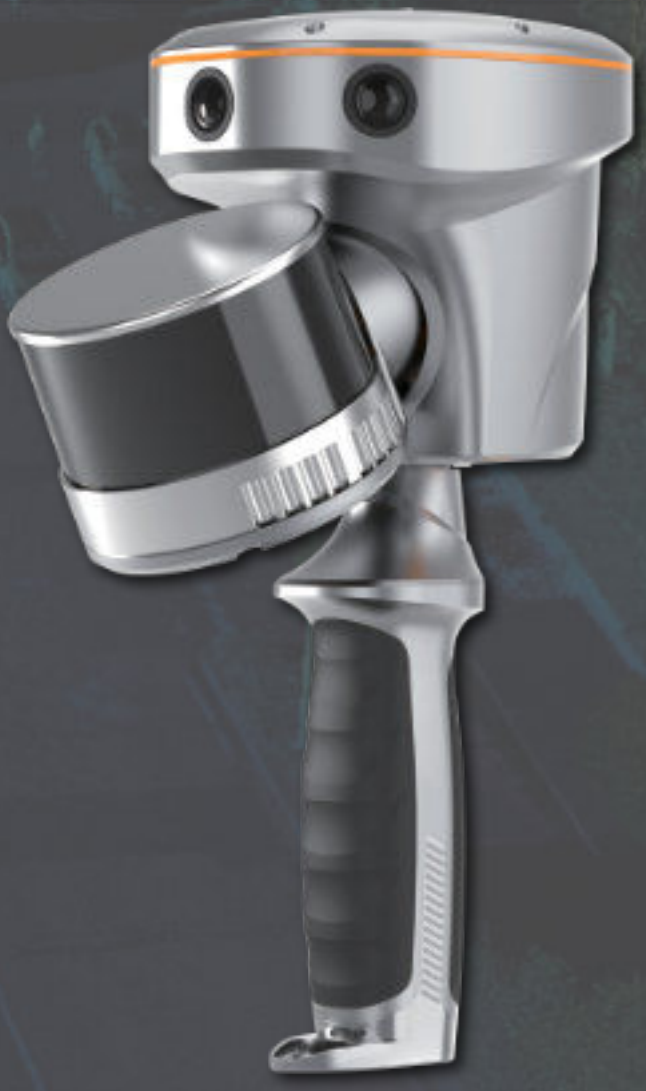
CHCNAV

RS10

INNOVATIVE SURVEYING SLAM SOLUTION



MAPPING
& GEOSPATIAL

CHCNAV

HANDHELD SLAM 3D LASER SCANNER + GNSS RTK SYSTEM

The RS10 brings a new approach to geospatial surveying by integrating GNSS RTK, laser scanning and visual SLAM technologies into a single platform designed to improve the efficiency and accuracy of indoor and outdoor 3D scanning and surveying tasks. The RS10 is a versatile solution for surveying, civil engineering and BIM professionals, as well as for applications such as agricultural and forestry surveying, power line inspection, material pile volume calculation and data collection in underground spaces. With the RS10, surveyors are able to overcome the challenges of surveying in areas with poor or no GNSS signals, bringing a new level of flexibility and accuracy to their work. By supporting both traditional GNSS RTK surveying and innovative 3D reality capture, the RS10 simplifies fieldwork and improves data reliability.

RTK AND SLAM FUSION

The RS10 is the result of CHCNAV's expertise in GNSS technology development. Featuring a 4th generation air dielectric GNSS antenna, it provides RTK positioning accuracy of better than 3 cm in a variety of challenging environments. Combined with the system's high-precision LiDAR and three HD cameras, it fuses RTK, laser and visual SLAM to deliver 5 cm absolute measurement accuracy. From detailed architectural surveys to complex infrastructure projects, the RS10 gives professionals the tools they need to efficiently collect rich and accurate data.

REAL-TIME SLAM

Equipped with a powerful on-board processor, the RS10 provides real-time SLAM (Simultaneous Localisation and Mapping) capabilities to create georeferenced point clouds directly in the field without the need for post-processing. With immediate feedback on the collected data, users can make adjustments on the fly to ensure complete and detailed scan coverage. The RS10 can map large areas up to 13,000 square meters in real time, making it ideal for rapid or complex surveying projects where time and accuracy are critical.

EFFICIENT LOOP-FREE WORKFLOW

The integration of high-precision GNSS and SLAM technologies eliminates the need for traditional loop closure, which often complicates the data collection process for handheld scanners. By enabling loop-free path planning, the RS10 streamlines field data collection and significantly reduces the time and effort required to complete projects.

SEAMLESS OUTDOOR AND INDOOR MAPPING

The transition between outdoor and indoor environments is seamless with the RS10's ability to use the same coordinate system without the need for additional georeferencing. Users can select the desired CS directly in the field using either the SmartGo or LandStar™ SWs, ensuring consistent, simplified and accurate data collection in both outdoor and indoor environments.

SFIX TECHNOLOGY

With innovative SFix technology working in RTK rover mode, when RS10 enters an area with weak or even no GNSS signal, where conventional RTK surveying doesn't work, RS10 will calculate accurate RTK point coordinates from its LiDAR and Visual SLAM data. This technology ensures a precision of 5 cm within 1 minute without satellites signals, opening new possibilities for surveying indoor spaces and urban canyons.

