SPECIFICATIONS

GNSS Features

Channels	1698
GPS	L1C, L1C/A, L2C, L2P(Y), L5
GLONASS	G1, G2, G3
BDS	B1I, B2I, B3I, B1C, B2a, B2b
GALILEO	E1, E5a, E5b, E6, AltBOC*
SBAS	L1*
IRNSS	L5*
QZSS	L1, L2C, L5*
MSS L-Band*	Galileo HAS & BDS PPP
Positioning Output Rate	1Hz~20Hz
Initialization Time	< 10s
Initialization Reliability	>99.99%

Positioning Precision

Code Differential Positioning	Horizontal: 0.25 m + 1 ppm RMS Vertical: 0.50 m + 1 ppm RMS
GNSS Static	Horizontal: 2.5 mm + 0.5 ppm RMS Vertical: 3.5 mm + 0.5 ppm RMS
Static (Long Observation)	Horizontal: 2.5 mm + 0.1 ppm RMS Vertical: 3 mm + 0.4 ppm RMS
Rapid Static	Horizontal: 2.5 mm + 0.5 ppm RMS Vertical: 5 mm + 0.5 ppm RMS
PPK	Horizontal: 3 mm + 1 ppm RMS Vertical: 5 mm + 1 ppm RMS
RTK(UHF)	Horizontal: 8 mm + 1 ppm RMS Vertical: 15 mm + 1 ppm RMS
RTK(NTRIP)	Horizontal: 8 mm + 0.5 ppm RMS Vertical: 15 mm + 0.5 ppm RMS
SBAS Positioning	Typically<5m 3DRMS
RTK Initialization Time	2~8s
IMU Tilt Angle	0°~60°

Hardware Performance

Dimension	134mm(W) ×134mm(L) × 79.1mm(H)
Weight	860g (battery included)
Material	Magnesium aluminum alloy shell
Operating Temperature	-45℃~+75℃
Storage Temperature	-55℃~+85℃
Humidity	100% Non-condensing
Waterproof /Dustproof	IP68 standard, protected from long time immersion to depth of 1m IP68 standard, fully protected against blowing dust
Shock/Vibration	Withstand 2 meters pole drop onto the cement ground naturally
Power Supply	6-28V DC, overvoltage protection
Battery	Inbuilt 6800mAh rechargeable Lithium-ion battery
Battery Life	16h (static) 12h (rover) 10h (built-in UHF base)

Communications

I/O Port	5-PIN LEMO interface (external power port + RS232)
	Type-C interface (charge + OTG+ Ethernet)
	UHF antenna interface
Internal UHF	Radio receiver and transmitter
Frequency Range	410-470MHz
Communication Protocol	Farlink, Trimtalk, SOUTH
Communication Range	Typically 5-8 km with Farlink protocol, up to 12-15 km in optimal condition
Bluetooth	Bluetooth 3.0/4.1 standard, Bluetooth 2.1 + EDR
NFC Communication	Support
Modem	802.11 b/g/n standard wifi and 4G

Data Storage/Transmission

Storage	16GB SSD internal storage
	Support external USB storage (OTG)
	The customizable sample interval is up to 20Hz
Data transmission	Plug and play mode of USB data transmission
	Supports FTP/HTTP data download
Data format	Static data format: STH, Rinex2.01, Rinex3.02 and etc.
	Differential data format: RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2, CMR
	GPS output data format: NMEA 0183, PJK plane coordinate, Binary code
	Network model support: VRS, FKP, MAC, fully support NTRIP protocol

Sensors

Camera	Front Camera 8MP, Bottom Camera 2MP
Electronic bubble	Controller software can display electronic bubble, checking leveling status of the carbon pole in real-time
Thermometer	Built-in thermometer sensor, adopting intelligent temperature control technology, monitoring and adjusting the receiver temperature

User Interaction

Operating system	Linux
Buttons	Single button
Indicators	Bluetooth, satellites, data, charging and power indicators
Web interaction	With access to Web UI via WiFi or USB connection, users can monitor the receiver status and change the configurations
Voice guidance	Chinese/English/Korean/Spanish/Portuguese/Russian/Turkish/French/Italian
Secondary development	Provides secondary development package, and opens the OpenSIC observation data format and interaction interface definition
Cloud service	The powerful cloud platform provides online services like remote management, firmware updates, online registers, etc.

