

Large scale mobile mapping project in Belgium combines 360° images and LiDAR

IMAGE-V uses four mobile mappers to acquire panoramic images and point clouds of all roads in Flanders, Belgium. In total approx. 64.000km of roads will be mapped!

In January 2017 IMAGE-V, the consortium formed by Teccon and Sweco Belgium, published the last data set of Flanders in 3D LIDAR and high resolution 360° images. This concluded the 2-year project for the Flemish authorities in which the entire road network of Flanders (64.000 kms) was captured not only by 360° images (as had been done before...) but also synchronously by LIDAR point cloud data.

All mobile mapping data of Flanders, the northern region of Belgium, is available free of charge for local and regional authorities. A web-based viewer and software plugins for GIS- and CAD-systems allow inspections, measurements and inventarisations in a very efficient and accurate way.

Efficient acquisition of high-quality data

The image database is a full coverage database of panoramic images and LIDAR data of all Flemish roads. This project covers approximately 64.000 km of drivable roads and almost 13 million photos in two years! In a project of this scale an efficient data acquisition and processing workflow are crucial. IMAGE-V therefore decided to use four Topcon IP-S2 Compact + mobile mapping systems. Each system is installed as a unit on a measuring vehicle. The fixed arrangement ensures a stable setup.

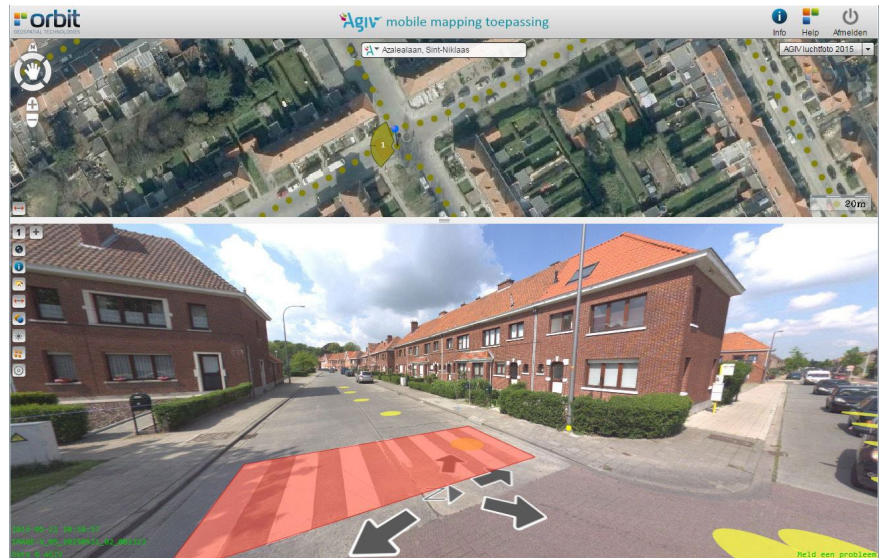


BY LIES STEEL

The mobile mapping system features a 360° camera and five LIDAR scanners. Every five meters the system takes a photo. The photos are processed into high-resolution panoramic images of 8,000 by 4,000 pixels resolution. At the same time the LIDAR data is acquired at a speed of 150,000 points per second. The scan data is used to generate a 3D point cloud.

Why use a 3D point cloud?

The contracting authority only required panoramic images in its tender. Yet IMAGE-V chose to offer a combined solution with 360° images and an accurate 3D point cloud. These inter-calibrated datasets are virtually integrated in the mobile mapping application. This means for the user that he can perform accurate measurements into what actually looks like an image application. The software will perform the underlying translation between the

