

# Tersus GNSS

## TS20 GNSS Receiver

### Overview

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The TS20 is an innovative integration of visual positioning technology, GNSS, IMU and a camera. Its CAD AR visual stakeout allows for precise path planning, while the IMU ensures accuracy with no tilt angle limit.

It can provide high accuracy and stable signal detection with an internal high-performance multi-constellation and multi-frequency GNSS board. The high-performance antenna can speed up the time to first fix (TTFF) and improve anti-jamming performance. The built-in large capacity battery supports long time of fieldwork in 4G/3G/2G network and Rover radio mode. The built-in UHF radio module supports long-distance communication. The rugged housing protects the equipment from challenging environments.



### Key Features

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- ✓ Multiple constellations and frequencies
  - GPS L1C/A, L2C, L2P, L5
  - GLONASS L1C/A, L2C/A
  - BeiDou B1, B2, B3, supports BDS-3
  - Galileo E1, E5a, E5b
  - QZSS L1C/A, L2C, L5
  - SBAS supports WAAS, EGNOS, GAGN, SDCM, MSAS
- ✓ 1568 channels
- ✓ Professional camera, visual navigation and stakeout in One step
- ✓ 410-470MHz UHF radio, 4G network, Wi-Fi, Bluetooth, NFC
- ✓ Tilt compensation without calibration, immune to magnetic disturbances
- ✓ 32GB internal storage
- ✓ IP68-rated dust- & waterproof enclosure, for reliability in harsh environmental conditions
- ✓ Free subscription to Tersus Caster Service (TCS): transmit the correction data from TS20 Base to Rover

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### Technical Specifications

#### Performance

|  |   |
|--|---|
| Signal Tracking:                         |   |
| GPS                                      | L1 C/A, L2C, L2P, L5                    |
| BDS                                      | B1, B2, B3, supports BDS-3              |
| GLONASS                                  | L1C/A, L2C/A                            |
| Galileo                                  | E1, E5a, E5b                            |
| QZSS                                     | L1 C/A, L2C, L5                         |
| SBAS                                     | supports WAAS, EGNOS, GAGAN, SDCM, MSAS |
| Channels:                                | 1568                                    |
| Image Sampling Accuracy(Typically):      | 2cm <sup>(1)</sup>                      |
| Single Point Positioning Accuracy (RMS): |   |
| - Horizontal:                            | 1.5m                                    |
| - Vertical :                             | 2.5m                                    |
| DGPS Positioning Accuracy (RMS):         |   |
| - Horizontal:                            | 0.25m                                   |
| - Vertical:                              | 0.5m                                    |
| High-Precision Static (RMS):             |   |
| - Horizontal:                            | 2.5mm+0.1ppm                            |
| - Vertical:                              | 3.5mm+0.4ppm                            |
| Static & Fast Static (RMS):              |   |
| - Horizontal:                            | 2.5mm+0.5ppm                            |
| - Vertical:                              | 5mm+0.5ppm                              |
| Post Processed Kinematic (RMS):          |   |
| - Horizontal:                            | 2.5mm+1ppm                              |
| - Vertical:                              | 5mm+1ppm                                |
| Real Time Kinematic (RMS):               |   |
| - Horizontal:                            | 8mm+1ppm                                |
| - Vertical:                              | 15mm+1ppm                               |
| Initialization (Typical):                | 4s <sup>(2)</sup>                       |
| Initialization Reliability:              | >99.9% <sup>(3)</sup>                   |
| Network Real Time Kinematic (RMS):       |   |
| - Horizontal:                            | 8mm+0.5ppm                              |
| - Vertical:                              | 15mm+0.5ppm                             |

|  |                  |
|--|------------------|
| Time To First Fix (TTFF):                          |                  |
| - Cold Start:                                      | <30s             |
| - Warm Start:                                      | <5s              |
| Re-acquisition:                                    | <1s              |
| Timing Accuracy (RMS):                             | 20ns             |
| Velocity Accuracy (RMS):                           | 0.03m/s          |
| Tilt Compensation Accuracy (No tilt angle limit ): |                  |
|  | ≤2cm(within 60°) |
| Observation Accuracy (Zenith Direction):           |                  |
| - C/A Code:  | 10cm             |
| - P Code:  | 10cm             |
| - Carrier Phase:                                   | 1mm              |

