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Simplicity is the new black: The BLK360 story

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Abstract

Meet the game changer.
The new Leica BLK360 is a revolutionary, miniaturised imaging laser scanner. Capturing the world around us, the BLK360 takes full-colour panoramic images overlaid on high-accuracy point clouds. Developed to provide a complete view of reality to businesses that couldn't previously consider professional 3D laser scanning, the BLK360 democratises reality capture whenever, wherever needed.

The newest software solutions coming with BLK360 are BLK360 app and Leica Cyclone REGISTER 360. Using the BLK360 app the user can visualise, annotate and process BLK360 spherical imagery and point clouds on-site. Running on an industry standard iPad, the app activates BLK360 scans remotely with the simple push of a button, adjusting BLK360 settings and controlling the scanning resolution as per specific requirements. It generates a spherical image overlaid on a 3D point cloud with all the details needed to make accurate site surveys. In a simplified way to capture reality the user can create detailed project documentation by adding annotations and labels containing photos and voice memos. An accurate floor plan can be created, on-site, by simply identifying areas in the image as walls or openings, and the app automatically generates a floor plan. The floor plan can be saved in the industry standard DXF file format directly from the iPad to the desktop computer.
BLK360 colourised point cloud data can also be exported in the industry standard E57 format.
Leica Cyclone REGISTER 360 is the latest upgrade to the 3D laser scanning point cloud registration software, Cyclone REGISTER. REGISTER 360 empowers users of any skill level to work smarter, deliver results more accurately, visualise in more detail and collaborate more effectively - placing users at the centre of their projects.

Key words: BLK360, Leica Geosystems, grasp reality, laser scanning, point cloud

1 DEMOCRATISATION OF REALITY CAPTURE

Small, lightweight, black anodized aluminium, and with just a single button, the Leica BLK360 is barely recognisable as a professional grade 3D scanner. That button, however, unleashes its inner purpose – once pressed, three minutes later you have a full 3D scan of a room, in a combined laser, photogrammetry and heat-mapped model that is ready to be used.

Fig. 1 BLK360 – the game changer

2 SINGLE BUTTON OPERATION

As its name implies, the diminutive BLK360 (standing just 16cm high and weighing in around 1kg) conducts 360 degrees horizontal and 300 degrees vertical scans at range up to 60 m, entirely automatic once the button is pressed. Mounted on a firm surface or an optional fold-flat tripod, the self-balancing unit rotates slowly on its ring bearing, initially photographing and thermally imaging for references purposes and then performing a laser scan. The entire process is completed in less than three minutes. Optical and thermal images and laser scanned data are downloaded in real time to ReCap Pro and registered on-the-fly so the field operator has an immediate visual check on the evolving point cloud model.

2.1 PORTABLE. SIMPLE. IMAGING.

BLK360 captures 360 000 points per second within a 60 m range, while the High-Dynamic-Range (HDR) imaging is performed by a 15 MP three-camera system that is calibrated for full spherical HDR imagery. 3D point accuracy is 6 mm at 10 m, creeping to 8 mm at 20 m. The thermal camera integration is aimed for the Architecture, Engineering and Construction (AEC) market and features a professional unit from infrared expert FLIR that is fully calibrated with the rest of the collected data points. The addition of accurate thermal overlays should prove useful for showing pipes, cables and other embedded fixtures that might not be immediately visible from surface scan. There are no cables required and while the imaging

scanner alone will store more than 100 reality captures, the BLK 360 acts as its own Wi-Fi router, sending scans directly to partnered devices. Battery life is good for 40 scans, usually, for a residential house, 12 scans are needed. Inbuilt LED lighting and weather proofing to IP54 standard means it can be used both indoors and outdoors.

Fig. 2 On site

3 APPLICATIONS

As from the imaging scanner characteristics results, BLK360 is a perfect tool for Building Information Modelling (BIM) projects. The accessibility, the light weight, the easy and understandable workflow – it has changed the way we think about utilising point clouds.

Fig. 3 BIM projects

BLK360 can be deployed in many places in any new construction project to aid the BIM process. For example, scanning all components as they are installed can provide a time-lapse record with millimetre accuracy data on the pipes, structural steel, floors, and rebar in the concrete slabs throughout the building along with the actual installation date. This information can be compared to the design to verify that all components are installed in the correct place. If any errors are discovered, the design can be revised so new components can be altered in the fabrication process instead of making costly changes onsite. BLK360 can also be used to quickly assess the slab flatness of concrete floors, easily calculating the extents of any areas that need to be adjusted, and accurately determine the volume of material needed. This capability leads to more accurate material orders and less waste.