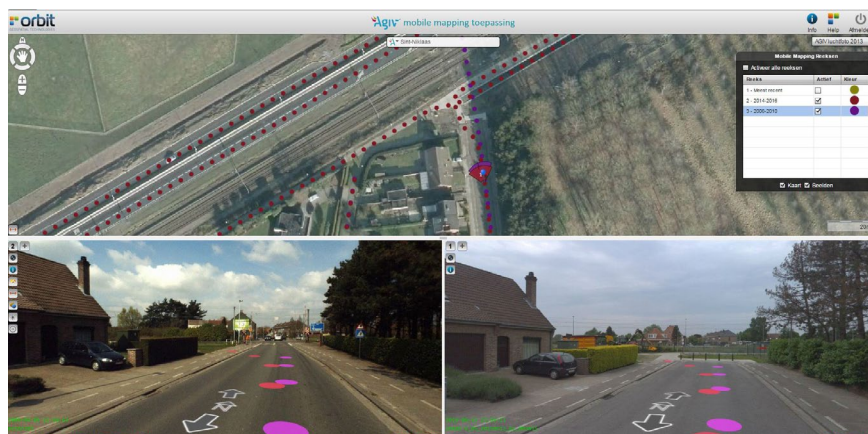


The mobile mapping application allows making detailed observations, measurements and surveys.

position on the image and the position in the point cloud. The measurement of x, y, z position is done simply with one click on the image. This greatly simplifies the method to define a point / line / area or volume resulting in an application that is easy to use. The combination of both data sets allows making detailed observations, measurements and surveys.

IMAGE-V—a joint venture of mobile mapping experts

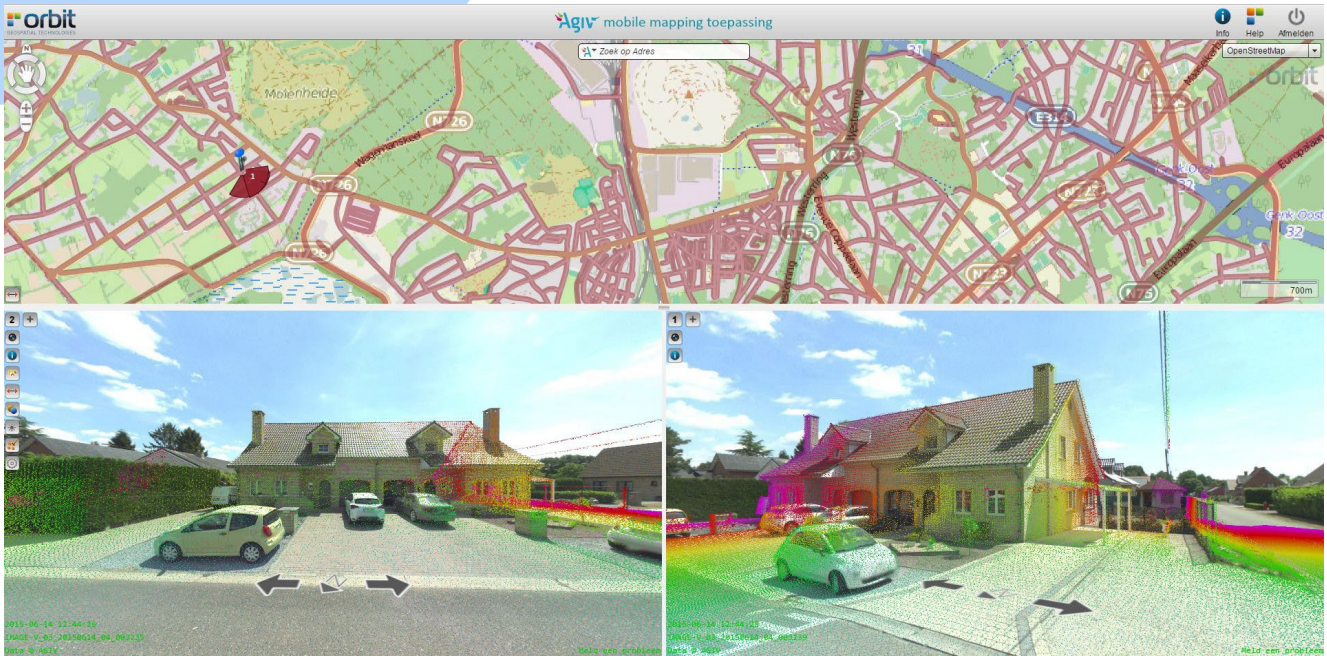
This project was executed by IMAGE-V, a joint venture between Tecon and SWECO Belgium. IMAGE-V combines the strengths of engineering company Sweco Belgium and land surveying company Tecon. The two Belgian companies have a high degree of specialization in the field of precise mobile data acquisition. IMAGE-V has no less than 6 fully equipped mobile mapping vehicles available for simultaneous 3D LIDAR and high resolution 360° images data acquisition. The joint venture started operations for this project with four vehicles in the fall of 2014 and recently published the last part of the dataset. In March 2016 the project was awarded the Geospatial Award out of 10 nominated projects.



