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# LUKA GNSS RECEIVER

## LIGHTER, SMALLER AND SMARTER

# LUKA GNSS RECEIVER

Smaller, lighter, and smarter. The LUKA GNSS receiver Ultimate version is equipped with a high-precision inertial measurement unit (IMU), which enables tilt measurement immune to magnetic disturbances. With calibration-free tilt compensation, the LUKA GNSS receiver offers reliable flexibility and efficiency, and surveyors no longer to keep the leveling pole upright. Additionally, the LUKA GNSS receiver comes with an internal high-performance multi-constellation, multi-frequency GNSS board that provides highly accurate and stable signal detection.
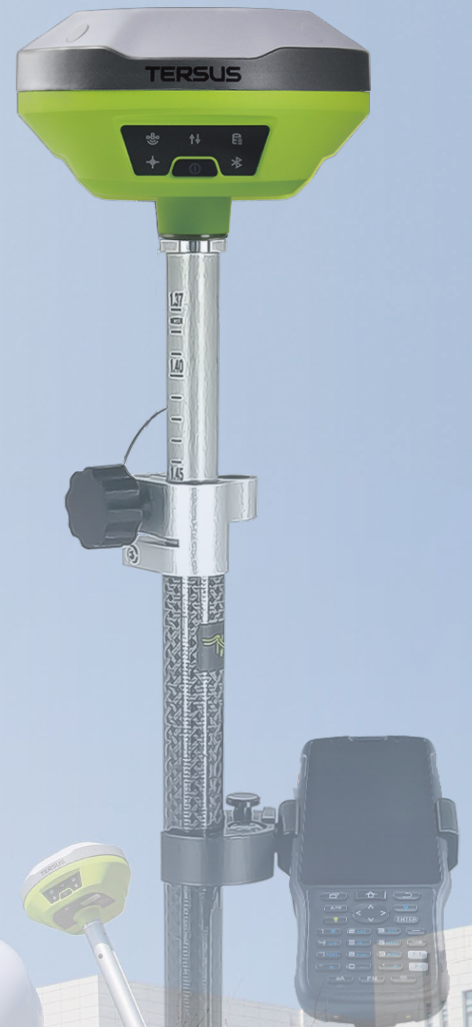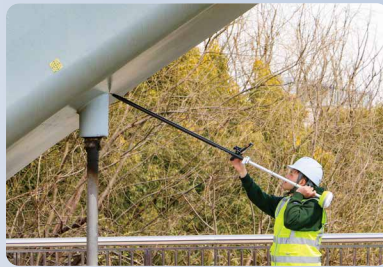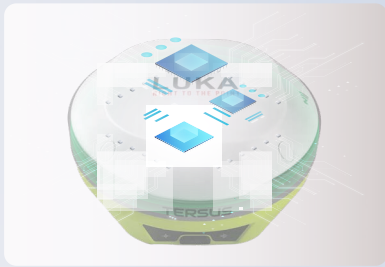
# Application Scenario

| Danger Zone | Hidden Point | Underground Utilities | Forest | City Canyon |

# Features

**Multiple constellations & frequencies:** GPS, GLONASS, BeiDou, Galileo, QZSS.

**1568 channels** for enhanced performance.

**High-accuracy tilt compensation** without calibration, up to **2cm within 60°**, immune to magnetic disturbances.

**Smart battery** with extended working hours and power level display.

**IP68-rated dust- & waterproof** enclosure for reliability in harsh environments.

**Rich data transmission options:** UHF radio, 4G network, Wi-Fi, Bluetooth, NFC.

**Flexible and fast charging methods:** 15W fast charging; Support power bank charging during Luka operation.

**Free Tersus Caster Service (TCS)** subscription for correction data transmission.

# Performance Comparison

The LUKA GNSS Receiver has four versions: Ultimate, Ultimate w/o UHF, Basic and Basic w/o UHF.
It provides selectivity for the requirement from different users.

| Version | LED indicators | UHF radio | Tilt compensation (IMU) | Memory | Warranty period |
|---|---|---|---|---|---|
| Ultimate | Satellite, Correction data, Static, Solution, Bluetooth | ✓ | ✓ | 8GB | ONE Year |
| Ultimate w/o UHF | Satellite, Correction data, Static, Solution, Bluetooth | — | ✓ | 8GB | ONE Year |
| Basic | Satellite, Correction data, Static, Solution, Bluetooth | ✓ | — | 8GB | ONE Year |
| Basic w/o UHF | Satellite, Correction data, Static, Solution, Bluetooth | — | — | 8GB | ONE Year |