*Reserve for future upgrade.
Remarks: Measurement accuracy and operation range might vary due to atmospheric conditions, signal multipath, obstructions, observation time, temperature, signal geometry and number of tracked satellites. Specifications subject to change without prior notice.
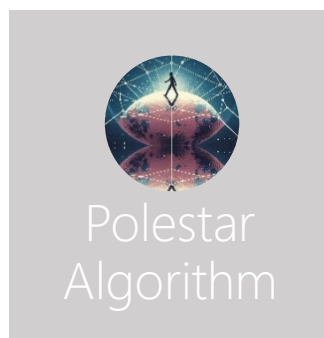
K50X
See Better, Work Better!

▶ Visual & AR Stakeout   ▶ HAS & PPP

▶ Photogrammetry Measurement (optional)

▶ 3D Modeling (optional)

KOLIDA
Professional's Choice

Polestar
Algorithm

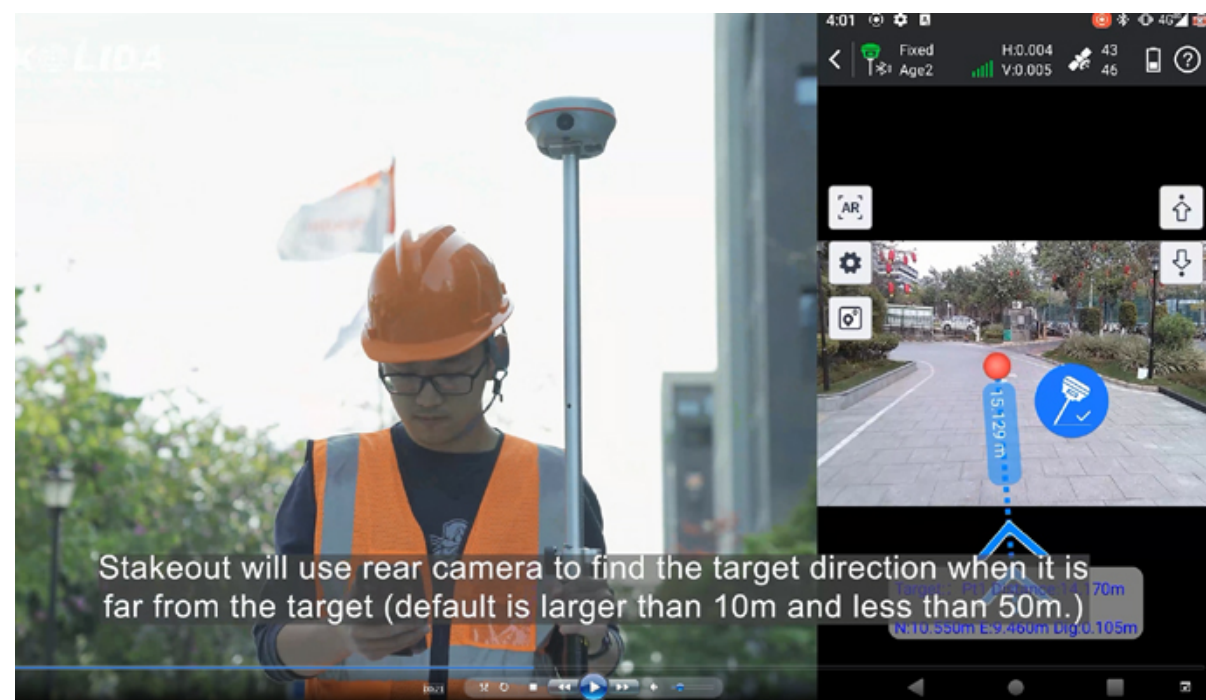# 1,698
channels

21
frequencies

8+1
RTK Accuracy

Empowered by the **Polestar** Algorithm, K50X can track enormous signals of all constellations with stunningly fast fixing speed even under the thick cover of trees or beside tall buildings.

Coordinates will be examined twice to ensure the utmost accuracy.

Stakeout will use rear camera to find the target direction when it is far from the target (default is larger than 10m and less than 50m.)

K50X allows you to implement immersive AR stakeout in any working environment. It is suitable for both non-experienced surveyor and expert to follow the visual guide to find the targets with 8MP front camera (for direction) and the 2MP camera on receiver (for precise positioning), provides up to 50% more efficiency.

During the work, it allows you to switch the data link from Bluetooth to WiFi, transfer visual data faster and save more time for work. When getting close to the target, it will provide direction and distance guidance to help users find targets at a faster speed.