Changes in infrastructure are clearly visible in a comparison between a photograph of 2009 (left) and a photograph of 2015 (right).

Easy to use online solution

The database is disclosed through a variety of technological solutions of Orbit GT. The Belgian company Orbit



Combination of panoramic photos and 3D point cloud in the online mobile mapping application.

GT delivers state-of-the-art applications for consulting and integration of mobile mapping data: the familiar panoramic images as well as 3D point clouds.

Online mobile mapping application

The secured online application allows for browsing the images at any time via the internet. This browser application combines the 360° images and 3D point cloud. The user-friendly and intuitive online viewer consists of a map and panorama component. The map component gives an overview of the image positions and helps in the search for the right images. The panorama component shows the 360° images and allows comparing temporal series, performing detailed measurements and basic feature extraction.

For mobile use, the database can also be accessed with the free 'Mobile Mapping Vlaanderen App' for iOS.

Integration

Also available is a SDK to integrate the online functionalities within the users business processes, workflows and environment. The SDK is available for free for all users and allows them to develop plug-ins for their own software environment. Users can also choose to buy one of the ready-made plug-ins available for common GIS or CAD software, such as ArcGIS, QGIS, AutoCAD, ...

Maximum use—from beginners to GIS experts

The Flemish Government has set up this project in such way that a maximum use can be achieved with a minimum of efforts for all government audiences. The online solution has been made available for all partners within the Flemish GDI-community. These are predominantly public and semi-public regional and local authorities. However, due to additional

privacy restrictions, it is not available for the general public. All government personnel can access the data free of charge and without any restrictions. The users vary from beginners to GIS experts. The Flemish Government has the property rights of the data and can decide to expand the user group.

Protection of privacy

Due to pre-arranged agreements with the commission for the protection of privacy covering all privacy related issues at once, it is not necessary for individual users to get their own privacy permission. The agreement requires the blurring of faces and license plates.

The database is not open to the general public. The main reason is the additional security measures to protect personal privacy. For example: the possibility of blurring houses on demand of the owner, which is necessary in such a case.



Local governments reduce the number of site visits, thanks to the recent panoramic images in the online viewer.

Disclosure of historical data

The application archives older mobile mapping data when new data become available. The archived data remains accessible on the application. The user can go back in time and compare different updates.

In 2008-2010 a previous mobile mapping project was executed of the Flemish roads. This dataset consists of

and regional, and within a multitude of domains including but not restricted to asset management, housing, environment, tourism, and public safety.

Local governments reduce the number of site visits, thanks to the recent images in the online viewer. The images also facilitate communication with citizens in a building permit application, notification of a complaint, etc.

can be checked and updated with the image database.

Flanders Information Agency

Flanders is the northern part of Belgium. The mission of the Flanders Information Agency (Informatie Vlaanderen), a regional governmental institution, is to ensure optimal use of geographical information in Flanders by working out solutions that can be integrated by governmental bodies, companies and the general public.

“The image database is ideal for identifying and inventorising objects in the public space.”

360° images, but no point clouds. The data collected in this previous project was brought online in the application of this project. This allows users to access new and historic data in one go. Faces and license plates in the historic data had to be blurred in order to comply with the same privacy prescriptions as the recent data.

Applications—Users

Mobile mapping data is considered a valuable tool for a more efficient and effective management of the public domain. Applications are found on different levels of government, both local

The user can not only look at the images, but can also execute measurements and feature extraction. These measurements can be exported and used in a GIS or CAD environment without the use of a plug-in.

The image database is ideal for identifying and inventorising objects in the public space. Think of trees, street furniture, public lighting, road markings and types of paving. With this information the public space manager can visualize information, interpret, compare the results and budgets of management choices and thus make informed decisions. Existing inventories

Conclusion

With the 360° image database of Flanders the Flemish government offers many (semi-) governments a free tool for managing public space. Everyone uses it at his own level, ranging from simple consultation by counter staff and board to integrated deployment for the GIS specialist. ■

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