TOPCON

IP-S2

Integrated High Accuracy Mobile Mapping System

Fully Integrated positioning and data collection solution for land based vehicles

- Dual frequency GNSS tracking
- High Accuracy 6-Axis IMU Integration
- Odometry and tracking from on-board vehicle
- Accurate time-stamping and geo-referencing of sensor data
- Supports multiple laser scanners and other sensor integration
- CAN bus or external wheel encoders
- Integrated, calibrated mounting solution

Topcon's IP-S2 Mobile Mapping System overcomes the challenges of mapping linear features to a high level of accuracy. Accurate vehicle positions are obtained using three technologies: a dual frequency GNSS receiver establishes a geospatial position; an Inertial Measurement Unit (IMU) provides vehicle attitude; and connection to the vehicle CAN bus or external wheel encoders obtains odometry information. These three technologies work together to sustain a highly accurate 3D position for the vehicle even in locations where satellite signals can be blocked by obstructions such as buildings, bridges, or tree lines.

The IP-S2 standard system includes three high-resolution LiDAR scanners that cover the vehicle path at ground level and sweep the adjacent areas to a distance of 30 meters. A high-resolution digital camera can be added to provide 360 degree spherical images at a rate of 15 frames per second. Other sensors can be integrated to provide total flexibility of system configuration for a wide variety of applications. Sensor inputs are recorded and time stamped at the rate of 15 nanoseconds.

A web-based processing service with desktop PC interface is included as part of the IP-S2 system. Vehicle position and sensor output are integrated seamlessly into one continuous three-dimensional data stream that can be exported as industry-standard formats. GNSS data can be post processed for higher accuracy. The desktop software also includes a viewer enabling the user to review point clouds generated from LiDAR scanners and make linear measurements.

The IP-S2 provides fast, high accuracy data and dynamic imaging for any linear mapping project. The vehicle-mounted system can map data at normal travel speeds for roadway surface condition assessments and roadside feature inventories. Safety is increased by removing pedestrians from the travelled lanes. Other applications include pipelines, railways, utility corridors, and waterways. Homeland security and disaster management are critically important to our health, safety and welfare. The IP-S2 is perfect for 3D street-view city mapping and provides essential information for these applications.

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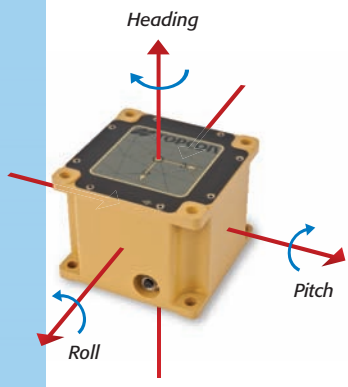
The IP-S2 is a modular system - sensors can be added based on user requirements.

Dual Frequency GNSS Tracking

The IP-S2 incorporates a top of the line, survey grade GNSS receiver capable of processing L1 and L2 GPS and GLONASS signals for the best possible field tracking capability in the industry.

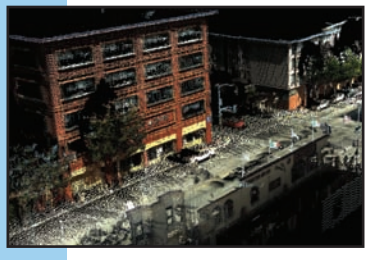


High Accuracy 6-Axis IMU Integration

Inertial Measurement Unit (IMU) technology tracks motion in 3D space. The IMU in the IP-S2 provides high rate acceleration and rotation information. When combined with high accuracy GNSS measurements, the IMU enables the IP-S2 system to calculate positions when driving near an obstruction such as buildings and trees, or through a tunnel or an overpass without compromising accuracy.

Odometry and Tracking from On-board Vehicle CAN Bus or External Wheel Encoders

The IP-S2 is also able to obtain wheel speed information from high accuracy external encoders which can be retrofitted to a vehicle that does not have Antilock brakes or traction control as standard equipment. This is used to estimate the velocity and position of the vehicle based off of a known location.



Accurate Time-stamping and Geo-referencing of Sensor Data

The system works by processing, logging and time-stamping sensor data to provide real-time, fused feedback. The logged data file may also be post-processed and filtered offline to provide improved position information and geo-registration of sensor data.