The New 5th Gen. IMU

Almost All-time Usable

In the past, surveyors would rotate the pole when changing the direction of travel or adjusting the attitude of the receiver, sometimes it disables IMU. Now the 5th generation IMU eliminates the loss of IMU Status in most scenarios to improve the availability and productivity of IMU. The calibrate-free feature save the time of manually initializing IMU each time.

Farlink 2.0 Radio

Farther Transmission, Less Limitation

After years of hardware and firmware updates, Farlink 2.0 can undertake larger data and provide more stable transmission. It can receive data from one specific base by using base-lock function. Even though there are several bases transmitting with the same frequency, your rover will receive data from the correct base. Each radio had extreme temperature-changing testing from -30 to 60 degree centigrade to prove the robustness

# Galileo HAS & BDS PPP

Single Point Positioning

By receiving corrections delivered directly from L-band satellites, K50X allows you to achieve 10 to 20 centimeter-level accuracy with only one rover on hand when base receiver or CORS service is not accessible in remote areas. (this function requires registration code, please apply from your dealers)

Extended Working Hours

Lightness with Ruggedness

Thanks to the high-capacity battery and the intelligent power management plan, K50X can work up to 12 hours in RTK radio rover mode, up to 16 hours in static mode. The charging port is Type-C USB, users can choose KOLIDA quick charger or their own smartphone charger or power bank to recharge.
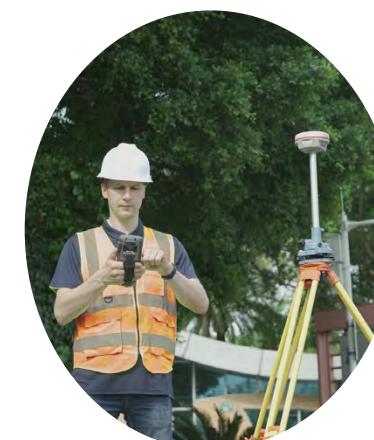
**Beyond the Productivity
of Traditional RTK**

More Efficient
than Traditional RTK

K50X can process a set of photos or a video, acquiring coordinates for hundreds of points within minutes. It boasts a wider working range and fewer blind spots through remote measurements with the camera. Locations that were once challenging, such as spaces under rooftops and areas with obstacles, are now easily measurable. (Photogrammetry Function is optional, not default)

More Versatile
than Traditional RTK

Utilizing visual positioning, surveyors can collect field data in a short time. The data can preserve safely in the device and is reusable at any time. These capabilities are particularly well-suited for distinctive GNSS measurement tasks, including documenting accident scenes and excavation sites for urban public facilities.

More User-friendly
than Traditional RTK

K50X visual positioning enables surveyors to measure points remotely, reaching distances of up to 10 meters or more (under ideal conditions), thereby eliminating the necessity to physically approach each point. This approach decreases the physical effort required during fieldwork.

Safer
than Traditional RTK

Leveraging visual positioning aids users in minimizing risks during surveys conducted in hazardous areas, such as busy roads and lakes, ensuring the safety of surveyors. Adopting a secure working approach is not only a personal need but also essential for the well-being of your family.

Three Approaches to Process
## --Precision Crafted for Your Work Specifications

Designed for Urban Surveying
--Cloud Server Online Processing

Surveyors, with a strong internet connection in urban areas, can process image data online using network and cloud servers. INNO8 achieves 2cm accurate coordinate data for image measurements within minutes, balancing precision and speed.
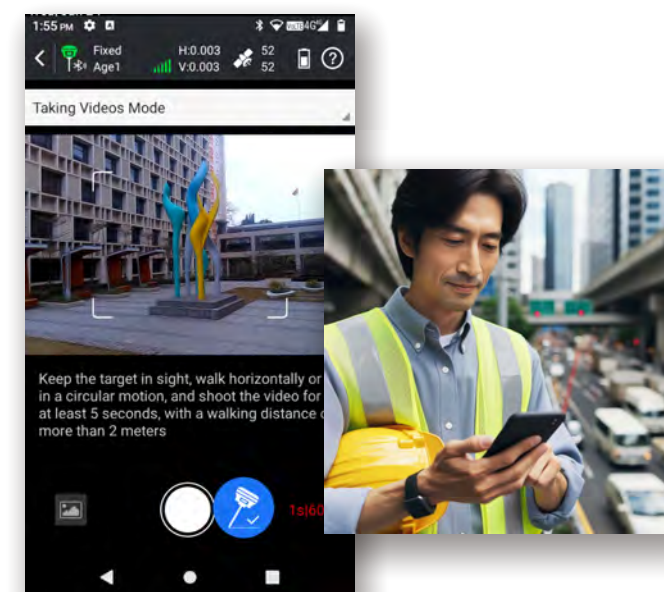
Designed for Field Surveying
--Data Controller Offline Processing