Fig. 4 As-built documentation for renovation

Collecting as-built data for renovation or restoration using a tape measure, pencil and graph paper takes a lot of time - and it often requires at least one more site visit.

The BLK360 is a perfect tool for validation to confirm the build on site matches up with the 3D model. It is small, lightweight, user friendly and produces good purposeful information well suited to as-built needs. The point cloud processing time is zero because the registration is done in real time.

For renovations or additions to an existing structure, drawings are often extremely out of date or simply don’t exist. This makes designing any type of renovation or addition difficult. The BLK360 locates whatever it sees and “freezes” the site in time in its current form. This data then can be transferred into CAD packages and used to develop extremely accurate existing condition drawings. Once these documents are created, laser scanning with the BLK360 continues to add value by capturing construction milestones and providing quality assurance as the project progresses.

Fig. 5 Retrofit

Using the BLK360 in a plant environment offers uncountable advantages. The ability to accurately map mechanical, electrical and plumbing (MEP) designs, constructions and structural components allows engineers to avoid conflicts that in the past would not have been caught until the construction phase. Utilising BLK360 in industrial plants is a major advancement from conventional methods. The accuracy, time savings, and most importantly, safety, make 3D laser scanning the most complete way to check as-builts for these facilities.

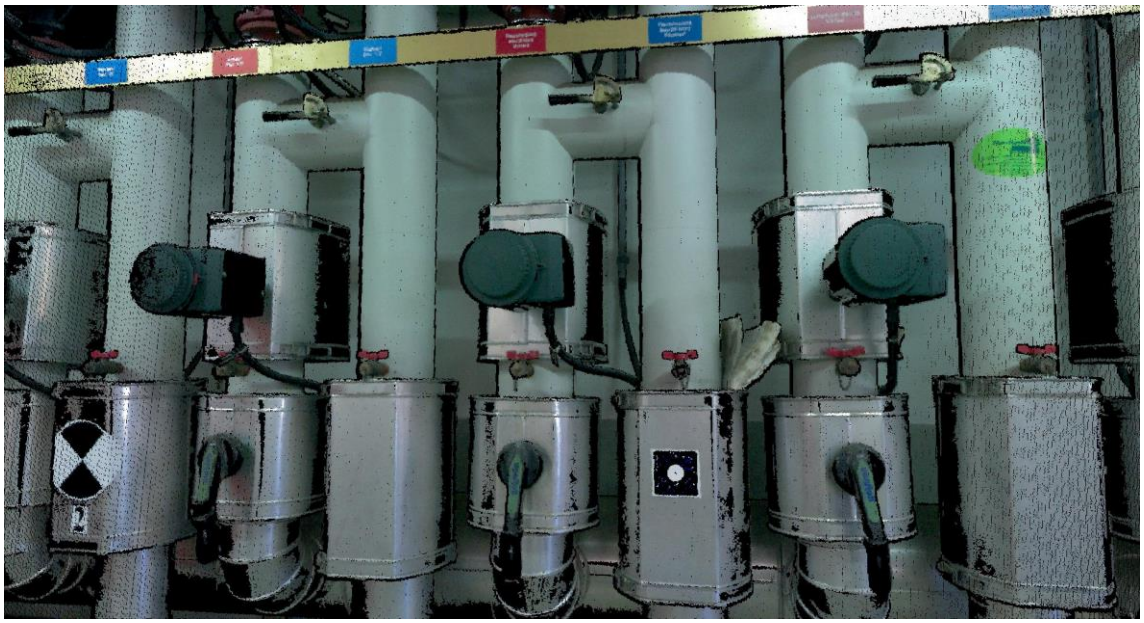

Fig. 6 Boiler Room – point cloud

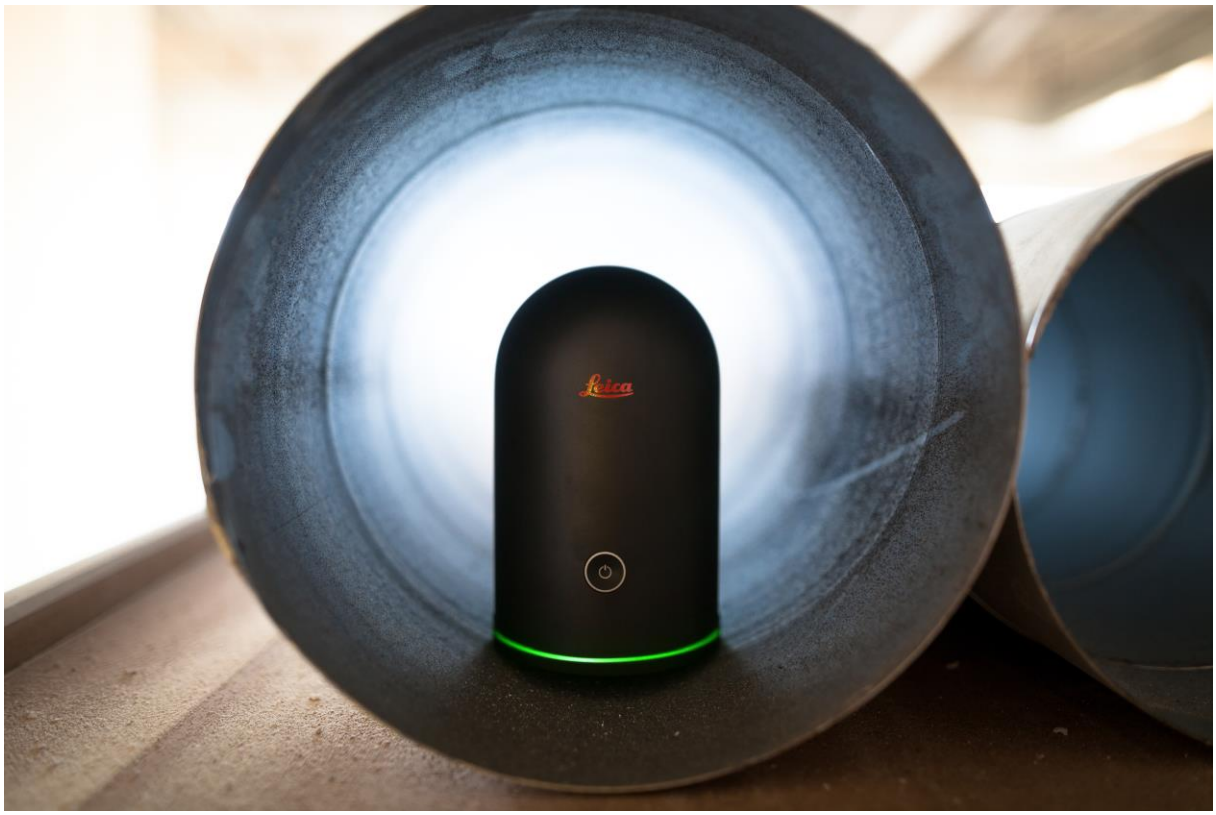

Fig. 7 Leica BLK360

4 SOFTWARE SOLUTIONS

4.1 LEICA CYCLONE REGISTER 360

Leica Cyclone REGISTER 360 is the latest upgrade to the 3D laser scanning point cloud registration software Cyclone Register. This most recent product built from the ground-up brings with it all-new capabilities from simple, guided workflows to automated registration and client-ready deliverables with the click of a button. It is the perfect companion for BLK360. Drag, drop and done. There are no import settings, neither for terrestrial and imaging data. The import itself is ultra-fast, approximately 20 times faster than anything that come before. The registration is done automatically, the user can fine tune and optimise final registration via built in tools.

Cyclone REGISTER 360 has been designed to guide new and non-traditional users through the registration process. New users will appreciate the highly visual display of a registration and the easy-to-understand error metrics while experienced users can still dig into their data and fine-tune their registration.

Cyclone REGISTER 360 offers batch export to TruView and JetStream platforms as well as industry-standard formats with one click.

