

A new approach to the Terrestrial Laser Scanner workflow: the RTC360 solution

Andrea Biasion (Switzerland), Gregory Walsh (USA), Bernd Walser and Thomas Moerwald (Switzerland)

Key words: Engineering survey; Laser scanning; Professional practice

SUMMARY

Leica's newest laser scanner offering, the RTC360, is embedded in a new approach for collecting and preparing reality capture data. The goal of this new approach is to improve the productivity of the entire workflow from collecting data in the field to preparing the final, registered point cloud. This objective informed the design of all three components: the laser scanner RTC 360, the field tablet software Cyclone FIELD 360, and the office software Cyclone REGISTER 360.

The productivity enhancements of the RTC360 solution (RTC stands for RealiTY Capture) pivot around collecting enhanced data in the field that is used throughout the workflow to automate the processing and preparation of the measurements. Over the last years, laser scanners have become much faster and more accurate. The process of assembling the data collected from each scan position, called registration, remained as a time-consuming and complex task done primarily in the office after the data was collected. Furthermore, knowledge of surveying techniques was critical in this process. Because the RTC360 solution provides a high degree of automation of this task, capturing and preparing the data is now accessible to non-surveying professionals.

Leica's RTC360 solution starts with the scanner, using methods inspired by "Simultaneous Location and Mapping" (SLAM) technology, integrated into the Visual Inertial System (VIS). The VIS, with the combined use of 5 cameras and one IMU on the scanner, delivers the 6 degrees of freedom of the delta pose between two sequential setups in real time, with no user interaction. The resulting delta pose is robust to most of the handling and environmental conditions.

Leica Cyclone FIELD 360 allows the user to visually inspect and correct the result of the VIS. Detecting problem early allows users to fix them at the most efficient time: that is, right in the field. The tablet software can also improve the scan data alignment based on both the VIS information

A new approach to the Terrestrial Laser Scanner workflow: the RTC360 solution (9968)
Andrea Biasion (Switzerland), Gregory Walsh (USA), Bernd Walser and Thomas Moerwald (Switzerland)

FIG Working Week 2019
Geospatial information for a smarter life and environmental resilience
Hanoi, Vietnam, April 22–26, 2019

and a reduced size simulacrum of the scan data, making the final data registration in office on the full data more efficient. In addition, users can enhance the data stored with spatially indexed notes, images, and other data generated in situ.

The RTC360 laser scanner is also the fastest on the market. The WFD (Waveform Digitizing Module) delivers up to 2 Mio points per second and provides high dynamic measurements thanks to the double pulse technology implemented.

The HDR imaging system of the RTC360 laser scanner is based on three cameras and delivers in a very short time, one minute, the high resolution HDR full dome picture, independent from lighting conditions.

All of these elements are combined into one highly automated import process in Cyclone REGISTER 360, in the office. Users can check the data and make corrections before import as with the field software. Cyclone REGISTER 360 merges the data from the VIS, the LIDAR, from the tablet, and from the HDR camera to produce a fully registered and coloured point cloud without manual intervention.

A new approach to the Terrestrial Laser Scanner workflow: the RTC360 solution (9968)
Andrea Biasion (Switzerland), Gregory Walsh (USA), Bernd Walser and Thomas Moerwald (Switzerland)

FIG Working Week 2019
Geospatial information for a smarter life and environmental resilience
Hanoi, Vietnam, April 22–26, 2019