SLAM-based Portable Indoor Mapping System

At Intergeo, SBG Systems has joined VIAmetris in announcing the MID, a SLAM-based portable indoor mapping system. For this innovation, VIAmetris has chosen SBG Systemsâ€™ brand new miniature AHRS, the Ellipse-A. With this system, just walking is enough to map the interior of a complete building. MID integrates 2D Lidar, a camera, an AHRS and a tablet PC that shows the map being drawn while the user walks through the building.

As the user walks, the 2D Lidar scans the room in a horizontal plane by measuring 43,000 points per second in a 270° field of view. The SLAM technology builds progressively the map in the shape of lines made of points. At the office, the surveyor imports the data into the post-processing software. He just has to draw over the lines of points to design the map. If any doubt occurs on a specific shape, whether it is actually the wall or furniture for example, a photo of the room is available in one click into the software. Indeed, the MID takes contextual pictures either every meter, at every change of direction, or manually. The centimetre-level accurate map is then ready to be imported in all CAD software. As the system works without GPS, the generated map is not located on earth nor in a local coordinates reference system. To do so, the user just has to link the MID's points cloud to a known point and all data will be automatically recalculated. Easier to use than a laser distance meter, a tacheometer, or a 3D scanner, the MID exceptionally reduces the execution time of indoor mapping.

AHRS

As the equipment is held by the surveyor, it is never perfectly horizontal. Hence, without an inertial sensor, the quality of the Lidar data could be diminished. VIAmetris was searching for an industrial-grade inertial sensor and ended up at SBG Systems. The selected sensor was the brand new AHRS 'Ellipse-A'. The Ellipse-A integrates very low noise gyroscopes as well as filters and algorithms usually used in survey-grade inertial navigation systems. This miniature AHRS delivers a roll and pitch accuracy of 0.2°. It also provides a magnetic heading to orient the map to the North. This is especially useful when there are a lot of rooms to survey or when the survey is conducted for several days.

To keep a robust heading, despite the natural magnetic disturbances created by the system, the AHRS embeds an advanced tool which allows calibration in real conditions. During the survey, Ellipse-A data is sent at a 200Hz output rate to the internal computer and is synchronised with pictures and points clouds. Tested for three months by a surveying company, the MID is ready to enter the market.

Intergeo

Both SBG Systems' Ellipse Series and VIAmetris' MID will be presented for the first time to the surveying market at Intergeo, Berlin, the world's leading trade show for geodesy, geoinformation and land management.

For more information on Ellipse-A AHRS, see here.

For more information about the new MID Series, please go here.

For a product overview on inertial navigation systems see Geo-matching.com.