

# Reasons to be cheerful

Good things come in threes, so they say, which is probably why Hexagon Geosystems CTO Burkhard Boeckem looks so pleased. GeoConnexion caught up with him in London to find out why

**GeoConnexion (Geo):** At Autodesk University 2016, Hexagon unveiled the Leica Geosystems BLK360 portable imaging laser scanner. Its diminutive size, minimalist design, high performance and attractive price proved a game-changer in 3D reality capture, and it went on to garner a clutch of industry awards. At the time, Juergen Dold President GSI, Hexagon AB, promised a string of further innovations under the BLK banner. Have you managed to keep that promise?

**Burkhard Boeckem (BB):** We're certainly on track having, since then, launched a trio of BLK hardware devices: the hand-held BLK3D imaging scanner for real-time, in-picture 3D measurement at the end of 2018; and, at last year's HxGN LIVE conference in Las Vegas, the BLK247, a LiDAR and multispectral camera fused sensor, as well as the BLK2GO wireless handheld imaging laser scanner. We finished the year by launching a web portal for users to share BLK3D pictures, for collaboration and in picture measurements.

**Geo:** That's a pretty impressive achievement by anyone's standard and, of course, the BLK3D and BLK2GO have gone on to win awards in their own right, with the latter having scooped the Best of Innovation Award at CES 2020 in Las Vegas. Presumably all this innovation is backed by a large and dedicated design team?

**BB:** Quite the reverse. In fact, the BLK design team is a small agile team, but one that is incredibly talented.

**Geo:** Many of these products exploit the LiDAR technology used so successfully in the BLK360. Does this continue in further development?



Burkhard Boeckem. Photo: GeoConnexion

**BB:** Most certainly, and an example can be found in the BLK2GO where our design brief was to engineer a LiDAR sensor that was smaller, faster and fully protected for mobile use. The result is a Class 1 LiDAR that has been miniaturised. Scan speed has received a boost, the new sensor capturing data at a rate of 420,000 points per second. This enables the user to walk quite quickly when scanning, with a full 360° of freedom in the horizontal plane, and gives a new and unique view of the point cloud.

**Geo:** Can you say something about the optical cameras used in the BLK2GO?

**BB:** We use a 12MP camera with a rolling shutter to capture detail in high resolution. Its functions can be remotely adjusted by the user

via the BLK2GO's WiFi or USB-C 3 link, e.g., to automatically capture panoramic images at set distances or to add special annotations. There are also three small but powerful cameras hidden in the shaft that perform visual navigation via SLAM (Simultaneous Localisation And Mapping) functions and have global shutters so they are pixel-synchronous while the BLK2GO is on the move. And while SLAM would not normally be used for point cloud colourisation, we have also included this option.

**Geo:** The BLK247 is interesting in that it integrates optical, thermal and LiDAR sensors to detect any intrusion into a geofence that has been defined around a structure or asset. Can you elaborate on this?

**BB:** Yes, the BLK247 employs sensor fusion technology to pull in imagery and LiDAR data, as well as AI-driven LiDAR techniques to detect change and discriminate between still and moving objects. Also, by using Artificial Intelligence at the edge we're able to perform all processing functions internally on the device.

**Geo:** As well as its use as a security measure, can you see its potential being applied elsewhere?

**BB:** Absolutely. For example, it has already been trialled as a safety aid to detect people and animals that stray into, for example, metro tunnels.

**Geo:** Edge computing means different things to different people but seems to feature more and more in your products. What do you see as the key benefits of this approach?

**BB:** Working on the edge of the cloud offers



Three-of-a-kind  
(from L-R): BLK247,  
BLK2GO and BLK3D

the advantages of real-time data processing and low latency and we've exploited these to imbue our devices with ever greater intelligence. For example, with the BLK2GO, we employ what we call GRANDSLAM technology. This combines a two-axis LiDAR with visual SLAM and an Inertial Measurement Unit (IMU). Thanks to this, the device knows where it is and where it has been in space. When used with the associated BLK2GO Live app for iPhone, it will accurately follow a user's trajectory while scanning and provide live 2D and 3D feedback.

**Geo:** On the topic of software, what desktop applications are recommended for the BLK2GO?

**BB:** On this project, we sought to achieve a seamless interface with our Cyclone

REGISTER 360 package. The result is a BLK edition that provides a seamless and simple-to-use interface, much like that used for the RTC360 3D laser scanner.

**Geo:** What are the chances of miniaturising and democratising airborne LiDAR sensors such as Leica's SPL100 for reality capture?

**BB:** The idea is there, but the challenge of reality capture from a height of several kilometres remains formidable. We are currently midway through a forestry project that is pushing the boundaries of what can be achieved, but a BLK-type airborne LiDAR is still a long way off.

**Geo:** Coming back down to earth, can we look forward to the introduction of even more terrestrial products under the BLK banner?

**BB:** We will certainly be keeping our promise to launch further hardware and, as importantly, to deliver improved software and achieve closer integration with other products. As part of this, we demonstrated a new cloud-based visualisation platform at January's CES 2020 event in Las Vegas. Known as HxDR, the platform offers a seamless drag-and-drop way to import and fuse airborne imagery, laser scans, indoor and outdoor terrestrial scan data and mobile mapping data. The result? An accurate digital representation of the real world that can be shared with professionals across many disciplines. It's all about connecting the dots, both between technologies and between people.



Hands-on with the BLK2GO at London's historic Somerset House

