

# CR

**Construction Review**  
[www.constructionreviewonline.com](http://www.constructionreviewonline.com)

## Land survey



**Land surveying and its importance**

**Supplement**

[www.constructionreviewonline.com](http://www.constructionreviewonline.com)



The eBee uses a rear-mounted propeller and due to its flexible foam construction it weighs 700 g (1.5 lbs), minimizing its impact energy.

Surveying and land surveying is the measurement and mapping of our surrounding environment using mathematics, specialised technology and equipment. Surveyors measure just about anything on the land, in the sky or on the ocean bed. They even measure polar ice-caps. Land surveyors work in the office and in the field. In the field, they use the latest technology such as high order GPS, Robotic Total Stations (Theodolites), and aerial and terrestrial scanners to map an area, making computations and taking photos as evidence. In the office, Surveyors then use sophisticated software, such as Auto-cad to draft plans and map the onsite measurements. Surveyors work on a diverse variety of projects from land subdivision and mining exploration, to tunnel building and major construction, which means no two days are the same. They are experts in determining land size and measurement. They also give advice and provide information to guide the work of engineers, architects and developers.

#### Importance of surveying

According to Renishaw plc, laser scanning is not only used in land surveying but is being adopted in more and more industries, since it gives detailed, accurate data, very quickly, and with fewer



Equipped with a high-resolution digital camera, the Aibot X6 generates high resolution data for the creation of orthophotos, 3D models and point clouds of a precision down to a few millimeters.

manpower requirements, saving companies costs. Surveying is important and most of us depend on it so as to ensure order in the physical world around us. Surveyors play an integral role in land development, from the planning and design of land subdivisions through to the final construction of roads, utilities and landscaping. Surveyors are the first people on any construction site, measuring and mapping the land. These primary measurements are then used by architects to understand and make the most of the unique landscape when designing and engineers to plan structures accurately and safely, ensuring buildings not only fit with the landscape but are able to be constructed.

According to Haglöf Sweden AB, It is valuable for everyone to keep track of assets to maintain control and healthy growth. Standardization, calibration and control systems are used in all industries, and when measuring, storing and processing data on-site, error sources are efficiently minimized. Problem areas are detected in time and actions are based on facts and figures. It is necessary to mark the boundaries on the ground, so that they are clear to observers standing on or near the property. Also surveying is intended to provide the evidence needed by the title insurer to delete certain standard exceptions to coverage and thereby provide "extended coverage" against off-record title matters including matters that would be revealed by an accurate survey.

Many properties have considerable problems in regard to improper bounding, miscalculations in past surveys, titles, easements, and wildlife crossings. Also many properties are created from multiple divisions of a larger piece over the course of years, and with every additional division the risk of miscalculation increases. The result can be abutting properties not coinciding with adjacent parcels, resulting in gaps and overlaps. Many times a surveyor must solve a puzzle using pieces that do not exactly fit together. In these cases, the solution is based upon the surveyor's research and interpretation, along with established procedures for resolving discrepancies. This essentially is a process of continual error correction and update, where official recordation documents countermand the previous and sometime erroneous survey documents recorded by older monuments and older survey methods.

#### Sensefly Ltd

senseFly is a Swiss manufacturer of autonomous, ultra-light mapping drones (also called UAVs) and related software. Their network of approximately 40 value-added distributors serves 60 countries, including 3 companies that serve 21 African countries – plus they have a key accounts team and direct sales staff to serve customers in those markets where they don't yet have distributors. Their flagship product is the eBee, an easy-to-use and safe fixed-wing mapping drone. This solution is already employed by land surveyor professionals around the world, including many working in the fields of construction and mining.

The eBee is an advanced and fully automated geo-data collection tool. A user simply defines the area they want to map using the drone's flight planning software and then they launch the drone by hand to automatically collect high-resolution aerial images of this area. They can then use their powerful post-flight software, powered by Pix4D, to 'stitch' these images together and create highly accurate 2D orthophotos and 3D elevation models. Or export these outputs into a wide range of third-party applications. More recently senseFly also announced the eBee RTK, a survey-grade version of the eBee capable of producing orthomosaics and 3D models with absolute accuracy of down to 3 cm – without the need for Ground Control Points. They supply their drones to numerous African countries via a mix of distributors and direct sales. Their

two distribution partners for example supply senseFly technology into countries ranging from Angola and Congo to South Africa, Botswana and Mozambique.

