# RinoNav

# ASTRA PLUS

## Efficient AR Live View Stakeout GNSS Receiver

The RinoNav ASTRA PLUS is an efficient GNSS receiver integrated with visual technology by RinoNav GNSS. It supports immersive 3D stakeout in any working environment. With the AR visual positioning technology, the ASTRA PLUS helps you do stakeout more efficiently. The compact design makes it easy to carry around in various complex environments. The ASTRA PLUS is perfect for any survey scenario, thanks to its internal TX/RX radio and 60° inclination IMU function.

### AR Visual Positioning:More Efficient Stakeout

There is no need to move the pole back and forth and rely on work experience during a stakeout. Follow the visual guide to find the target stakeout point with a 2MP camera. Suitable for a non-experienced user and provides up to 50% more efficiency.

### Integrated Tx/Rx UHF Modem in a Compact Design

The built-in transceiver radio modem in the compact design of the ASTRA PLUS makes it a full-featured and portable GNSS receiver that works as a base or rover station.

### Multi-constellation and Multi-frequency

With 1408 channels of GNSS tracking, it provides stable and reliable accuracy. All GNSS signals come with the standard, including GPS, BDS, GLONASS, GALILEO, and QZSS.

### 16GB Internal Memory

The built-in 16GB internal memory can store more data; there is no need to worry about a long-time span project.

### Max 60° Tilt Survey: A Different Way of Working

• Quickly and accurately measure points while standing or walking without leveling the pole.
• Concentrate on where the pole tip needs to go, which is especially useful during a stakeout.
• Easily start a survey in environments that are hard to reach, such as building corners and slopes.
• No need to worry about the pole movement when measuring, provided the pole tip is stationary.

### Light Weight & Compact Design

The compact design of the ASTRA PLUS makes it a small size and lightweight GNSS receiver, which is easy to carry around by users without getting tired.

# Product Specification

# ASTRA PLUS

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### GNSS Performance

| | | |
|---|---|---|
| Satellites tracking | GPS | L1C/A/L2P (Y)/L2C/L5 |
| | BDS | B1I/B2I/B3I/B1C/B2a/B2b |
| | GLONASS | L1/L2 |
| | GALILEO | E1/E5a/E5b/E6 |
| | QZSS | L1/L2/L5/L6 [1] |
| | SBAS | WAAS, GAGAN, MSAS, EGNOS, SDCM, BDS |
| | L-Band | B2b PPP (Only for the Asian-Pacific region) |
| Channels | | 1408 |
| Cold start | | < 30 seconds |
| Warm start | | < 20 seconds |
| Hot start | | < 5 seconds |
| RTK signal initialization | | < 5 seconds |
| Initialization reliability | | > 99.9% |
| Update rate | | 20 Hz |
| High precision static | | ■ H: 2.5 mm + 0.5 ppm RMS<br>■ V: 5 mm + 0.5 ppm RMS |
| Static and Fast Static | | ■ H: 3 mm + 0.5 ppm RMS<br>■ V: 5 mm + 0.5 ppm RMS |
| RTK | | ■ H: 8 mm + 1 ppm RMS<br>■ V: 15 mm + 1 ppm RMS |
| Standard point positioning | | ■ H: 1.5 m RMS<br>■ V: 2.5 m RMS |
| Code differential | | ■ H: 0.4 m RMS<br>■ V: 0.8 m RMS |
| SBAS | | ■ H: 0.4 m RMS<br>■ V: 0.8 m RMS |
| Correction data | | RTCM V3.X, RTCM2, CMR |
| Data output | | GGA, ZDA, GSA, GSV, GST, VTG, RMC, GLL, Binary |

### Power Supply

| | |
|---|---|
| Battery | Rechargeable<br>Built-in Lithium-ion battery x 1<br>3.6V ~ 10000 mAh<br>Support 20W fast charging |
| Voltage | Type-C, Type-C PD 12V |
| Working time | Static: 20 hours |
| Charging time | Typically 5.5 hours |

1: It will be supported through future firmware update.

### System

| | |
|---|---|
| Operation system | Linux |
| Internal memory | 16 GB |
| Bluetooth | BT 5.0 BR + EDR, BLE |
| Wi-Fi | IEEE 802.11 a/b/g/n/ac |
| TNC | Connect internal radio with antenna |
| Type-C port | Charge and data transmission |
| Web UI | View status, update firmware,<br>set up working mode, download data, etc. |
| Intelligent voice | Broadcast working mode and status |
| MEMS | Dynamic tilt survey up to 60°<br>Tilt survey performance: 10 mm + 0.7 mm/° tilt<br>Less than 25 mm accuracy in the inclination of 30° |

### Physical

| | |
|---|---|
| Dimension | Φ120 mm x H71.5 mm |
| Weight | 503.4 g |
| Operating temperature | -30°C ~ +60°C |
| Storage temperature | -40°C ~ +80°C |
| Water / dust proof | IP67 |
| Shock | ■ Withstand topple over from a 2 m survey<br>  pole onto hard surfaces<br>■ Survive a 1.2 m free drop |
| Vibration | Vibration resistant |
| Humidity | Up to 100% |
| Indicators | Satellites, datalink, battery, Bluetooth |
| Button | Power button, short press to voice<br>broadcast working mode and status |
| Certificate | FCC, CE, KC, ANATEL |

### Internal Radio

| | |
|---|---|
| Type | TX and RX |
| Emitting power | 1 W |
| Operation range | 3-5 km typically |
| Frequency range | 410 - 470 MHz |
| Channel spacing | 12.5 kHz / 25 kHz |
| Protocol | Satel, Satel_ADL, PCC-GMSK, PCC-4FSK,<br>HiTarget, TrimTalk, South, TrimMark III,<br>GEOTALK, GEOMARK, PCCFST,<br>PCCFST_ADL, HZSZ |

### Visual Configuration

| | |
|---|---|
| Pixel | 2 MP |
| Frame | 25 Hz |
| FOV | 88° |
| Photosensibility | Micro-light level high sensitivity |
| Stakeout accuracy | 3 cm |