# Tersus GNSS
## LUKA GNSS Receiver

## Overview

The LUKA GNSS Receiver is a new generation GNSS RTK system, which is small, light, and easy to carry and operate. It supports a calibration-free tilt compensation function immune to magnetic disturbances; a leveling pole is unnecessary. The LUKA GNSS Receiver 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 7000mAh large capacity battery supports up to 19 hours 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

- ✓ Supports multiple constellations and frequencies
  - • GPS L1, L2, L5
  - • GLONASS L1, L2
  - • BeiDou B1I, B2I, B3I, B1C, B2a
  - • Galileo E1, E5a, E5b
  - • QZSS L1, L2, L5
  - • SBAS supports WAAS, EGNOS, GAGAN, SDCM, MSAS
- ✓ Supports 1568 channels
- ✓ 410-470MHz UHF radio [1], 4G network, Wi-Fi, Bluetooth, NFC
- ✓ Tilt compensation without calibration, immune to magnetic disturbances[1]
- ✓ The design is exquisite and compact, making it more convenient to carry and operate
- ✓ 8GB internal storage
- ✓ Up to 19 hours working in 4G/3G/2G network and Rover radio mode
- ✓ IP68-rated dust- & waterproof enclosure, for reliability in harsh environmental conditions
- ✓ Free subscription to Tersus Caster Service (TCS): transmit the correction data from LUKA Base to Rover

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## Technical Specifications

## Performance

**Signal Tracking:**

GPS L1/L2/L5;          BDS B1I/B2I/B3I/B1C/B2a;
GLONASS L1/L2;      Galileo E1/E5a/E5b;          QZSS L1/L2/L5
SBAS supports WAAS, EGNOS, GAGAN, SDCM, MSAS

| | |
|---|---|
| Channels: | 1568 |

**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[2] |
| Initialization Reliability: | >99.9%[3] |

**Network Real Time Kinematic (RMS):**

| | |
|---|---|
| - Horizontal: | 8mm+0.5ppm |
| - Vertical: | 15mm+0.5ppm |

**Observation Accuracy (zenith direction):**

| | |
|---|---|
| - C/A Code: | 10cm |
| - P Code: | 10cm |
| - Carrier Phase: | 1mm |

**Tilt Compensation Accuracy (No tilt angle limit ):**

| | |
|---|---|
| | ≤2cm(within 60°)[1] |

**Time To First Fix (TTFF):**

| | |
|---|---|
| - Cold Start: | <30s |
| - Warm Start: | <5s |
| Re-acquisition: | <1s |
| Timing Accuracy (RMS): | 20ns |
| Velocity Accuracy (RMS): | 0.03m/s |

## System & Data

| | |
|---|---|
| Operating System: | Linux |
| Storage: | Built-in 8GB |
| Differential Data Format: | CMR, RTCM 2.x/3.x |
| Data Output: | RINEX, NMEA-0183, Tersus Binary |
| Data Update Rate: | 20Hz |

## Software Support

Tersus Nuwa

## Communication

| | |
|---|---|
| Cellular: | 4G LTE/WCDMA/GSM/EDGE |

**Cellular Bands [4]:**

| | |
|---|---|
| | LTE FDD B1, B3, B7, B8, B20, B28 |
| | LTE TDD B38, B40 |
| | WCDMA B1, B8 |
| | GSM/EDGE B3, B8 |
| Network Protocols: | Ntrip Client, Ntrip Server, TCP Tersus Caster Service (TCS) |
| Wi-Fi: | 802.11b/g/n |
| Bluetooth: | 4.1 |

**Internal Radio[1]:**

| | |
|---|---|
| RF Transmit Power: | 0.5W/1.0W |
| Frequency Range: | 410MHz ~ 470MHz |
| Operating Mode: | Half-duplex |
| Channel Spacing: | 12.5KHz / 25KHz |
| Modulation Type: | GMSK, 4FSK |
| Air Baud Rate: | 4800 / 9600 / 19200bps |

# Technical Specifications

| Radio Protocols: | |
|---|---|
| | TrimTalk450, TrimMark 3, South, Transparent, Satel |
| **Wired Communication** | |
| USB: | Type-C, OTG |

## User Interface

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

## 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℃ ~ +45℃ |
| Working Time: | up to 19 hours[5] |

## Physical

| Dimension: | φ132x68mm |
|---|---|
| Weight: | ≈ 827g[6] |
| Operating Temperature: | -40℃ ~ +70℃ |
| Storage Temperature: | -55℃ ~ +85℃ |
| Relative Humidity: | 100% not condensed |
| Dust- & Waterproof: | IP68 |
| Pole Drop onto Concrete: | 2m |
| Vibration: | MIL-STD-810G, FIG 514.6C-1 |

Note:
(1)  IMU and built-in radio are optional, details refer to performance comparison table.
(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 for LUKA Ultimate is 99.99%, for Basic is 99.9%. May be affected by atmospheric  conditions, signal multipath, and satellite geometry.
(4)  Optional for LTE FDD B28A.
(5)The working time of the battery is related to the working environment, working temperature and battery life. Up to 19 hours working in 4G/3G/2G network and Rover radio mode.
(6) The actual size/weight may vary depending on the manufacturing process and measurement method.

# Performance Comparison

| PN | Version | Configuration |
|---|---|---|
| 628xxxxxxxx | Ultimate | IMU+UHF+4G |
| | | |
| | | |
| | | |

| Version | Ultimate |
|---|---|
| Channels | 1568 |
| GPS | L1/L2/L5 |
| GLONASS | L1/L2 |
| BeiDou | B1I/B2I/B3I/B1C/B2a |
| Galileo | E1/E5a/E5b |
| QZSS | L1/L2/L5 |
| SBAS | WAAS, EGNOS, GAGAN, SDCM, MSAS |
| GNSS Antenna | Integrated |
| Button | Power Button |
| LED indicators | Satellite, Correction data, Static, Solution, Bluetooth |
| Bluetooth | ✓ |
| 4G | ✓ |
| UHF radio | ✓ |
| Tilt compensation (IMU) | ✓ |
| Electronic bubble | ✓ |
| Memory | 8GB |
| USB OTG | ✓ |
| Battery capacity | 7.4V 7000mAh |
| Smart battery with power display | ✓ |
| Warranty period | Two Year |

**VALHALLA INSTRUMENTS**

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**AUTHORIZED RESELLER**