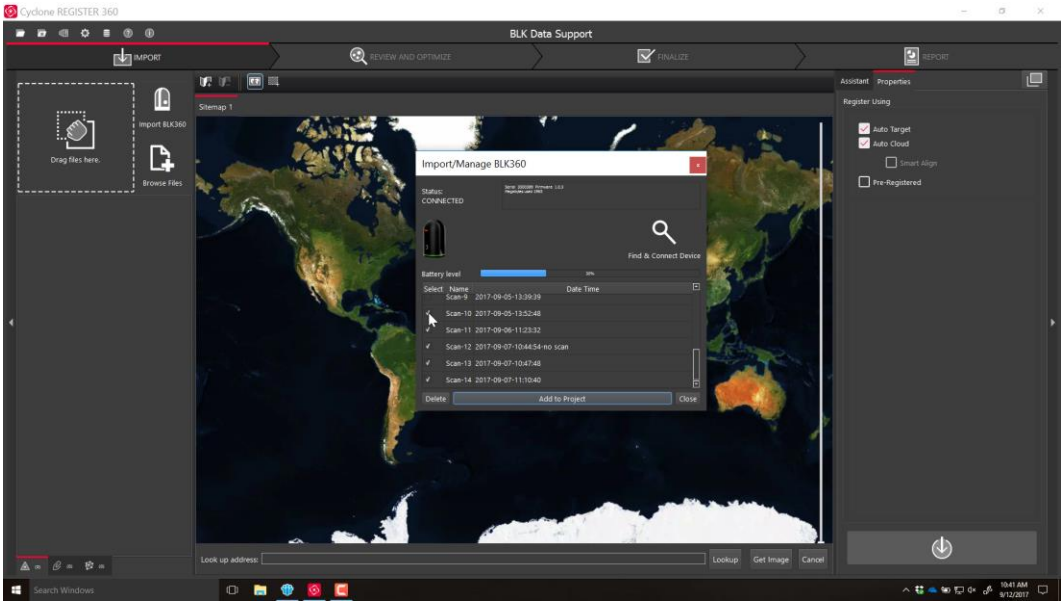

Fig. 8 Leica Cyclone REGISTER 360

4.2 BLK360 APP

Using the BLK360 app, the user can visualise, annotate and process BLK360 spherical imagery and point clouds on site. The app, running on an industry standard iPad, allows the user to activate BLK360 scans remotely with the push of a button, adjusting BLK360 settings and controlling the scanning resolution as per the requirements.

It generates a spherical image overlaid on a 3D point cloud with all the details needed to make accurate site survey.

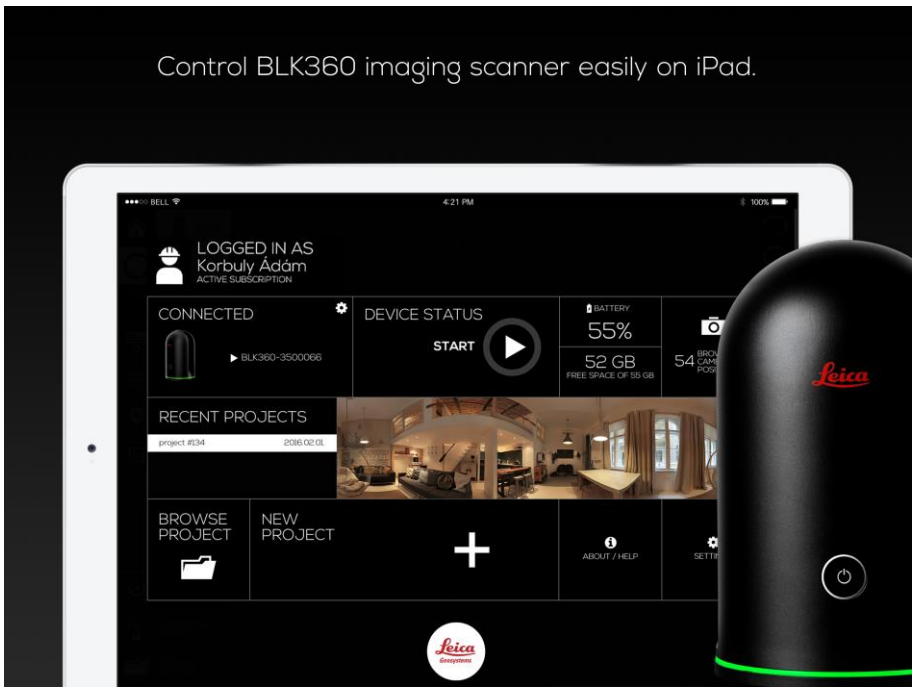

Fig. 9 BLK360 App

In a simplified way to capture reality, users can create detailed project documentation by adding annotations and labels containing photos and voice memos. The app allows making accurate distance measurements directly on the 360 degree image. All the measurements like wall lengths, surfaces or openings are displayed live on the iPad screen. An accurate floor plan can be created, on site, in minutes by simply identifying areas in the image as walls and opening and the app generates a floor plan of a space automatically. The floor plan can be saved in the industry standard DXF file format directly from your iPad to your desktop computer.
BLK360 colourised point cloud data can also be exported in the industry standard E57 format – making it available for use in the other point cloud processing applications.

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