Without internet coverage, surveyors can perform offline image data processing using the data controller app. This mode offers the fastest processing speed, saving time on data uploads and delivering 4cm accuracy results within 30 seconds.
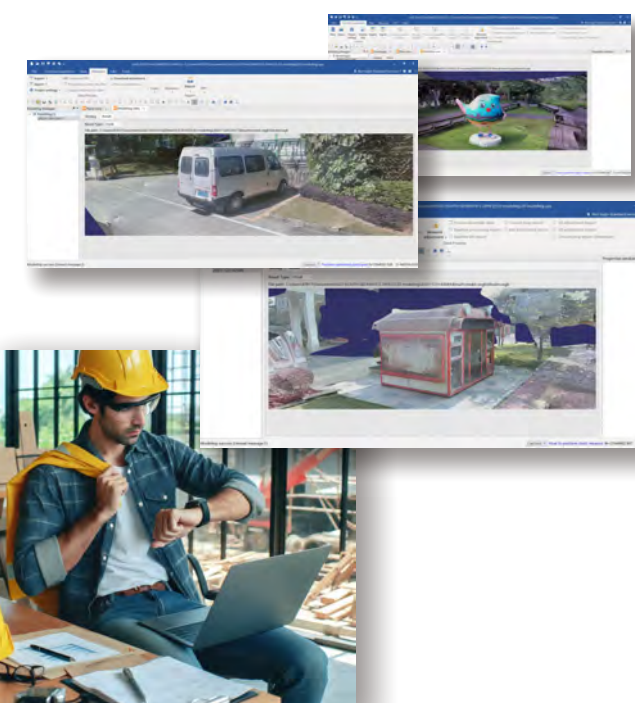
Designed for Users with
Tight Fieldwork Schedules
--Desktop Software Processing

For time-sensitive fieldwork, surveyors can opt not to process data on-site. Instead, they can use desktop post-processing software back in the office for enhanced measurement and calculation functionalities. This mode allows outdoor focus on data collection, maximizing point acquisition speed and time efficiency.

3D Modeling--Broadening Your Working Power

Eyes on Now, Be Prepared for Future

K50X enables single-user 3D modeling, on the models visually displaying geographic information like coordinates, areas, and volumes. It supports transforming model data into different formats and customize coordinate parameters for diverse applications.
(3D modeling function is optional, not default)

Ensuring a Smooth Journey for Your Success

K50X harnesses KOLIDA's 3D modeling tech, seamlessly integrating image measurements with UAV data, including DJI and other brands. Overcoming data gaps in UAV surveys, K50X supplements incomplete models by collecting ground image data, improving overall survey outcomes.

Work in Your Preferred Way

Surveyors can import K50X data into KOLIDA UAV and third-party modeling software for 3D modeling. Future updates to KGO (PC version) and KSurvey (Android App) will also include 3D modeling functions, allowing users to select the most suitable software for optimal work efficiency based on scenario and task requirements.

0.1mm
Left and Right Camera Deviation

The modular design ensures that the assembly flatness of the camera is within 0.15mm, with a left and right deviation of within 0.1mm, preventing camera misalignment and ensuring the accuracy of visual positioning.

Polycarbonate Top Cover

5 years

The top cover and ring utilize integral molding technology, ensuring strong integrity and resistance to damage. The polycarbonate material is corrosion-resistant, protecting internal precision components. It mitigates the impact of extreme environments on the mainframe and can be used in natural settings for over 5 years.

110N

Impact Resistance

10 years

The anti-collision ring utilizes TPU material, effectively cushioning against an impact force of 110N (the impact force from a 2-meter drop is approximately 30N). Therefore, it safeguards your K50X from a 2-meter pole drop or other unexpected impacts.

Protective Layer

The polyethylene coating can reach 100-300μm, preventing aging and rust of the shell, providing scratch resistance, and offering effective protection for over ten years.

The internal heating components are closely fitted to the shell, and passive air cooling is utilized for heat dissipation. With a thermal conductivity of 65W/(m·K), it can achieve heat dissipation without the need for additional cooling components, ensuring optimal operation under different temperature conditions.