#### Aibotix GmbH

Aibotix develops and manufactures high quality and intelligent multi-rotor copters for applications in the industrial sector. The company's name encloses AI for artificial intelligence and BOTIX for robotics. Aibotix is represented around the globe. The company produces several hundred UAV's annually, making it one of the five largest manufacturers in the world. Their core product, the flying robot Aibot X6, is already flying on every continent and supports professionals, such as surveyors, engineers, energy suppliers, construction, and infrastructure companies in their daily work. This leads them not only to establish a world-class multicopter. Rather, they aim to integrate the Aibot X6 directly into the workflow of their customers and thereby making it easier and more efficient.

With the Aibot X6 UAS (Unmanned Aerial System) you can generate data for orthophotos, 3D models, and point clouds in high density with great accuracy. In-house flight planning software makes it simple to obtain all the parameters essential for professional-class photogrammetry. Through their global network of partners, Aibotix offer their customers all over the world personal service and advice and the Aibot X6 can be purchased in Africa from their partners Leica Geosystems and ACIEL Geomatics in South Africa.

#### IMAJING, for transportation infrastructures data collection

imajing® provides worldwide organisations with field data collection and Geographic Information System (GIS) solutions for roadways and railways infrastructures management. imajbox®, first element of the tool chain, is a portable mobile mapping technology designed and sized to answer problematics of large networks maintenance, where every type of roads – bitumen, gravel, earth – and railways need to be surveyed. Compact, standalone and easy-to-use, imajbox® can be installed on any kind of vehicle – car, truck, bike, train – and enables high quality positioning of corridor

imajview, photogrammetric and GIS software, is developed and adapted to imajbox® surveys processing and GIS data production from images. Capable of addressing multi-thematic projects, imajview is a customizable tool box which can fit in any network asset inventory or assessment project. imajnet®, representing the last brick of imajing tool chain, is a turnkey web service solution developed to manage and centralize all data produced by imajbox. All-dimension, imajnet® enables time and space navigation. Pervasive, the web service can be integrated into GIS applications for collaborative asset management purpose within organizations, enabling to handle thousands of kilometers.

imajing® solutions are used to perform massive road or railway inventory and condition survey with flexibility and simplicity, which is not possible with most technologies that are cumbersome and where data storage and cost of surveyed kilometers become important issues. Up to now, more than 500,000km of data has been collected with imajbox, and processed for GIS purpose. According to IMAJING's International Business Manager Inès Guth, several service companies in Africa are equipped with imajing® tool chain. One of them is based in South Africa and currently works on railways surveying in Nigeria. Another one



Haglöf's Vertex Laser instrument VL5 is a unique combination instrument featuring both ultrasound and laser technology with very high accuracy and many built-in applications that offer operators in forestry, utility industry and construction areas high versatility and reliable precision measurement.

is based in Cameroun and surveys the national roads for the Ministry of Transport. A european company also surveyed the totality of the Transgabonais railway for maintenance purpose. Ms. Guth also added that today, African countries need to maintain, expand and manage their transportation infrastructures. After having developed its business in Europe and South America, imajing® starts focusing on the African continent which has huge needs and potential. imajing® is



imajing®'s field data collection and Geographic Information System (GIS)



FARO Laser Scanner X Series, the perfect instruments for 3D Documentation and Surveying.

opened to consider opportunities for developing the african market through partners. The company believes that it is very important to have local representative being able to provide sales support and technical assistance.

#### FARO Europe GmbH & Co.KG

FARO is the world's most trusted source for 3D measurement, imaging and realization technology. The Company develops and markets computer-aided measurement and imaging devices and software. Technology from FARO permits high-precision 3D measurement, imaging and comparison of parts and complex structures within production and quality assurance processes. The devices are used for inspecting components and assemblies, production planning, documenting large volume spaces or structures in 3D, for investigation and reconstruction of accident sites or crime scenes, as well as surveying and construction. For indoor and outdoor applications like surveying, FARO presents the smallest and lightest laser scanners on the market – the Focus3D X Series. The fast and accurate laser scanners

Focus3D offer everything you might expect from professional 3D laser scanners – with FARO's established and well-known level of simplicity. Focus3D X 330 offers extra long range – 330m, Focus3D X 130 is a mid-range device offering precise scanning up to 130m. Both scanner models are equipped with GPS and offer the possibility to perform scanning even in bright sunlight. Remote scanning as well as almost limitless scan data sharing via SCENE Webshare Cloud makes the laser scanning solution truly mobile.

