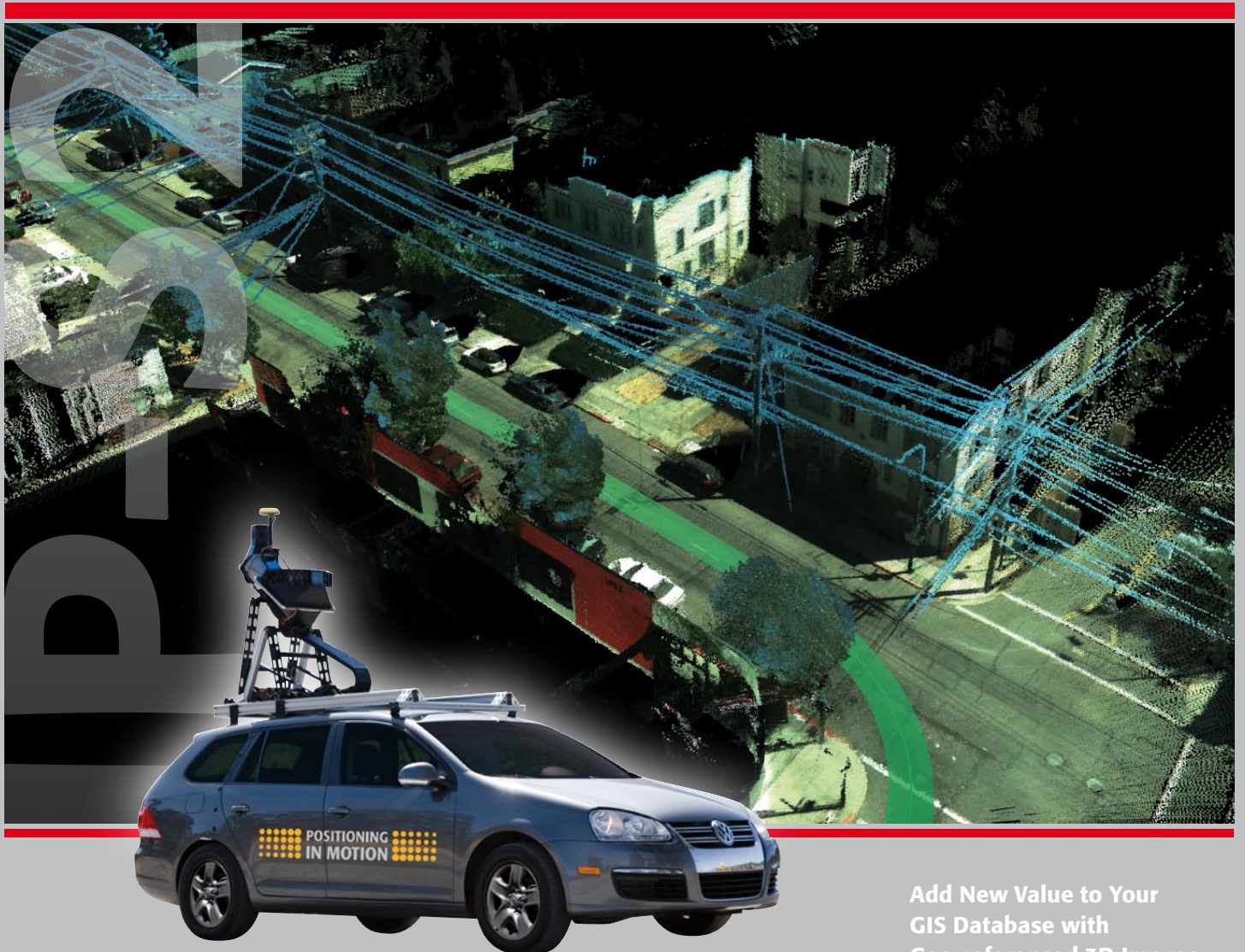


IP-S2 HD – MOBILE MAPPING SYSTEM



Add New Value to Your GIS Database with Geo-referenced 3D Images

- Ultimate density, long range scanning
- Panoramic plus high resolution cameras
- Dual Frequency GNSS Tracking
- High Accuracy 6-Axis IMU Integration
- Internal or external Wheel Encoders for Odometry and Tracking

