

Document Title	Specifications – GNSS survey equipment and related software and maintenance contract
Version	1.0
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Document Control			
Version	Author	Date	Comments
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1. Definitions

TP = Transnet Property

OD = Operational Divisions

GNSS = Global Navigation Satellite System (general term describing any satellite constellation that provides positioning, navigation, and timing services on a global or regional basis).

Geospatial relates to data that can be used to identify and locate positions of physical objects/assets on the earth's surface.

Complete GNSS systems included Base (tripod, radio, antenna, batteries) and Rover (Receiver, plumb pole, bracket to hold hand held controller, Controller, antenna, batteries)

2. BACKGROUND

- 2.1. Transnet Property (TP), Geo-Spatial uses Global Navigation Satellite System (GNSS) survey equipment to execute land surveys (topographical, engineering, cadastral etc.) for Transnet Property, other Transnet OD's and to verify geospatial data for the drawing office.
- 2.2. The existing equipment is more than ten years old and since it is computerized it should be replaced every three to five years. The equipment is functionally and technically obsolete as spares are no longer kept by manufacturers thus leading to lengthy downtime periods.
- 2.3. The current GNSS only follows two of the constellations and surveys are at times limited to satellite availability. The new systems follow all the constellations and surveys are now possible in wooded areas (covered or forested), initialization is obtained quicker, and surveys are completed timeously. See list below for the constellations:
 - U.S. Global Positioning System (GPS)
 - Russian Global'naya Navigatsionnaya Sputnikovaya Sistema (GLONASS)
 - European Galileo System
 - Chines Beidou system
 - Indian Regional Navigation Satellite System (IRNSS)
 - Japanese QZSS system
- 2.4. Transnet Property (TP), Geo-Spatial wishes to approach the market to procure four (4) complete GNSS systems including related software and accessories for the four (4) regional offices as stated below in Section 3.

3. GNSS SURVEY EQUIPMENT REQUIREMENTS

The supplier is required to quote Transnet Property (Geo-Spatial) for four (4) new GNSS systems as stated below in table 1.

Regional Offices	QTY	Product Description
Cape Town (Western Cape)	1	GNSS Systems, related software and accessories
Gqeberha (PE) (Eastern Cape)	1	GNSS Systems, related software and accessories
Durban (Coastal)	1	GNSS Systems, related software and accessories
Pretoria (Inland)	1	GNSS Systems, related software and accessories
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Table 1: GNSS survey equipment requirements for Transnet Property

4. Technical and functional requirements

4.1. Range : Minimum Range of 5km but greater range will be an advantage

4.2. GNSS Specifications

- Code differential GPS positioning
 - Horizontal $\pm 0.25\text{m} + 1\text{ppm RMS}$
 - Vertical $\pm 0.50\text{m} + 1\text{ppm RMS}$
- Static and Fast Static GPS Surveying:
 - Horizontal $\pm 5\text{mm} + 0.5\text{ppm RMS}$
 - Vertical $\pm 5\text{mm} + 1\text{ppm RMS}$
- Kinematic Surveying:
 - Horizontal $\pm 10\text{mm} + 1\text{ppm RMS}$
 - Vertical $\pm 20\text{mm} + 1\text{ppm RMS}$
 - Initialization time 10sec to 15sec for baselines up to 10km
 - Initialization Reliability should be better than 99.5%
 - Capacity to track newest/latest constellations.
 - Tilt compensation (Accuracy required 15 – 20mm)
 - Real time correction service or equivalent. Rover receives direct correction from satellite.
 - Cellular (20Mbps), Bluetooth, Wi-Fi connectivity (20Mbps)
 - Battery solution provided to obtain 8 hours of constant work per day battery life. Battery should be hot swappable.
 - 6GB internal memory or more
 - Follow all major constellations.

4.3. Software

- Process the Raw data and provide output in industry standard formats e.g. Excel various formats, CAD, GIS, Survey related software
- Should include data transfer software.
- Survey Controller must be handheld.
- Software solution must be able to integrate with AUTOCAD software, Survey software.

4.4. Physical Characteristics

- GNSS Receiver must weigh less than 1.5Kg with internal battery, internal radio and UHF antenna.
- Survey Controller must weigh less than 1.25kg including rechargeable battery
- Battery solution to provide for an eight (8) hour day (Batteries to be supplied to provide this workday of 8 hours must cover - rover, base, survey controller and radio, for base and Rover.
- GNSS Receiver should survive a minimum 2m drop onto concrete.
- Controller and radio should survive a minimum 1.2m drop onto concrete.
- Must have a protective carry case.

4.5. Environmental

- Operating temperature range from -30°C to 60°C
- Storage temperature range from -40°C to 65°C
- Dust/Water Protection class at least meeting IP66, should be protected from temporary immersion to depth of 1 metre.
- Operating Humidity up to 90%

4.6. Survey Controller

- Full Colour Touch Screen, readable in daylight
- 32GB Storage or better with expansion memory slot & USB host
- Full QWERTY keyboard
- Integrated speaker and microphone
- 5MP camera or better, integrated GPS (Geo-referencing), compass and accelerometer
- Integrated Bluetooth, WIFI and GSM/GPRS
- Have cable free operation capabilities

4.7. Radio

- Should have link rates within the industry standard range (4800 to 256000bps)
- Wide frequency band width industry standard range (390 to 470MHz)

4.8. Accessories

- Tripod heavy duty with protective bag
- Pole Extension 25cm
- 5m Tape Measure, Metric/Tenths
- Tribrach, with optical plummet
- Tribrach Adapter, Fixed
- Snap-on Rod Level (Bubble)
- Rod - 2.0m Carbon fibre range pole without bipod

4.9. Software upgrade/maintenance

If any software upgrades are necessary during the three-year (or longer) maintenance period, they must be updated to the latest version of the software. Maintenance and servicing will be carried out by the local supplier. All support and training requirements will be fulfilled by the supplier, and evidence of their qualification to provide such support and training must be provided. Software updates typically include new tools and functionalities that were not present in the previous version. The service provider will consistently offer the latest software version through a physical data storage device or their website. Clear guidelines for the installation of upgrades should be provided. Maintenance and servicing are exclusively entrusted to the local supplier.

4.10. Telephonic technical support/Training

Telephonic technical assistance will be provided to end users encountering challenges with software usage and equipment operation. The service provider must be available during the office hours specified in the agreement. Training will be offered upon receipt of the GNSS equipment, software, and accessories.

4.11. Warranty (Mandatory items)

- No grey products will be considered.
- Minimum warranty of 3 years. (May be a combination of Supplier and Manufacturer warranty).
- Maintenance period of 3 years as per Scope of Works

5. Supplier support conditions

The service provider is required to clearly define the type of support that falls outside the standard annual software maintenance service, along with the corresponding hourly rate. The supplier should be reachable on weekdays from 7:30 to 17:00.

6. Deliverables

Upon receipt of payment, the GNSS systems and all the listed accessories will be delivered to the four Geo-Spatial Transnet offices located in Cape Town, Gqeberha, Durban, and Pretoria.



Terence Stiles

Date: 18/03/2024