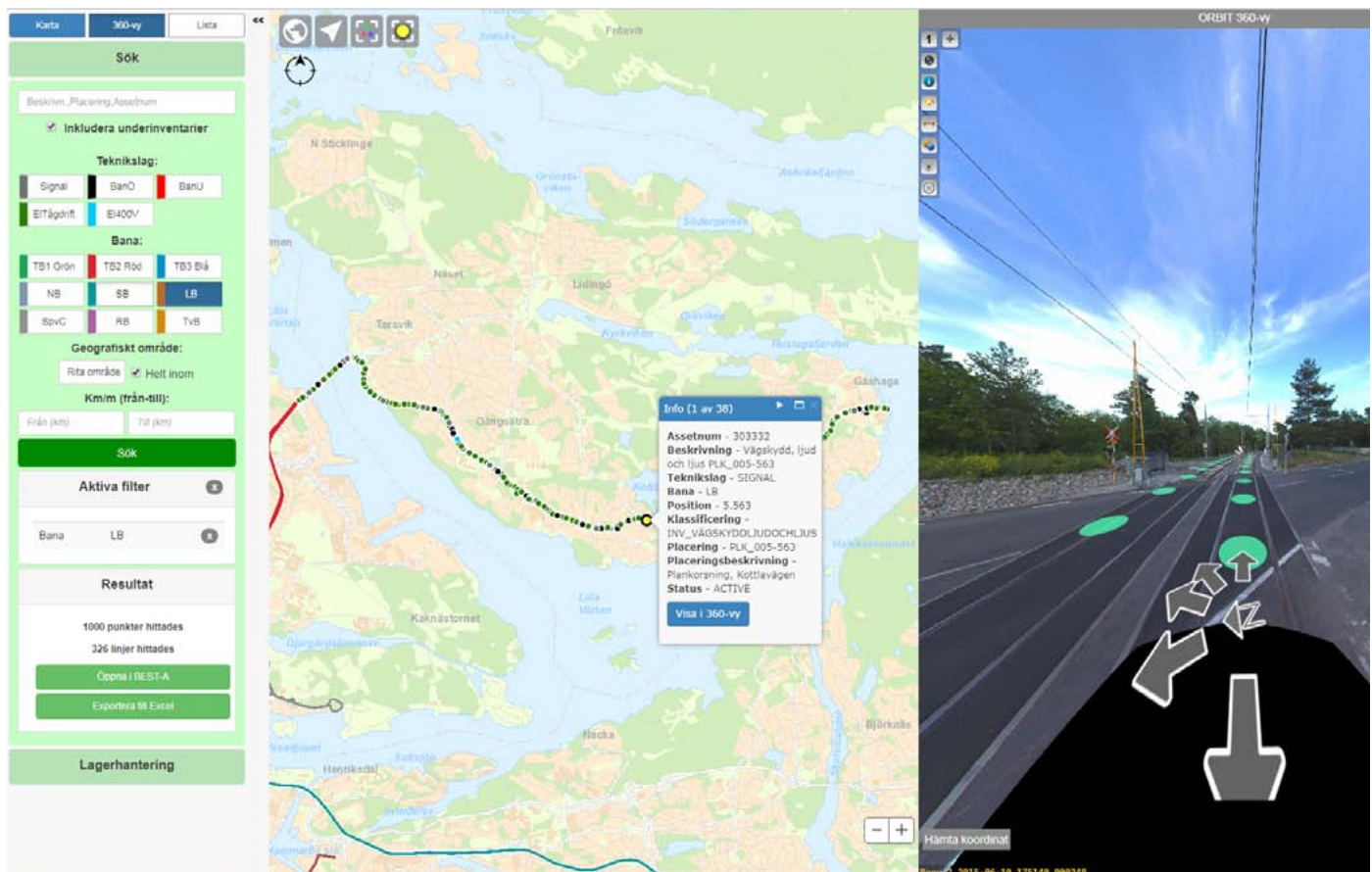


STOCKHOLM PUBLIC TRANSPORT ADMINISTRATION RAIL ASSET MANAGEMENT

EVERY DAY THE STOCKHOLM RAILWAY SYSTEM TRANSFERS 1 350 000 PASSENGERS. THIS RAILWAY NETWORK INCLUDES 7 METRO LINES AND 10 LIGHT RAIL LINES COVERING A 228 KM LONG RAIL NETWORK. THE NETWORK IS STRETCHING THROUGH 169 STATIONS, OF WHICH 47 ARE UNDERGROUND. THE UNDERGROUND METRO SYSTEM HAS A HISTORY OF MORE THAN HALF A CENTURY AND HAS BEEN UPDATED AND EXTENDED OVER THE YEARS. DAILY MAINTENANCE AND PLANNED UPGRADES IN THE COMPLEX RAILWAY NETWORK HAVE INCREASED THE NEED FOR AN ASSET MANAGEMENT SYSTEM THAT PROVIDES WITH THE NECESSARY CONTROL AND MONITORING.



