

5 Questions to... Håkan Engman, Bentley Systems



What makes the digital city so relevant for geospatial surveyors, and what lies ahead for 3D city modelling? We asked these and a couple of other questions to Håkan Engman, the director of business development in the digital cities business unit at Bentley Systems. In that role, he is leading business management activities for OpenCities products. He is also responsible for the integration of the Swedish company Agency9 following Bentley's acquisition of it in September 2018.

The 'digital city' or 'smart city' is a hot topic. What makes it so relevant for geospatial surveying professionals?

In most cases, smart initiatives in a city originate from an ambition to improve the services delivered to its citizens or to manage its resources at less cost. Geospatial information and digitalization are essential components of these initiatives, regardless of whether the aim is to improve transportation, shorten lead time for building permits or optimize water supply systems. The challenge is to capture the data and to structure it in a way that enables the implementation and distribution of services. One way to do this is by creating a city-scale 'digital twin'. A digital twin is a digital representation of a physical asset, process or system, as well as the engineering information that allows us to understand and model its performance. It is enabled by adding open data across engineering data, operations and information data to the geospatial model, and also adds the fourth dimension: the chronology to track historical performance and predict future behaviour. City-scale digital twins begin with and are updated through 4D surveying and reality modelling by ContextCapture and Orbit GT to derive as-operated 3D models from photogrammetry and/or point clouds. Reality modelling provides engineering-precise, real-world context to support planning, design, construction and operations. As cities continue to advance their digital processes and automate workflows, data accuracy and accessibility are even more critical. When accuracy and access are an issue, data-driven decision-making is problematic. But because digital twins can be continuously updated, they can reflect the reality at any given time.

Bentley Systems has a long history concerning both building information modelling (BIM) and geographic information systems (GIS), and the two are becoming increasingly intertwined. How do you expect this to impact the industry in the future?

[Bentley Systems](#) does indeed have a long and rich history in both geospatial technology and in BIM for municipal infrastructure applications, spanning capital expenditure and operational expenditure. We are also the leading innovator in reality modelling, as well as in geotechnical modelling and data management. With our new cloud-based iTwin services bringing all this together, city and campus digital twins now offer an immediate opportunity to help cities and regions tackle a wide range of challenges and problems, enhancing their infrastructure performance and their constituents' quality of life. In infrastructure projects, the geospatial data is always essential to associate the engineering data with the landscape. Frequent surveying of a project using unmanned aerial vehicles or terrestrial mapping gear gives an updated view of the status of development and compares reality with the engineering models. Combined visualization of engineering models and the geospatial information is becoming more essential.

How is Bentley accelerating digital transformation in urban areas?

At Bentley, going digital is about an ongoing process of digitalization. We provide software and services to help both city departments and organizations in the urban ecosystem with solutions that span the lifecycle from planning to performance. We offer applications that support various use cases that are enhanced by access to trusted information that may live in different applications and data sources but can seamlessly work together with a federated approach, which enables digital twins.

In 2018, your company [Agency9](#) was acquired by Bentley. How did that come about and how have things evolved since?

Bentley had been evolving the 3D reality mesh produced by Bentley's ContextCapture application and applications in Scandinavia and internationally. Agency9 solutions were adopted by many cities in the Nordics for communication and engagement in urban development, including Stockholm and Gothenburg. The software was capable of streamlining unlimited-size mesh models even before Bentley acquired it. Now hosted in Microsoft Azure, [OpenCities Planner](#) delivers cloud-based, city-scale digital twins to improve stakeholder and citizen engagement and to simplify and facilitate urban development. Addressing a wide variety of potential use cases, OpenCities Planner helps users – through devices like web, mobile, touchscreens and digital billboards – to intuitively visualize and explore 2D, 3D, GIS and other data aligned with the reality modelling of the city. We are seeing opportunities with city-scale and campus digital twin workflows to consume information from other analysis and simulation results (created in other applications). However, displaying and visualizing in OpenCities Planner makes it a great application for communicating across not only cities and their residents, but also the expanded ecosystem within which Bentley has other applications used for design projects across all infrastructure segments.

Projects such as the Helsinki 3D+ initiative seem to have set a trend, with many other cities keen to follow suit. What lies ahead for 3D city modelling?

Helsinki has strategically invested in 3D city modelling to drive the adoption and use cases in the city environment. With the basis of a semantic model of CityGML, as well as an updated high-resolution reality mesh city model created in ContextCapture, Helsinki is implementing many applications in 3D.

When openness becomes a policy within cities, it is much simpler to federate the necessary information fit-for-purpose. When an open data policy exists, the opportunities grow to use the data to make informed decisions. Helsinki's open data policy supports multiple city departments with many different types of analysis, simulation and planning.

Other cities are starting to adopt an approach like Helsinki, including mesh models and a semantic model to leverage the benefits of the mesh's photorealism in public communication and the granularity the object semantic models for analysis. These features can be visualized together, connecting attributes and objects into the context.

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