Worldwide, approximately 15,000 customers are operating more than 30,000 installations of FARO's systems. The Company's global headquarters is located in Lake Mary, Fla., its European head office in Stuttgart, Germany and its Asia/Pacific head office in Singapore. FARO has branches in Brazil, Mexico, Germany, United Kingdom, France, Spain, Italy, Poland, Netherlands, Turkey, India, China, Singapore, Malaysia, Vietnam, Thailand, South Korea and Japan. Their products are also found in North Africa and South Africa. FARO partners with a network of third-

party distributors all over the world. Each distributor passes a rigorous qualification process, so you know the solution you receive is the correct one.

#### Caliper Corporation

Caliper Corporation, founded in 1983 and headquartered in Newton, MA, is a technology leader in the development of geographic information systems (GIS) and transportation software. Caliper is also a highly regarded consulting and R&D provider offering professional services in quantitative management consulting, transportation, and decision support systems development. Caliper software products are supported with extensive technical services in GIS applications and training, database development and software customization. Caliper is the developer of TransCAD® Transportation Planning Software, TransModeler® Traffic Simulation Software, and Maptitude® Geographic Information System Software packages.

Maptitude Geographic Information System (GIS) software provides everything you need to realize the benefits of desktop mapping and spatial analysis with a single, easy-to-use package. For South Africa, a FREE Country Package is available that includes a detailed street layer with addresses for pin-mapping (geocoding) and travel time information for computing routes and drive-time rings. Also included are building footprints for many urban locations, railroads, and comprehensive named landmarks that range from public facilities to commercial buildings including shops, restaurants, and retail stores.

In addition, Caliper has created a Download Free Layers Add-In for Maptitude that provides easy access to no-cost web-based data-sources. This tool downloads detailed data including streets, landmarks, natural features, railways and postal code points for Congo, Ethiopia, Lesotho, Libya, Madagascar, Morocco, and Somalia. In addition, you can download political boundaries for most of Africa including Algeria, Botswana, Cameroon, Egypt, Ghana, Kenya, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Tanzania, Tunisia, and Zimbabwe. Maptitude also supports dozens of geographic file formats, table formats, and raster image formats.

#### Haglöf Sweden AB

Haglöf Sweden® manufactures a full range of precision measurement solutions used by industry professionals all over the world. They focus on combining tough exteriors with smart interiors for solutions that are easy to use, packed with modern technology and that offer exceptional communication and compatibility skills. Apart from the world's largest selection of increment borer models for quality control of wood, they offer a great choice of diameter caliper models, hypsometers, rangefinders and other instruments and tools for field management, testing and control work. Patented technology and long manufacturing know-how are keys to why Haglöf Sweden® is one of the most respected brand names in the business.

Their products are developed and made in limited, quality assured series by their experienced team. With a tight organization and close collaboration with operators, customers and branch people, you can rely on Haglöf Sweden® solutions. Their products are ruggedized and designed for rough use in tough surroundings. They are built to increase your efficiency, improve accuracy in your measurement results and to save time and money for you and your organization. Haglöf Sweden



Maptitude Geographic Information System (GIS) software provides everything you need to realize the benefits of desktop mapping and spatial analysis with a single, easy-to-use package.

products are currently represented in South Africa and direct sales has been made in Morocco, Egypt, Syria, Kenya and Ethiopia. Their larger European and North American dealers sell and export products to African countries. Their company is always looking for professional, skilled, knowledgeable and branch experienced distributors, preferably with background in forestry and computer technology.

## CONTRIBUTORS

#### senseFly Ltd

info@sensefly.com  
www.sensefly.com

#### Aibotix GmbH

carsten.rudolph@aibotix.com  
http://www.aibotix.com/

#### IMAJING,

iguth@imajing.fr  
www.imajing.eu

#### FARO Distribution

Stefanie.Meier@faroeurope.com  
www.faro.com

#### Caliper Corporation

sales@caliper.com  
www.MappingSoftware.com

#### Haglöf Sweden AB

gabriella.haglof@haglofsweden.com  
www.haglofsweden.com



At senseFly, we are always on the edge of technology innovation. The company holds several patents in the field of aerial robotics and is pursuing multiple research projects to expand its offer range.



Phone +41 21 552 04 40

website:www.sensefly.com