Railview is an intuitive and user-friendly map-based viewer that is capable of visualizing big data.

Today, all employees of Stockholm Public transport administration and their contractors can use a single source to find relevant railway information about Stockholm metro and light rail lines. This solution is realized by the development of a rail asset management system that has an integrated visualization application of the whole network together with all railway-related objects visible in a 360-degree image viewer and online maps. The image and map application contributes to an intuitive and user-friendly environment through smart functions such as viewing, measuring and adding new objects directly in the system.

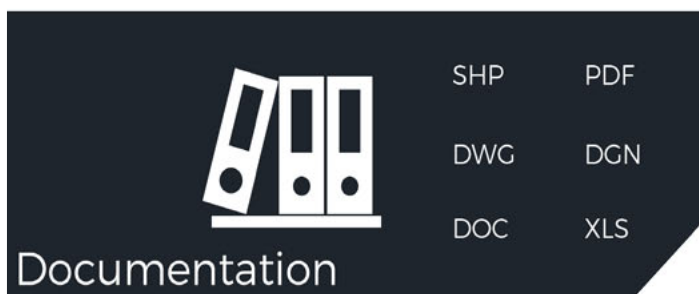
Around five years ago, Stockholm Public transport administration started

to implement a new railway asset management system using Maximo solution produced by IBM. At the same time, WSP saw an opportunity to develop a documentation and visualization technique for complex environments. As a result, a new concept of management system was created, all railway assets were provided with their geographical position together with map visualization and 360-degree images. Existing technologies were merged with innovative solutions to offer a product that gathers all necessary information about railway assets.

A WSP's project team consisting of specialists in geomatics, system development and railway, have together developed a method and process for

accurate documentation of the track environment and, successively, built up an asset database where every object is classified, documented and georeferenced. An essential part of the method involves the mapping technique using both laser point cloud and 360-degree images.

The relevant information for the asset database is extracted from the gathered data. The newly measured data has two great advantages: the laser point cloud enables a precise measurement of position, and the easy to use 360-degree image viewer helps quickly recognize and identify the objects. 360-degree images and laser data are published for specific user groups. The users are able to go through the whole railway network and



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see information visually in snapshots using IBM Maximo and the integrated Orbit Mobile Mapping Publisher. The system is especially useful and essential for many projects that involve reconstruction or completely new construction of facilities and allows to obtain information about any part of railway infrastructure directly in the web browser.

Within the project, an online map application called Railview has been developed. Railview is a browsing and viewing tool for a wider user group in Stockholm Public Transport administration. It allows to search asset information, visualize it on the map, 360-degree images or in the table. Simplified filtering options are included to ease the search

within railway line, technique type, geographic position or even free text, all depending on the users' requests. In fact, Railview is an intuitive and user-friendly map-based viewer that is capable of visualizing big data.

The described asset collection and management system has many advantages over traditional data systems. Firstly, the data collection is time efficient and replaces on-site surveying that would require many weeks in high risk environments. Moreover, the images allow for visual inspection and help verify attributes such as model or material, and the integrated laser measuring can detect the height, length and precise position of the asset. The implementation of this project completely changes the

way of collecting data and opens new opportunities for data inspection in dangerous or hardly accessible environments, like tunnels and highways. WSP provided the technical services to collect the real world 3D data, extract the assets from the 3D data and build up the database, and integrate the Orbit Mobile Mapping viewer into IBM Maximo.

In conclusion, the benefits of 360-degree images for any user of the asset management system are immense. The visualization of assets with stored relevant metadata, for instance, maintenance history, remarks or performed inspections, gives Stockholm Public Transport Administration full control of their infrastructure.

ABOUT THE AUTHORS

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ABOUT WSP GROUP

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