Thermal Conductivity

**65W/(m-k)**

0.1μm

Rotational Deviation

5°

The bottom threaded interface maintains a rotational deviation of within 5 for the pole, allowing users to precisely install the pole with ease. This convenient installation process saves time for the fieldwork.

Micropore Diameter of the Waterproof Membrane

The diameter of drizzle (400μm) is 40-4000 times that of the E-PTFE membrane. Therefore, it can prevent rainwater from passing through the protective film.

The design with a contact angle of 135.6° prevents liquid water from wetting and capillary infiltration. At the same time, it allows for breathability, ensuring the normal operation of internal components of the instrument.

Ksurvey APP

## Field Data Collection & Mapping: The Most Advanced is Here

Measure & Draw : Save Time in Field work and Office
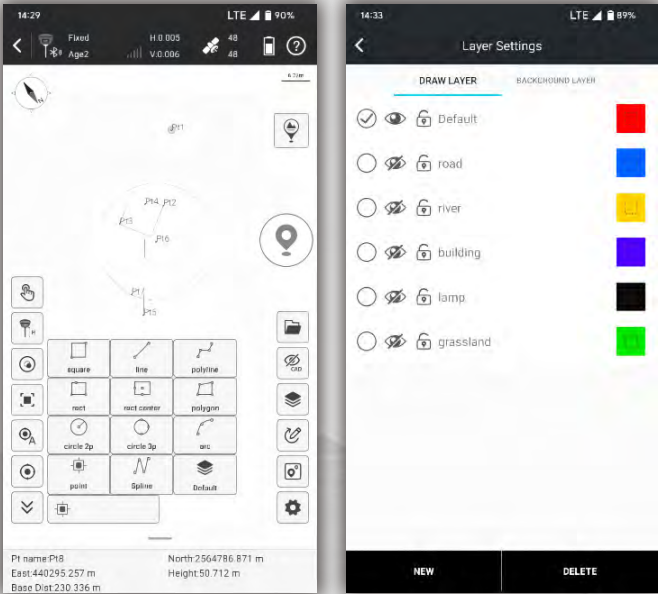
This feature allows you to draw the result map while completing point measurements.

• Before measuring points, users can choose the shape of the target object to be measured from 11 preset figures. The software will guide you to measure points in an order and automatically connect lines and complete the drawing of the figure.

• The .dxf or .dwg maps created on-site can be used directly in office work.

• Users can assign measured objects with different attributes, to different layers for measurement and management, making no mistakes.

### Visual Positioning : Industry-Leading Non-Contact Measurement Technology
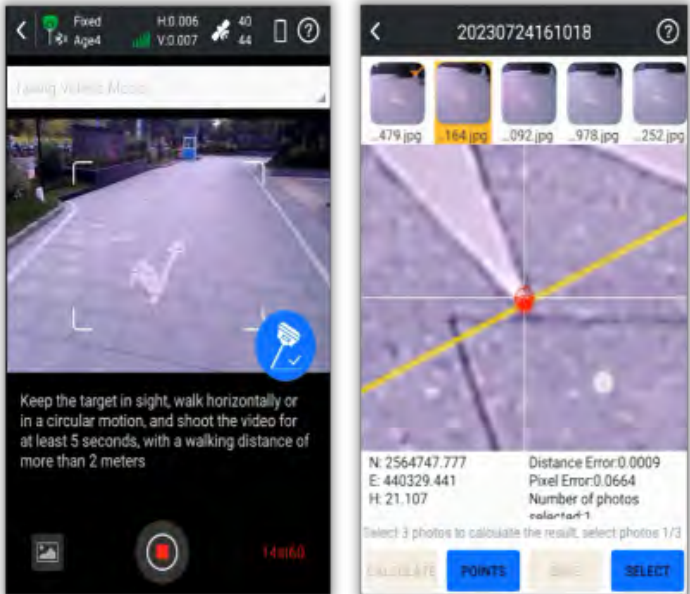
Photogrammetry Measurements can be conducted by taking pictures or videos. Coordinates of all points in the photos can be acquired.

• Now, target points that are inaccessible due to dangerous environments, poor satellite signals, or impassable terrain can be measured remotely.

• The captured image data can also be used with software like SGO, Pixel4D, DJI Terra, and CC for 3D modeling.

• Image measurement data can also be combined with drone measurement data to address issues of blurriness and deformation in ground data models collected by drones.

(This function only works with the receiver models that have front-facing camera or dual-cameras)

CAD Draw : Drafting without a PC
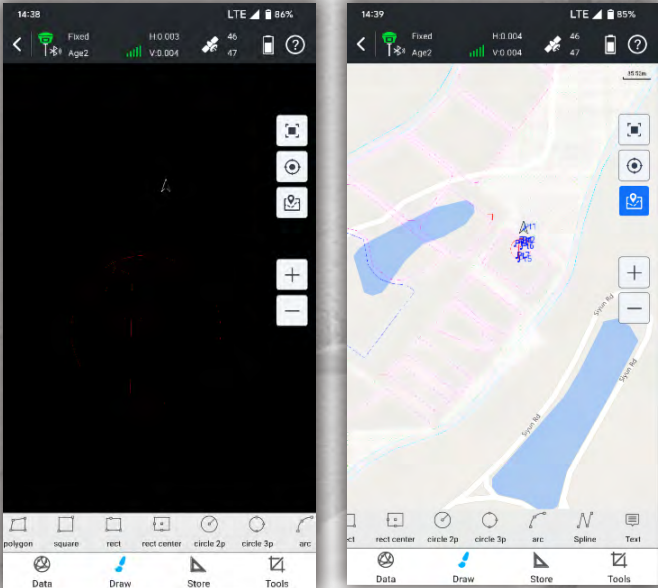
Select points to form a polygon, and directly identify the area division points for the surveyor to stake out. There is no more need for the user to guess a position to measure, and then to adjust.

• CAD drawing does not require a computer.

• CAD files prepared on office PCs can be edited and managed by users on RTK data collection terminals.

• Drawing tools include up to 11 types of figures and one type of text.

Static & PPK Measurement : More Assistance Now is Available
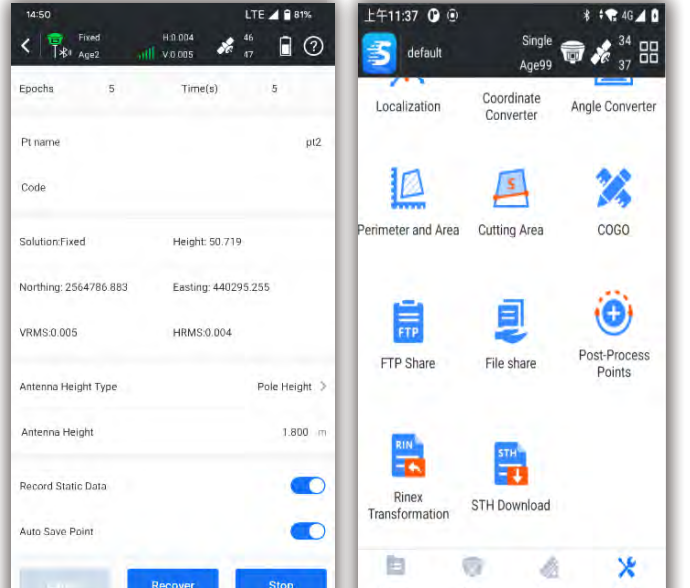
The software provides both static and PPK data collection capabilities.

• Data can be downloaded wirelessly, no need for a PC and cables.

• It is possible to convert .sth files into RINEX files right on the data collector or tablet or your phone, no need of PC.

• Data can be shared with others through mobile Internet.

• The accuracy of PPK data collection is as high as Trimble equipment, the result can be directly imported for use in TBC.

Ksurvey APP

Stakeout: Lighten Your Load, Increase Your Output

CAD Stake-Out : Save Labor Cost and Reduce Errors
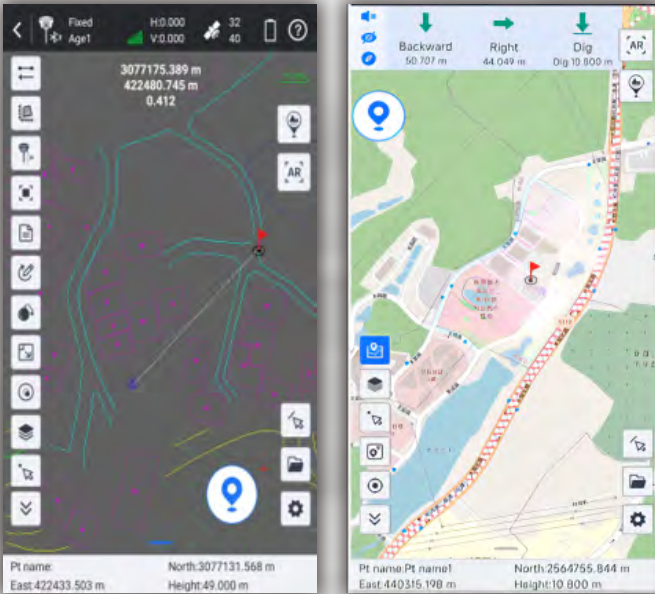
Traditional data collection software requires users to import points or lines to be setout from .csv or .txt files, users need to spend quite a lot of time to edit point and line libraries.