Integrated, Calibrated Mounting Solution

Advanced machine learning algorithms greatly ease the calibration of the system by automatically extracting system parameters and tuning the filter for optimal performance.

The plug-and-play flexibility of the IP-S2 system allows for your choice of sensor combination to accurately collect just the information you need in a timely manner from the safety of your vehicle.

Supports Multiple Laser Scanners and Other Sensor Integration

The IP-S2 comes standard with GNSS and IMU measurement capabilities. Add a laser scanner or 360 degree digital camera for additional data, depending on user requirements. With flexible sensor and interface options, powerful automated calibration and high performance filtering the IP-S2 enables applications which demand high precision positioning in diverse and demanding environments.

IP-S2 Features:

- Accurate Vehicle Position
- Precision LiDAR
- 360 (deg) Spherical Imagery

The Leader in Positioning Technology...

Topcon Positioning Systems is the worldwide leading developer and manufacturer of precision positioning equipment and offers the widest selection of innovative precision GPS systems, laser, optical surveying, and machine control products.

From open-field construction projects to isolated surveying sites and from rolling farmland to inner city utility projects, Topcon Positioning Systems creates innovative technology solutions that give a decidedly competitive edge to end-users.

Recognized as the innovative trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands facing GIS, construction, surveying, agriculture, utilities and law enforcement professionals worldwide. We look forward to building solutions that solve your data collection project challenges today and in the future.

For further information on the IP-S2 product, please email: mobilemapping@topcon.com

Specifications

GNSS COMPONENT	
Channels	40 channels, all-in-view, L1 L1 GPS, L1/L2 GPS, L1/L2 GLONASS, L1/L2 GPS + L1/L2 GLONASS WAAS
Low Signal Tracking	Down to 30 dBHz
Cold Start	< 60 sec
Warm Start	< 10 sec
Reacquisition	< 1 sec
Vibration	Up to 30 g's of dynamic
Advanced Firmware Function	Multipath Mitigation, Co-Op Tracking
Real time Position & Raw Data	Up to 20 Hz update rate
RTCM SC104 v2.1 and 2.2	Input/Output
NMEA 0183 v2.1, 2.2, 2.3 & 3.0	Output
IMU	
Type	Honeywell HG1700
Data Rate	100Hz
Gyro Bias/Drift Rate	1°/hr, 3°/hr, 5°/hr
POWER	
Input Supply Voltage	9V to 28V
PHYSICAL	
Size	7.87" x 9.06" x 4.33"
Weight	8lbs
ENVIRONMENTAL	
Temperature Operating Storage	-30° to +60°C -40° to +70°C
I/O PORTS	
CAN Bus	OBDII - MOLEX-9 Pin
Encoder	TTL quadrature input
Ethernet	100 Base-T
USB 2.0	Host input/output
RS-232-/422	Up to 2 Mb/s
High-speed Digital I/O (x4)	LVDS 400 Mb/s
LASER SCANNER	
Type	Two (2) SICK™ LMS 291-S05, One (1) SICK™ LMS 291-S14
Scanning Angle/Angular Resolution	
- LMS 291-S05	180°/1° Angular Resolution
- LMS 291-S14	90°/0.5° Angular Resolution
Typically Measurement Accuracy	±45mm
Typical Range	30m
Date Rate	75 Hz via Ethernet

Outage Duration	System	Position Error (m)		Attitude Error (Degrees)		
		2D	H	Roll	Pitch	Heading
0 s	IP-S2 (AG58 - 1°/Hr)	0.015	0.025	0.020	0.020	0.040
	IP-S2 (AG60 - 3°/Hr)	0.015	0.025	0.025	0.025	0.050
15 s	IP-S2 (AG58 - 1°/Hr)	0.020	0.025	0.020	0.020	0.045
	IP-S2 (AG60 - 3°/Hr)	0.025	0.025	0.025	0.025	0.060
30 s	IP-S2 (AG58 - 1°/Hr)	0.040	0.030	0.025	0.025	0.050
	IP-S2 (AG60 - 3°/Hr)	0.055	0.030	0.030	0.030	0.075

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It's time.

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Specifications subject to change without notice

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