: 64GB
4. Memory: 8GB RAM, LPDDR4
5. Expansion; via sdhc card up to 2TB
6. Battery life: Medium usage approx. 5hrs can range 4-7 hours (depending on display settings, connectivity. Data processing, ambient temperature.
    a. Charging Time: Full-charge 3.5 hours
    b. Secure Windows: 10 pro operating system
7. Display: Large 7" inch multi-touch screen
8. Keyboard: Full QWERTY or ABC, with backlight, numeric key block FN keys (6 physical + 62nd function Fn keys)
9. Camera: Rear Camera 8 MP auto focus with Flash front camera 2MP fixed-focus LED Flash
10. GNSS: Integrated u-blox NEO-M8N,L1,GPS/GLONASS/BaeiDou
11. Physical Specifications
    a. Size: 20.9x 30.2x7.0 cm (8.2 x11.9 x2.76). Angled design
    b. Weight: 1.42(3.12 lb) kg including rechargeable battery
    c. Sensors: 3-axis accelerometer, Magnetic sensor, ambient light sensor, proximity sensor
    d. Handgrip

III. Processing Software

1. Same brand as the hardware
2. Capable of processing very long baselines (over 1000km) of static observation
3. Capable of applying key GNSS processing parameters like data correction to satellite orbits and clock, antenna phase center at the satellite and ground receivers, Differential Code Biases (DCB), Earth Orientation and Rotation Parameters (EOP).

IV. Warranty – 1 Year Standard Warranty

V. Accessories

1. Heavy duty tripod with tribrach
2. User's manual, range pole with bipod, data download cables, connection cables, hard case, Bags for controller

VI. Miscellaneous

1. All parts and accessories should be compatible with existing GNSS Unit of the Hydro-Meteorology Division (HMD)
2. Brand-product offer must be 30 years existing in experience supplying for the GNSS product worldwide.
3. Technical Support: phone access and site visit (must bring tools for fixing simple defects) – 24/7 Access
4. Supplier will conduct training (2-day training for the operation and features of the instrument for 25 participants). All expenses for this activity shall be shouldered by the supplier.
5. Delivery Period: Within sixty (60) calendar days from receipt of NTP.

G. Warranties / After Sales Support

1. The winning bidder warrants that it shall strictly conform to all the Terms and Condition of the Contract, including this Terms of Reference (TOR).
2. All workmanship, materials and equipment shall be warranted by the supplier for a period of **one (1) year** commencing from the date of acceptance. The warranty shall include:
   - Technical assistance when summoned to by the end-user regarding the delivery items.
   - Immediate replacement of the defective item/s, in any case of malfunctions during the warranty period.
3. While the equipment is undergoing repair, a spare unit shall be made available to PAGASA to maintain the continuous operation of the system. Repair of the defective materials or equipment shall be permitted provided that the repaired item meets original specifications.