#### System & Data

|                           |                                 |
|---------------------------|---------------------------------|
| Operating System:         | Linux                           |
| Storage:                  | Built-in 32GB                   |
| Differential Data Format: | CMR, RTCM 2.x/3.x               |
| Data Output:              | RINEX, NMEA-0183, Tersus Binary |
| Data Update Rate:         | 20Hz                            |

#### Communication

|                                 |  |
|---------------------------------|--|
| Cellular:                       | 4G LTE/WCDMA/GSM/EDGE  |
| Cellular Bands <sup>(4)</sup> : |  |
|                                 | LTE FDD B1, B3, B5, B7, B8, B20, B28                           |
|                                 | LTE TDD B38, B40, B41  |
|                                 | WCDMA B1, B5, B8   |
|                                 | GSM/EDGE 900/1800MHz   |
| Network Protocols:              | Ntrip Client, Ntrip Server, TCP<br>Tersus Caster Service (TCS) |
| Wi-Fi:                          | 802.11a/b/g/n/ac   |
| Bluetooth:                      | 5.0  |

# Technical Specifications

|                            |  |
|----------------------------|--|
| <b>Internal Radio:</b>     |  |
| RF Transmit Power:         | 0.5W/1.5W  |
| Frequency Range:           | 410MHz ~ 470MHz  |
| Operating Mode:            | Half-duplex  |
| Channel Spacing:           | 12.5KHz / 25KHz / 250KHz                                 |
| Modulation Type:           | CSS, GMSK, 4FSK  |
| Air Baud Rate:             | 4800 / 9600 / 19200bps                                   |
| Radio Protocols:           | LORA, TrimTalk450, TrimMark 3, South, Transparent, Satel |
| <b>Wired Communication</b> |  |
| USB:                       | Type-C, OTG  |

## Camera

|        |                     |
|--------|---------------------|
| Pixel: | bottom camera 2.0MP |
|--------|---------------------|

## Electrical

|                                   |                               |
|-----------------------------------|-------------------------------|
| External Power Supply :           | Support USB (5~20V)           |
| Fast Charging:                    | Support, 15W max (5V 3A)      |
| Lithium Battery:                  | Built-in, 7000mAh/7.4V        |
| Charging Time:                    | 3 hours (20%-90%)             |
| Battery Charging Temperature:     | +10°C ~ +45°C                 |
| Working Time:                     | up to 19 hours <sup>(5)</sup> |
| Smart Battery with Power Display: | Support                       |
| Electronic Bubble:                | Support                       |

## Physical

|                          |                            |
|--------------------------|----------------------------|
| Dimension:               | φ134x71mm                  |
| Weight:                  | ≈ 850g <sup>(6)</sup>      |
| GNSS Antenna:            | Integrated                 |
| Operating Temperature:   | -40°C ~ +70°C              |
| Storage Temperature:     | -55°C ~ +85°C              |
| Relative Humidity:       | 100% not condensed         |
| Dust- & Waterproof:      | IP68                       |
| Pole Drop onto Concrete: | 2m                         |
| Vibration:               | MIL-STD-810G, FIG 514.6C-1 |
| Warranty Period:         | One Year                   |

## Software Support

|             |
|-------------|
| Tersus Nuwa |
|-------------|

## User Interface

|                 |  |
|-----------------|--|
| Button:         | Power Button                                 |
| LED Indicators: | Satellite, Correction Data, Static, Solution |
| Voice:          | Support                                      |
| Power Display:  | Support                                      |

Note:

- (1) The measurement precision may be subject to anomalies such as multi-path, obstructions, satellite geometry , atmospheric conditions, etc.
- (2) The initialization time depends on various factors, including the number of satellites, observation time, atmospheric conditions, multi-path, obstructions, satellite geometry, etc.
- (3) The initialization reliability may be affected by atmospheric conditions, signal multipath, and satellite geometry.
- (4) Optional.
- (5) The working time of the battery is related to the working environment, working temperature and battery life.
- (6) The actual size/weight may vary depending on the manufacturing process and measurement method.

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