IP-S2 3D Mobile Mapping System with Velodyne® Laser Scanner

IP-S2 HD is the ultimate solution when minimizing field work and obtaining maximum detail in a single run is important. IP-S2 HD provides the greatest point cloud density and longest range available today. The unique arrangement of lasers minimizes scanning shades and scans objects from multiple sides in a single pass. Four optional high resolution cameras locally enhance the resolution of the panoramic images, enabling the user to read small texts on traffic signs or other roadside features.

Topcon's IP-S2 mobile mapping systems provide high accuracy data and dynamic imaging for any mapping project. The vehicle-mounted systems collect geo-referenced data for roadway surface condition assessments and roadside feature inventories while traveling at highway speeds. The systems reduce project costs while increasing operator safety by keeping surveying crews and mapping personnel off the roads. The IP-S2 is perfect for 3D street-level city mapping in difficult GNSS environments like urban canyons, and it's ideal for mapping pipelines, railways, utility corridors, waterways, homeland security and disaster management.

Accurate vehicle positions are obtained by the IP-S2 by combining three different technologies: a dual frequency GNSS receiver; an Inertial Measurement Unit (IMU) that provides vehicle attitude, and a connection to external wheel encoders that provides odometry information. These three technologies work together to generate a precise 3D position for the vehicle even in locations where satellite signals can be blocked by obstructions such as buildings, bridges or tree lines.



IP-S2 System Features

- Dual frequency GPS and GLONASS tracking
- High performance 6 axis MEMs base inertial measurement unit
- Vehicle odometry and tracking information from dual internal or external wheel encoders
- High accuracy, high density point cloud information from Velodyne® laser scanner
- Factory calibrated for minimal user setup



IP-S2 System Applications

- 3D Mobile mapping and surveying
- Automated vehicle control
- Vehicle tracking
- Roadway condition assessment
- Pipelines, Railways, Utility Corridors, Waterways
- Homeland Security
- Disaster Management

