POINT CLOUDS EVERYWHERE AT HXGN LIVE 2014

'Great Stories Start Here'

This yearâ€™s HxGN Live, Hexagon Metrologyâ€™s annual user conference, was once again held in Las Vegas, USA, from 2-6 June. Its maxim: â€˜Great Stories Start Hereâ€™. From a geomatics point of view the event can be typified as â€˜point clouds everywhereâ€™. This report focuses on their creation by airborne Lidar, mobile mapping, trolleys and handhelds.

Although Leica Geosystems, part of Hexagon, has been a prominent manufacturer of airborne Lidar systems for decades, in October 2013 it acquired Swedish Airborne Hydrograph AB (AHAB) – a small firm which has been specialised in bathymetric airborne Lidar for over 20 years. Today, AHAB manufactures three types of Lidar systems: one for capturing land and two aimed at seabeds and riverbeds. The systems can be arranged in various configurations, fitting in one standard casing but stamped with different logos. DragonEye is a purely topographic Lidar system. In March 2014 the Dual Head was launched consisting of two scanners each emitting up to 500,000 pulses per second summing up to a pulse rate of 1MHz and joined by an RCD30 80MP camera recording RGB and near infrared. When flying at a height of 1km, the point density is 16 points/m^2. The scan pattern is circular enabling the receipt of up to four returns per ground point. One sensor is pointing forward and one backward; the resulting oblique view enables the recording of facades on both sides of buildings without occlusion. Its uses include 3D modelling of buildings and cities; monitoring of forests and power transmission lines; and survey of roads and railways. Bathymetry can be captured by two oblique Lidar systems: one for shallow water (max. depth: 15m; pulse rate 35kHz) and one for deep waters (max. depth: 50m; pulse rate 10kHz). Both use the green band and record the full waveform, and the penetration depth depends on how clear the water is. Both bathymetric systems can be combined with the DragonEye land Lidar to seamlessly capture seabeds and the adjoining land. Now that Leica has directed its gaze towards ‘the sea’, it raises the question of which manufacturer of multibeam echosounders is the first in line to be acquired.

Road Surveys

Many countries have adopted road safety strategies and these often involve 3D modelling. Mobile mapping systems (MMS) mounted on cars are ideal for this purpose, as they can drive at speeds of up to 100km/h while acquiring data. As a follow-up to Pegasus:One, the Pegasus:Two MMS was launched at HxGN Live 2014. All sensors and computers are integrated in the same casing. The trunk of the vehicle stores only the rechargeable 11-hour battery. The MMS consists of one Lidar sensor and six horizontal cameras (rear and skyward-view cameras are optional) while there is space for a thermal camera, ground-penetrating radar, sonar, pollution monitor or other sensors. The MMS can be extended with a Leica ScanStation P20. Positioning is done with Novatel’s ProPak6. A handle surrounding the unit enables easy mounting on any moving platform. Stuart Woods, vice president of Mobile Mapping, admitted that the handle took longer to design than any other component.

Trolley and Handheld

A prototype of Pegasus:T2, a trolley-based MMS weighing 20kg, was also on display. Designed for original data capture, updating or extending existing 3D models of construction sites or plants, for example, the system will be available by the end of 2014. The greatest challenge will be adaption for indoor use. To date, the collection of point clouds has focused on creating new 3D models but once these are in place the need for updating will arise as pipes are subsequently replaced and valves added. At a booth on the exhibition floor, the company DotProduct presented its DPI-7 KIT handheld device composed of off-the-shelf hardware: an Android tablet computer and PrimeSense Carmine 1.08 RGB and depth sensor. However, the heart of the handheld is the patent-pending Phi.3D software which stitches newly captured point clouds to existing ones in real time using the overlaps. This tool allows not only updating but also capturing of those parts of a scene which are invisible or not accessible to regular laser scanners.

Over 3,500 attendees from 80 countries participated in HxGN Live 2014. Two user conferences will be organised in 2015: one in Las Vegas from 1-4 June and a second one in Hong Kong from 18-20 November.

The image shows Aldo Facchin, R&D manager for Mobile Mapping Geosoft Srl (Italy) – part of Leica Geosystems – mounting a Pegasus:Two on a van of the Spicer Group, a surveying, engineering and planning firm based in Michigan (USA) (Courtesy: M. Lemmens).