

LASER SCANNING ON THE GO



As the world population grows and global changes in building and infrastructure construction become more rapid, our need to document this growth and change increases. Referred to as wearable reality capture sensor systems, this new concept is shaping how measurement professionals come to understand and shape the world among them.

The Leica Pegasus:Backpack was invented as part of this generation of new wearable reality capture sensor systems in response to the growing global changes. The Prisma Group was the first company to use the Pegasus:Backpack in its recent infrastructure project.

Based in the Netherlands, the Prisma Group consists of three companies: Prisma Meten, Prisma Geocensus and Prisma Van Steenis. The company has a variety of specialities including survey (rail, infrastructure, utility), industry (offshore and onshore), GIS, hydrography, geodetic measurements, 3D laser scanning, monitoring and mobile mapping.

The Prisma Group has always been a brand advocate of Leica Geosystems, relying on the quality products that generate quality services. One of the Prisma Group's goals is to develop the international market. With rapid progress in the field of 3D laser scanning, the Prisma Group was keen to work closely with Leica Geosystems to achieve its goal and to become No. 1 in the field of scanning.

Through a collaborative partnership, Prisma Van Steenis was the first 3D specialist in the Netherlands that produced a 3D scan with the Pegasus:Backpack at the rail tracks of Pernis Rotterdam, Netherlands. Leica Geosystems was approached by Prisma Van Steenis in November 2015 to help with this challenging project. The project came about as it was commissioned by the government for a rail contractor to firstly verify the principles of procurement and then to assess what materials, such as ballasts, sleepers and rails, were present. Prisma Van Steenis were commissioned to carry out the rail project.

The project scope entailed the scanning of the position and height of the rail tracks because the contractor was looking to renew his contract and was keen to impose the new alignment

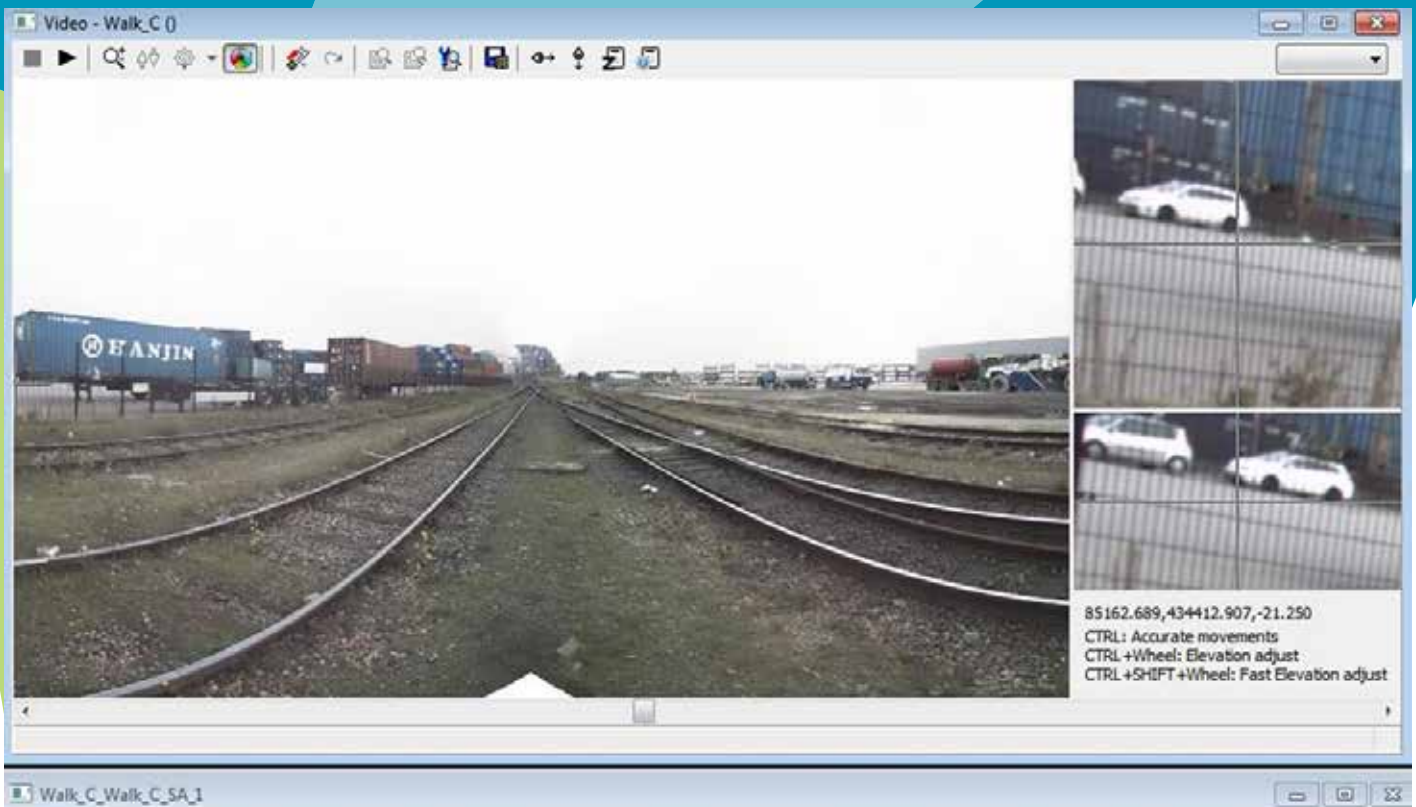
of the railway track. Before any measurements could be taken, there was an initial analysis of the project interfaces and overlaps, and the risks carried out with the scan data and the 360-degree shots. The area that was scanned was a yard with numerous tracks and switches, containing 1.5 kilometres of industrial freight, which was in full use by several carriers and companies. The complete **3D scan will be used for reverse engineering, to help with lay-plans, ballast volumes and profiles**. The captured 3D data can be used to build a reliable design of a new railway track layout, delivered as a 3D model, and can also be used for BIM and quantity determination.

MOBILITY IN A DIFFICULT SPACE

There were many challenges working in a railway environment whilst trying to capture reality data during this project. From low-hanging electrical lines to constricted spaces around train cars, classical surveying methods can be extremely limited in this environment. Whilst working on the rail project, Prisma Van Steenis had to take the measurements whilst the yard was in use, and, therefore, there were real risks of collisions and a high risk to personal health and safety. By law, the risk area (the railway track) is not an accessible area for surveyors and is normally prohibited for inspections. Prisma van Steenis needed a **safe, quick and accurate solution** to collect the point clouds and 360-degree pictures needed for this scanning project. The survey needed to be collected quickly to reduce cost and lead time.

The deployment of the Pegasus:Backpack provided numerous advantages over traditional methods for the Prisma Group. The surveyors were a lot safer on the tracks and ran much less risk to their health because they did not have to enter the risk area.





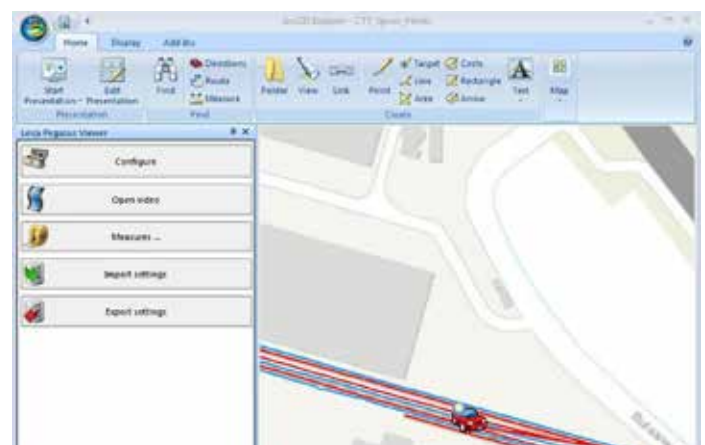
In addition to this, the surveyors did not have to perform any measurements during nightfall, which is a hazard in itself with limited visibility causing many hazards. The Pegasus:Backpack was the perfect solution. Distances could be measured without entering dangerous areas with maximum effect. With one measurement from the Pegasus:Backpack, the surveyor was provided with the correct, current and complete information on the same day. The quality of the measurements from the Pegasus:Backpack is highly accurate and best in class.

The results of the project were compared with traditional terrestrial surveying (that took several days to complete) and the results from the Pegasus:Backpack were very impressive. The differences between the backpack's scan and the digital measurements are about 3 centimetres on an absolute level, and the relative results are even better (mm level). The captured 3D data can be used to **build a reliable design of a new rail track layout**. The newer technology also allowed the measurement professionals to conduct the entire survey in **three hours**, that would normally take five days. There was also a **cost saving of nearly 50 percent** for the contractor. The advantage of scanning is that you capture the entire situation, so any forgotten detail can be obtained from the point cloud at a later date if necessary.

“Using wearable reality capture enabled us to realise many benefits over traditional surveying techniques,” said Prisma Director Klaas de Weerd. ***“With Leica Pegasus:Backpack, every spot in the rail yard was reachable. We also did not have to implement extra safety measures since there was no need for us to enter high-risks areas: we could simply capture the data from a safe distance. Finally, we saw great time savings due to error-free data acquisition in a baseline survey that will allow us to accurately monitor any changes to the design in the future.”***

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