IP-S2 HD



Single PC for data collection

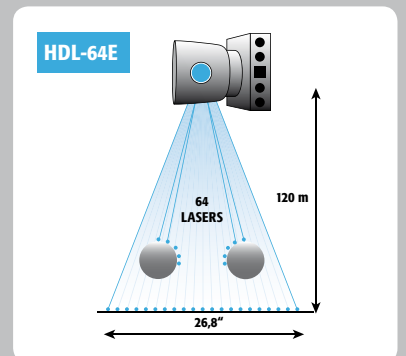


Car mount fits standard roof-rack



Ready for future extensions

VELODYNE LASER SCANNER



HDL-64E scans both sides of features

IP-S2

IP-S2 HD brings a new level of detail to mobile mapping data

1 GNSS Antenna

2 360° Digital Camera

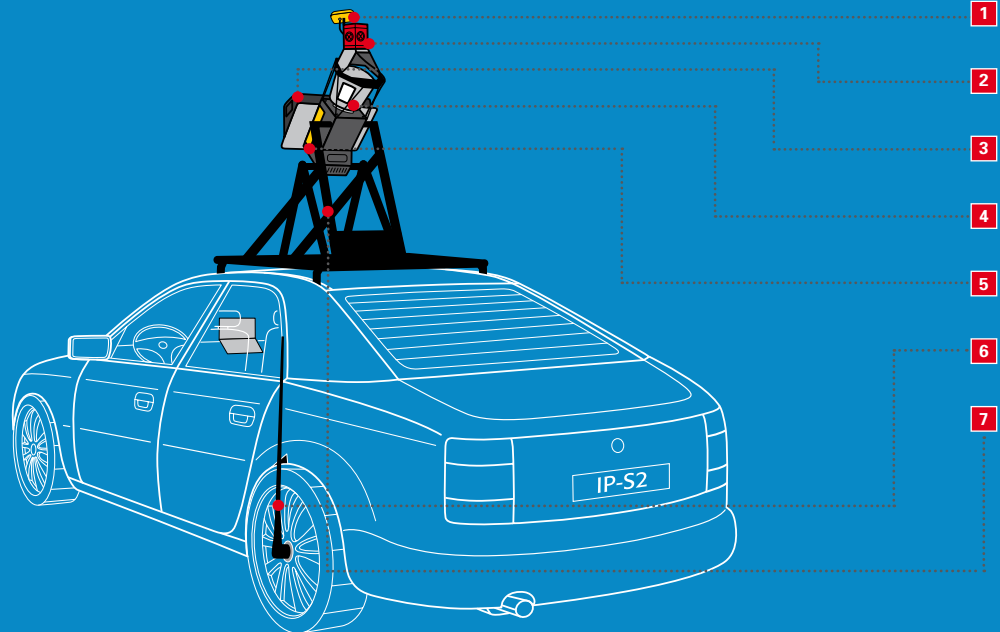
3 Optional high resolution detail cameras

4 Laser scanners

5 IMU

6 Wheel encoders

7 Sensor mount folds down when system not in use



Vehicle Position Metrics*

Outage Duration	System	Position error (m)		attitude Error (Degrees)		
		2D	H	Roll	Pitch	Heading
0s	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
15s	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
30s	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

Outage results are determined by calculating the RMS of the maximum errors for a minimum of 30 outages. Each outage was selected such that at least 100-second high-accuracy GNSS outputs (fixed ambiguities) were available before and after the outage. All results are based on a forward-and-backward smoothed solution with inertial and wheel sensor data input. Metrics were obtained using PPK (Post Processing Kinematic) solution.

* Under optimal conditions



Sensor

- 64 lasers/detectors
- 360° field of view (azimuth)
- 0.09° angular resolution (azimuth)
- 30.13° vertical field of view (elevation) ±5.26° up to 24.87° down with 64 equally spaced angular subdivisions (approximately 0.4°)

Laser

- Class 1 - eye safe
- 4 x 16 laser block assemblies
- 905 nm wavelength
- 5 nanosecond pulse

- Adaptive power system for minimizing saturations and blinding

Mechanical

- 15V +/- 1.5V @ 4 amps
- approximately 29 lbs
- 10" tall cylinder of 8" OD diameter
- 300 RPM spin rate
- Environmental Protection IP67

Output

- 100 MBPS UDP Ethernet packets

It's time.

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.



IP-S2



www.topcon.eu

Specifications subject to change without notice.
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SPECIFICATIONS

IP-S2 HD

GNSS COMPONENT	
Tracking	20 satellites, all-in-view, L1, GPS, L1/L2 GPS, L1/L2 GLONASS, L1/L2 GPS + L1/L2 GLONASS, WAAS, MSAS, EGNOS
Low Signal Tracking	Down to 30 dBHz
Cold Start	< 60 sec
Warm Start	< 10 sec
Reacquisition	< 1 sec
Advanced Firmware Function	Up to 30 g's of dynamic multipath mitigation Co-Op tracking
Real Time Position & Raw Data	Up to 20Hz update rate
RTCM SC104 v2.1, 2.2, 2.3, 3.0	Input/Output
NMEA 0183 v2.1, 2.2, 2.3 & 3.0	Output
HIGH-ACCURACY IMU	
Type	Honeywell HG1700
Data Rate	100 Hz
Gyro Bias/Drift Rate	1°/hr, 3°/hr
POWER	
Input Supply Voltage	Continuous 12-14 VDC with approximately 50 amp draw.
System power consumption	Approximately 300W.
PHYSICAL	
Size	1422 x 699 x 1245 mm
Weight	approx 82 kg
ENVIRONMENTAL	
Operating Temperature	-10 C to + 40C
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

Your local authorised Topcon distributor is: