



TOPCON

Mobile Mapping System IP-S2 Lite

IP-S2 Lite

Mobile Mapping System



- Integrates 3D Video Image with GIS Database
- Captures 360° Video with Positional Information While Driving
- Camera Vector Technology Assigns 3D Coordinates to Video Images
- Measurements can be taken on Video Screen
- Generates 3D CG of Roadside Features
- Overlays 3D CG on Video Image
- Active Linkage with GIS Software

Mobile Mapping System Captures 360° Video Image while Driving

Data Collection



Drive a vehicle through the desired route



Post processing



Integration of captured data

Automatic extraction of feature points

Automatic data processing



Linkage with GIS Database



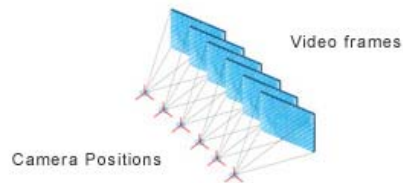
3D video image linked to GIS database

Inventory

Landscape Simulation

Camera Vector (CV) Technology

The CV-Technology assigns accurate 3D coordinates to every pixel in each video frame using camera vectors - vectors from the camera center. To calculate the camera vectors, three-dimensional camera positions and attitudes are determined by tracking the movements of multiple points in every frame. Utilizing a full scope of 360° spherical images that include points at a variety of elevations, the camera position and attitude can be accurately computed, maximizing precision of camera vectors.



IP-S2 Lite Sensor Unit

CV-Image



Three sensors - 360° camera, GPS and IMU - are integrated into a single block for easy mounting on a rooftop carrier of various vehicles. Digital camera captures spherical video image, GPS receiver collects geographical location, and IMU (inertial measurement unit) monitors vehicle attitude while assisting positioning where GPS signals can be blocked.



Simple Configuration



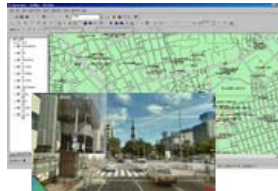
The simplified system configuration requires only one laptop PC and an HDD (eSATA connection) inside the car.

Portable, Easy Mounting System



A hard carrying case secures the sensor units for transportation and storage. The system can be quickly mounted on and dismantled from a vehicle as needed.

Active Linkage with GIS software



Integration with GIS software

Sharing a common database, all operations and edits on video images are reflected upon digital maps of GIS software.



Measurement between 2 Points

Distance, height, tilt, and azimuth can be measured by clicking two points on the PC screen.



Points, Polylines, Polygons

Points, polylines and polygons can be traced on the PC screen and registered as spatial information.



Object Tag

Objects in the video images can be identified and registered with attribute information.



3D Coordinate Measurement

Point and click on video screen to check the 3D coordinate value of the point. Enables to measure a slope surface.



Overlaying CG

3D Computer Graphics can be overlaid onto the video images. Ideal for landscape simulations.

IP-S2 Lite Software



S2 Lite Controller - Data Collection Software -

Captures video images with a 360° camera, collects positional data with a GPS receiver and vehicle motion/attitude with an IMU.



S2 Lite MovieMaker - Spherical Movie Creator -

The MovieMaker generates a 360° spherical movie from captured video images.

kinematicOption

By conducting GPS kinematic analysis (postprocessing) on the data, the absolute position accuracy can be improved.



S2 Lite 3DMaker - 3D Image Processor -

With the CV-Technology, the 3DMaker calculates camera vectors and generates CV-Image of which pixels in all frames have geo-referenced 3D coordinate values.



S2 Lite for A-GIS - Extension for ArcGIS -

Creates active linkage between the 3D video images and ArcGIS.



Creates active linkage between 3D video images and GIS software. Development of the existing GIS software is required for S2 Lite EX-GIS application.



S2 Lite OrthoMaker
Makes simplified Ortho image.

IP-S2 Lite Specifications

IP-S2 BOX	
Integrated GPS Receiver	
Number of Channels	40 channels GPS L1 carrier, L1CA
Data Update/Output Rate	10Hz *1
Integrated IMU	
Type	MEMS gyroscope
Gyro Bias	25°/h
Acceleration Bias	8.0mG
General	
Data Update/Output Rate	100Hz
Input Voltage	10 to 18V DC
Keyboard	FN1, FN2, Power
LED	Power, GPS, Status
I/O ports	Power Supply, USB, Ethernet, 360° Camera, GPS Antenna
Operating Temperature	-30 to +60°C
Dust/Water Protection	IP66
Dimensions	200 x 230 x 110mm (excluding protrusions)
Weight	3.64kg
Sensor	
360° Digital Camera	
Configuration	6 CCD Image Sensors
Resolution	1600(H) x 1200 (V) Pixels
Operating Temperature	0 to +45°C
Recommended PC specification	
OS *2	Windows® XP SP2 or later / Windows® 7
CPU	Intel® Core™ Duo 1.4Ghz or higher
RAM	2GB or larger
Graphics Card	Graphics Card with an independent Graphic Chip Recommended NVIDIA GeForce GTS250 or higher (Necessary for S2 Lite OrthoMaker) Supports OpenGL 1.2 or higher 256MB or larger video memory
Port	e-SATA x 1, USB x 2, Ethernet x 1 IEEE1394b x 1 (or ExpressCard/34-slot x 1)

*1 1Hz with S2 Lite Controller software

*2 Not available for Windows® Vista