Moreover, for complex shapes such as curves, circles, and polygons, the traditional stake-out process is complicated. Now, our new CAD stake-out program offers a superior solution for surveyors.

• No need for manual editing of point libraries.
• Staking-out geometric shape is faster and easier.

• No need for obtaining coordinate files before work. Staking-out can be done with just a CAD drawing.
• Online maps and CAD drawings can be displayed simultaneously, improving accuracy.
• AR guide lines make staking-out more intuitive.

Area Division : Developed for Professional Cadastral Survey and Stake Out

Select points to form a polygon, and directly identify the area division points for the surveyor to stake out. There is no more need for the user to guess a position to measure, and then to adjust.

• Six methods of division to determine the area division points. The methods are flexible and suitable to different user needs.

• The graphic display is intuitive and understandable.

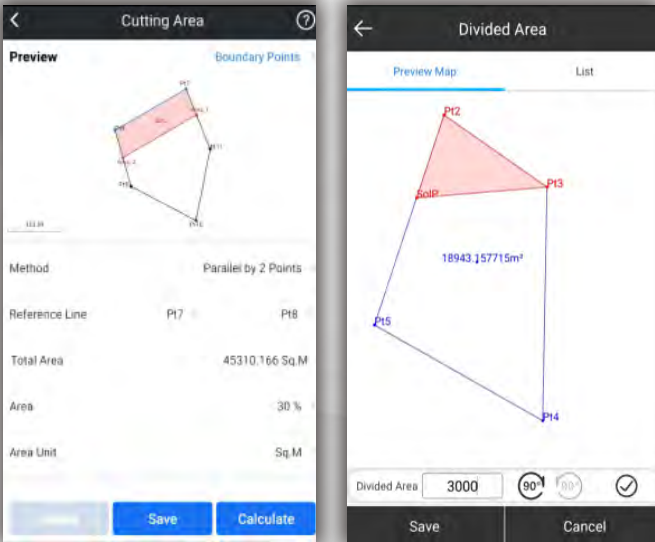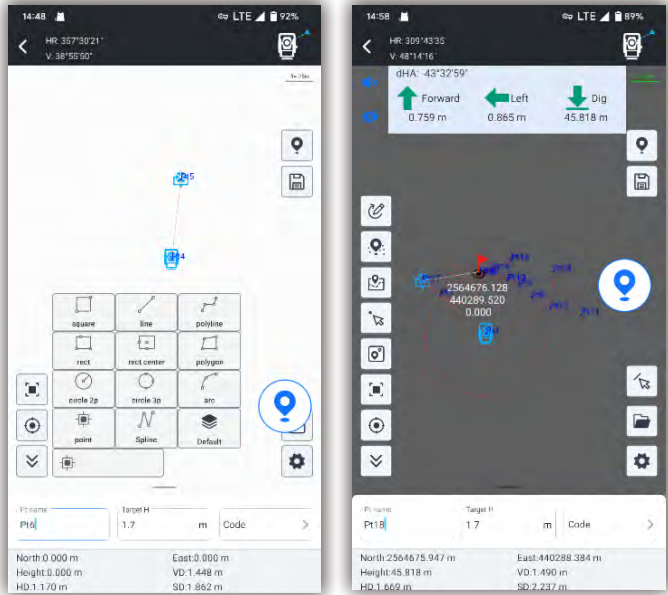### Live-View Stake-Out : Faster, More Accurate, More Intelligent

Users utilize the real-time imagery captured by the camera at the bottom of the receiver and the AR guide lines displayed by the software, to locate the target points.

• When users perform stake-out with a dual-camera GNSS receiver, the software can call upon both cameras to work together. At medium to long distances, the software uses the front-facing camera to indicate the direction of travel, and at close range, it uses the downward-facing camera to find the specific location. This further increases the speed of staking out.

