# TOPCON

## 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 Arc GIS -**
Creates active linkage between the 3D video images and Arc GIS.

**S2 Lite EX-GIS**
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.

## It's time.

## 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 NVDIA 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,Ethernetx 1 IEEE1394b x 1 (or ExpressCard/34-slot x 1) |

*1 1Hz with S2 Lite Controller software
*2 Not available for Windows® Vista

## IP-S2 Lite
**Mobile Mapping System**

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# IP-S2 Lite
**Mobile Mapping System**

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

- 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

The IP-S2 Lite captures video and spatial information while driving a vehicle. A series of S2 Lite software integrates the

With one click on a digital map, you can view 360° video image that puts you at the exact location.
On a PC video screen, you can take measurements, inventory the assets, extract necessary information, or

Data collection is fast, easy, and safe. While driving a vehicle, the IP-S2 Lite captures 360° spherical video image along with all the necessary information such as geographical

Topcon IP-S2 Lite not only provides revolutionary data collection solution, but also enables you to add new value

## 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
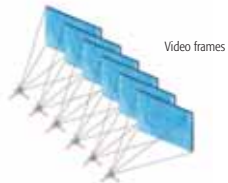
Video frames

CV-Image is defined as the video imagery of which pixels in all frames

Camera Positions

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### Data Collection

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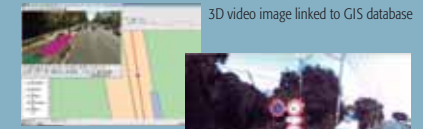Drive a vehicle through the desired route

### Post processing

▶ ▶ ▶

Integration of captured data

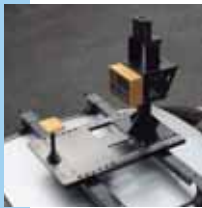Automatic extraction of feature points

Automatic data processing

### Linkage with GIS Database

3D video image linked to GIS database

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## Mobile Mapping System Captures 360° Video Image while Driving

### IP-S2 Lite Sensor Unit

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 dismounted from a vehicle as needed.

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## Active Linkage with GIS software
## 3D Video Images Add Unprecedented Value to the GIS Database

### 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.