

FLOORPLANS FOR THE 21ST CENTURY

MOBILE LIDAR SCANNERS CAN NOT ONLY SPEED UP THE CREATION OF FLOOR-PLANS, THEY CAN TAKE THEM INTO A THIRD DIMENSION, SAYS VIKTORIA LANGLEY

In an era when satellites roving space automatically capture the data needed to create maps, every corner of the earth is available to anyone with a smartphone. Technological innovation in mapping has brought us to the point where capturing data is fast and accessing it is easy.

This progress is in stark contrast to what happens in indoor spaces, where digital innovation still lags far behind what has happened to outdoor mapping. Instead of maps, buildings usually have two-dimensional floorplans, which are used for everything from planning and renovations to commercial leasing and emergency response.

Floorplans have made some progress towards going digital, with the introduction of software such as AutoCAD. But they remain static and two-dimensional, lacking the level of detail and interaction that outdoor maps provide.

They also tend to involve a significant amount of manual labour, especially when updating floorplans in an existing structure. Even if the original floorplans were drawn in AutoCAD, the architect or engineer still has to verify the accuracy of the plans since changes will most likely have been made throughout

the lifetime of the building. This requires taking several field measurements to verify the plans.

When AutoCAD drawings are not already available, the process of updating floorplans can be especially painful. Creating new floorplans based on existing conditions often involves collecting the data from multiple existing drawings as well as taking field measurements. Floorplans end up being a costly and time-consuming project that most building owners or operators only invest in when absolutely necessary.

To reduce the time and effort it takes to create and update as built floorplans, one German company decided to use 3D visualisation technology to transform not only the process but also the end product.

Applying innovation

German engineering firm Hemminger is an industry leader in surveying, providing services to many of Germany's most important manufacturers. The management at Hemminger was an early adopter of mobile 3D scanning technology, purchasing the first NavVis M3 mapping Trolley in mid-2015.

Initially, the M3 Trolley was purchased because a customer wanted 3D visualisation



Creating a floorplan from a point cloud



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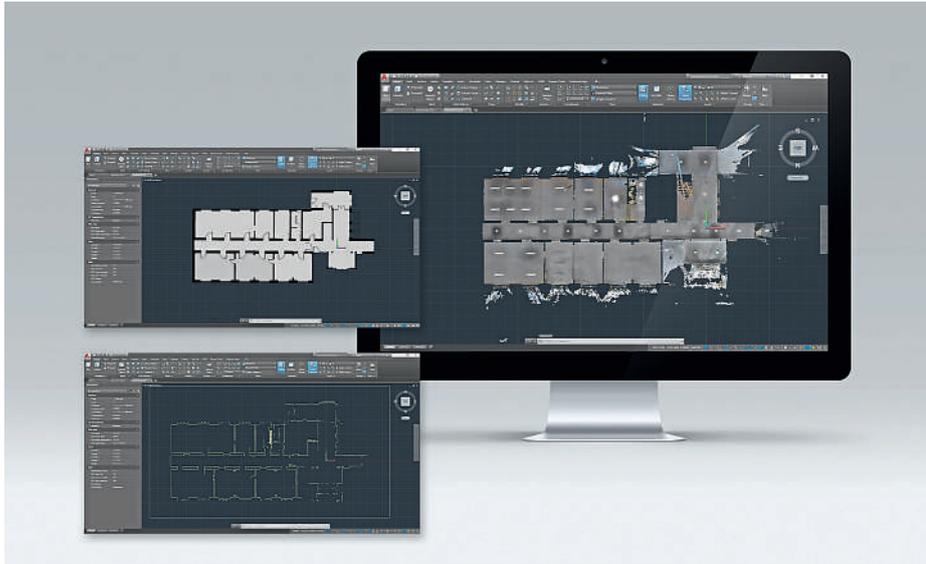
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3D VISUALISATION



SURVEYORS CAN NOW OFFER CUSTOMERS INTEGRATED 3D VISUALISATION AND FLOORPLANS – AND THE PRODUCT CAN BE DELIVERED FASTER THAN EVER BEFORE

of its factories. There are a few reality capture devices on the market that can capture the 360° images and point clouds needed for 3D visualisation, and most of these involve terrestrial scanners, meaning it is very time-consuming to capture large properties, such as factories.

By contrast, the NavVis M3 Trolley is equipped with six cameras and three laser scanners that automatically capture the data needed for 3D visualisation as the device is pushed through a room. This key difference of mobile LIDAR scanning makes it a suitable option for reality capture in large commercial and industrial properties as it essentially means that data can be captured by walking through a building.

The speed at which the M3 Trolley captures 3D measurement points is what made Hemminger employees realise that the device solved another problem for them. Creating and updating accurate floorplans in AutoCAD is a service that Hemminger is often tasked with so to minimise the time and cost constraints associated with creating floorplans, Hemminger

started using the data captured by the M3 Trolley to draw floorplans in AutoCAD.

How it works

The data captured by the NavVis M3 Trolley is processed using NavVis software, and then made available to end users with NavVis's 3D visualisation software, the IndoorViewer. The IndoorViewer lets users view the 360° panoramic images and point clouds in any browser. Integrating AutoCAD floorplans into this process is very similar, with only a few additional steps needed.

One example of how this works in practice that demonstrates the added value integrating floorplans and 3D visualisation brings to customers is demonstrated by a recent project where the Hemminger team updated the warehouse floorplans for a retail logistics provider. The warehouse is not only a large space, but also an important part of operations. To minimise disruption, the 40,000 square-metre space was scanned overnight during an eight-

hour period. Two M3 Trolleys were used to speed up the process and a total station simultaneously captured the georeference points.

Once the data was captured and processed, Autodesk Recap was used to compare the existing floorplans with the auto-generated floorplan that the M3 Trolley produces. The existing floorplan was nearly 10 years old and the comparison showed that in that time, nearly 80% of the original plan had changed. As a result, the plans were completely redrawn.

To create traditional two-dimensional floorplans using data captured by the M3 Trolley, the point clouds are still processed in NavVis software. The only difference is that at this point users have to ensure that the dataset is processed in a format supported by Autodesk ReCap (usually E57). Once the dataset is imported into Autodesk ReCap, the data needed to draw a floorplan is extracted, which lets the user generate section lines from the point cloud. Once the section lines are generated, the section planes and point cloud are hidden to generate a coarse floorplan. The wall thickness can be easily determined from the generated section lines, which lets users create a detailed floorplan simply by tracing the generated polylines. Once these have been drawn, the floorplan is complete and can be imported to the NavVis IndoorViewer.

Added value for the customer

Faster data capture is only one advantage of using NavVis technology to update or create floorplans. The real benefit of integrating floorplans and 3D visualisation software is the added value for the customer. The NavVis IndoorViewer is browser-based, which means it is easy to publish and share the data by sending a link. But it also means comments, notes, and information can be added with the click of a mouse using the Point of Interest (POI) feature. The search function lets users find POIs, while the measurement tool lets users verify information from their desktop.

For Hemminger customers, the 360° panoramic images have been a particularly popular deliverable. IndoorViewer users can click on the floorplan and get Google Street View style access to that location or even virtually walk through the buildings. Hemminger's retail logistics customer used the new floorplan to plan the new layout of the warehouse. With the panoramic images, the planners could see exactly how the current layout looked without even having to visit the site. The images let them spot differences, verify information, and even take measurements.

The added value of 3D visualisation therefore isn't just for customers: surveyors can now offer customers integrated 3D visualisation and floorplans – and the product can be delivered faster than ever before.

Viktoria Langley is marketing manager at NavVis GmbH (www.navvis.com)