• AR guide lines can be displayed in point staking out, line staking out, and CAD staking out programs.

(This function only works with the receiver models that have downward-facing camera or dual-cameras)

Additional Features

Compatible with Multiple Devices

The App Now works with GNSS, Total Station, Echo Sounder, GIS Tablet, in future it will work with SLAM Scanner, Terrestrial Lidar Scanner.
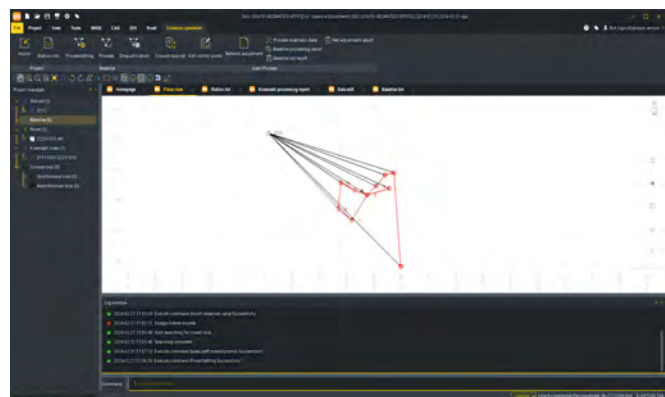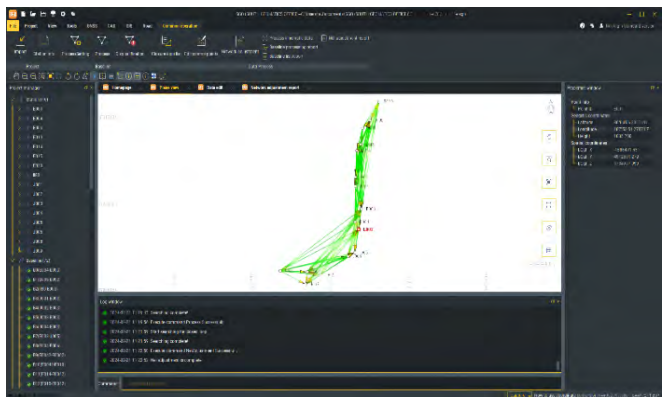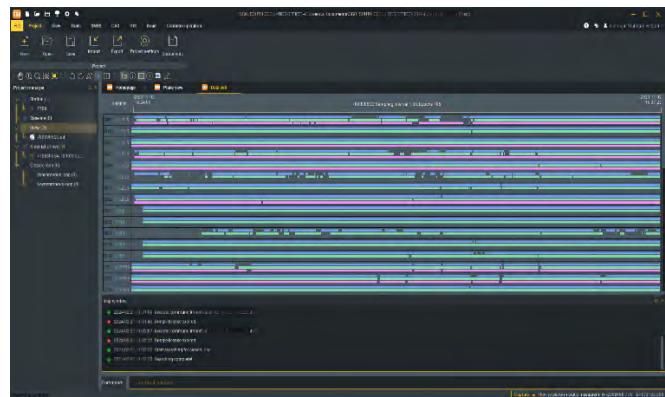
Innovations for Better User Experience

■ RTK Data Backup

■ QR Code Share

■ Multiple Basemap Support

■ Basemap

■ Adjustment

■ Network Mount Point Sorting

■ NMEA Output Setting

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KOLIDA Geo Office (KGO)

Ideal GNSS Data Processor, Help You To Keep Advancing

Data Processing & Reporting

When surveyors need to do post-processing of GNSS data, our software always can provide state-of-the-art technology to help you to produce optimal results. User just need to import field data, the software will automatically process GNSS baselines. Once results come out, the software can generate reports.

RINEX Import and Export

This feature enables users to import the third party GNSS receiver data into our software and post-process it, by using the industry standard RINEX format.

High Accuracy Guaranteed

RTK check, the unique function in our software, can compare RTK and PPK results to automatically acquire the most accurate coordinates for each target point.

It fills up the gap of poor corrections in RTK or hindered observations in PPK.

This improvement is to provide guarantee for your every survey.

3D Modelling

User can import photogrammetry image data into the software, to achieve 3D modeling, visually presenting geographic information data such as coordinates, areas, and volumes.

Model data can be transformed into different formats and applied with various coordinate parameters based on actual needs, making it adaptable to a wider range of application scenarios.