VI-LIDAR TECHNOLOGY

The RS10's Vi-LiDAR technology offers a new mode of RTK surveying that combines GNSS rover capabilities with laser scanning for contactless offset measurements. By simply selecting the point to be measured in the image scene of LandStar™ software, its three-dimensional coordinates are calculated in real time from the intersection of the RTK-origin line and the LiDAR point cloud to an accuracy of 5 cm within 15 m (50 ft).

ONE DEVICE, TWO WORKING WAYS

Ready for RTK Users

Operates in rover mode with CHCNAV LandStar™ software for easy use and minimal training.

Hot-Swappable Battery

Runs for 60 minutes on a single battery, allowing for easy replacement without powering off the unit.

Precision Alert

When used as a SLAM scanner, SmarGo provides real-time accuracy information for on-the-spot improvement.

Automatic Drawings

Using the CHCNAV software ecosystem, the RS10 data can be sent to CoProcess for instant drawing extraction.

SPECIFICATIONS

General System Performance

Product	 RS10	 RS10 (32-lines)
Absolute accuracy	H: < 5 cm RMS(1) V: < 5 cm RMS(1)	
Relative accuracy	<1 cm	
Power supply mode	Lithium battery, supports hot-swapping and portable charger	
Working time from a single battery(2)	1 h	
Data storage	512 GB	
Field of view	360° × 270°	
Weight	1.9 kg (including RTK and battery)	1.7 kg (including RTK and battery)
Loop-free data acquisition	Yes	
Real-time accuracy assessment	Yes	

Laser Scanner

Laser product classification	Class 1 Eye Safe	
Range	0.05 to 120 m	0.5 to 300 m
Channel	16	32
Point cloud thickness	2 cm	1 cm
Range capability	80 m @10% reflectivity (Channels 5 to 12) 50 m @10% (Channels 1 to 4, 13 to 16)	80 m @10% reflectivity
FOV (Horizontal)	360°	
Horizontal angle resolution	0.18° (10 Hz)	
FOV (Vertical)	30° (-15° to +15°)	40.3°(–20.8° ~ +19.5°)
Max. effective measurement rate	320,000 points/sec	640,000 points/sec
Selectable scan speed	10 Hz	
Max. Number of return pulses	2	
Wavelength	905 nm	

GNSS Performance(3)

Channels	1408 channels with iStar2.0
GPS	L1C/A, L2C, L2P(Y), L5
GLONASS	L1, L2, L3*
Galileo	E1, E5a, E5b, E6*
BeiDou	B1I, B2I, B3I, B1C, B2a, B2b
QZSS	L1C/A, L1C, L2C, L5, L6*
NavIC/IRNSS	L5*
PPP	B2b-PPP
SBAS	EGNOS (L1, L5)

GNSS Accuracies

Real time kinematic (RTK)(4)	H: 8 mm + 1 ppm RMS V: 15 mm + 1 ppm RMS Initialisation time: <10 s Initialisation reliability: >99.9%
Post-processing kinematic (PPK)	H: 3 mm + 1 ppm RMS V: 5 mm + 1 ppm RMS
PPP	H: 10 cm V: 20 cm
High-precision static	H: 2.5 mm + 0.1 ppm RMS V: 3.5 mm + 0.4 ppm RMS
Static and rapid static	H: 2.5 mm + 0.5 ppm RMS V: 5 mm + 0.5 ppm RMS
Code differential	H: 0.4 m RMS V:0.8 m RMS
Visual-assisted positioning	Yes

IMU

IMU update rate	200 Hz
Auto initialisation	Yes
Attitude accuracy after post-processing	0.005° RMS pitch/roll, 0.010° RMS heading
Position accuracy after post-processing	0.010 m RMS horizontal, 0.020 m RMS vertical

Camera

Number of cameras	3
Resolution	15 MP (5 MP*3)
Sensor size	2592 (H) × 1944 (V)
Pixel size	2.0 μm
FOV	210° × 170°

Environments

Operating temperature	-20°C to +50°C
Storage temperature	-20°C to +60°C
Ingress protection	IP64(5) (according to IEC 60529)
Humidity (operating)	80%, non-condensing

Electrical

Input voltage	9 - 20 V DC
Power consumption	<30 W
Battery capacity	24.48 Wh

Equipped Software

SmartGo software	Data acquisition control, real-time point cloud display,etc
CoPre intelligent processing software	POS process, Adjust & Refine, Generate point cloud, modelling, etc
CoProcess efficient feature extraction software	Building feature extraction, road feature extraction, volume calculation, etc
LandStar Field Survey APP	Topographic survey, Point stakeout, Line stakeout, Elevation check, Facade survey

*All specifications are subject to change without notice.
(1) According to CHCNAV test condition.(2) Typical observed values. (3) Compliant, but subject to availability of BDS ICD, GLONASS, Galileo, QZSS and IRNSS commercial service definition. GLONASS L3, Galileo E6, QZSS L6 and IRNSS L5 will be provided through future firmware upgrade. (4) Accuracy and reliability are determined under open sky, free of multipaths, optimal GNSS geometry and atmospheric condition. Performances assume minimum of 5 satellites, follow up of recommended general GPS practices. (5) Splash, water, and dust resistant and were tested under controlled laboratory conditions with a rating of IP64 under IEC standard 60529.