# NUWA

Nuwa is a survey application software based on Android OS (Operating System), designed by and all rights reserved to Tersus GNSS Inc. Nuwa is simple, easy to use and has a friendly user interface. It is designed to work with the LUKA GNSS receiver, Oscar GNSS Receiver, and other receivers that support NMEA-0183. Nuwa provides extensive pre-defined coordinate systems that are used worldwide, and various data formats import and export like TXT, CSV, DXF, SHP, RAW, KML/KMZ, LandXML, RW5, HTML, and so on.
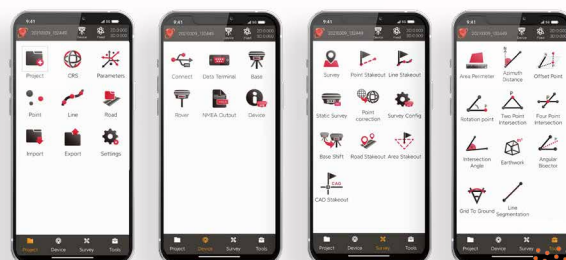
# Technical Specifications
# LUKA

## Performance

Signal Tracking:
GPS L1/L2/L5;
BeiDou B1I/B2I/B3I/B1C/B2a;
GLONASS L1/L2;
Galileo E1/E5a/E5b;
QZSS L1/L2/L5

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

Single Point Positioning Accuracy (RMS):
| | |
|---|---|
| - Horizontal: | 1.5m |
| - Vertica: | 2.5m |

DGPS Positioning Accuracy (RMS):
| | |
|---|---|
| - Horizontal: | 0.25m |
| - Vertica: | 0.5m |

High-Precision Static (RMS):
| | |
|---|---|
| - Horizontal: | 2.5mm+0.1ppm |
| - Vertica: | 3.5mm+0.4ppm |

Static & Fast Static (RMS):
| | |
|---|---|
| - Horizontal: | 2.5mm+0.5ppm |
| - Vertica: | 5mm+0.5ppm |

Post Processed Kinematic (RMS):
| | |
|---|---|
| - Horizontal: | 8mm+1ppm |
| - Vertica: | 15mm+1ppm |

Real Time Kinematic (RMS):
| | |
|---|---|
| - Horizontal: | 8mm+1ppm |
| - Vertica: | 15mm+1ppm |
| Initialization (Typical): | 4s[1] |
| Initialization Reliability: | >99.9%[2] |

Network Real Time Kinematic (RMS):
| | |
|---|---|
| - Horizontal: | 8mm+0.5ppm |
| - Vertica: | 15mm+0.5ppm |

Observation Accuracy (zenith direction):
| | |
|---|---|
| - C/A Code: | 10cm |
| - P Code: | 10cm |
| - Carrier Phase: | 1mm |

Time To First Fix (TTFF):
| | |
|---|---|
| - Cold Start: | <30s |
| - Warm Start: | <5s |
| Re-acquisition: | <1s |

## Performance – continued

Tilt compensation accuracy (No tilt angle limit ):
| | |
|---|---|
| | ≤2cm(within 60°)[3] |
| Timing Accuracy (RMS): | 20ns |
| Velocity Accuracy (RMS): | 0.03m/s |

## Software Support

Tersus Nuwa

## System & Data

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

## Communication

| | |
|---|---|
| Cellular: | 4G LTE/WCDMA/GSM/EDG |
| Cellular Bands: | LTE FDD B1,B3,B7,B8,B20, B28A LTE TDD B38,B40,B41 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[3]

| | |
|---|---|
| RF Transmit Power: | 0.5W/1.0W |
| Frequency Range: | 410MHz ~ 470MHz |
| Operating Mode: | Half-duplex |
| Channel Spacing: | 12.5KHz / 25KHz |
| Air Baud Rate: | 4800 / 9600 / 19200bps |
| Modulation Type: | GMSK, 4FSK |
| Radio Protocols: | Transparent, TrimTalk450, TrimMark3, South,Satel |

## Wired Communication

| | |
|---|---|
| USB: | Type-C, OTG |

## User Interface

| | |
|---|---|
| Button: | Power Button |
| LED Indicators: | Satellite, Correction data, Static, Solution, Bluetooth |
| Voice: | Support in Nuwa App |
| Power Display: | Support |

## Electrical

| | |
|---|---|
| External Power Supply: | Support USB (5~20V) |
| Fast Charging: | Support, 15W max(5V 3A) |
| Battery: | Built-in, 7000mAh/7.4V |
| Charing Time: | 3 hours (20%~90%) |
| Battery Charging Temperature: | +10℃ ~ +45℃ |
| Working Time: | Up to 19 hours[4] |

## Physical

| | |
|---|---|
| Dimension: | φ132x68mm |
| Weight: | ≤ 827g[5] |
| 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) The initialization time depends on various factors, including the number of satellites, observation time, atmospheric conditions, multi-path, obstructions, satellite geometry, etc.
(2) The initialization reliability may be affected by atmospheric conditions, signal multipath, and satellite geometry.
(3) IMU and built-in radio are optional, details refer to performance comparison table.
(4) 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.
(5) The actual size/weight may vary depending on the manufacturing process and measurement method.

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