

## INTERVIEW WITH AIDAN MERCER, BENTLEY SYSTEMS

# Capturing, Modelling and Building the Reality



Bentley Systems held its latest annual Year in Infrastructure Conference in London, UK. The event proved to be an excellent opportunity to take a look behind the scenes at Bentley, a leading provider of software solutions for advancing infrastructure. 'GIM International' talked with Aidan Mercer, global industry marketing director for utilities and government. In this in-depth discussion, he zooms in on the role the company plays in advancing the world's infrastructure and how geomatics is a key element of many of Bentley's applications.

*(By Wim van Wegen, content manager, GIM International)*

**We're hearing a lot about reality modelling at Bentley's Year in Infrastructure Conference. How can governments and local authorities benefit from the rapid developments in reality modelling?**

This year we have indeed talked a lot about reality modelling, and we are excited to announce it is 'going mainstream', as our CEO Greg Bentley has said. What does he mean by that? In 2015, we talked about a Bentley application called ContextCapture, which takes digital photographs and automatically turns them into a photorealistic 3D model of existing site conditions. This year we're focusing on the consumption of that captured data; how infrastructure professionals can utilise the 3D models that are captured through digital photographs for operations, maintenance and various purposes. One of the most exciting announcements we've made at the conference related to ContextCapture is a new feature for 'hybrid inputs' – to combine point cloud data and digital photogrammetric data into a single model, or reality mesh. This means our users can use both sets of technologies, enhanced by ContextCapture. Previously, there was a debate about which technology to use. Now, that's no longer debatable because the technologies are complementary. For government entities, this means that by using this technology they can be innovative in terms of capturing existing assets, large or small. Of course, inside a city there may be different types of infrastructure assets and with a lot of different stakeholders – ranging from the urban planning department to water utilities, energy utilities and building regulators – that want very specific information. Therefore, the ability to capture the existing site conditions with hybrid inputs can significantly benefit stakeholders that might want to access these models. A prime example of a government using this technology innovatively is the City of Helsinki, a long-standing user of Bentley 3D modelling technology. In fact, they won a 'Be Inspired' award in the Innovation in Reality Modelling category at this year's Year in Infrastructure Conference. That project, entitled 3D+, will publish a huge amount of data and make it usable and accessible for the public. They took more than 50,000 images and created a highly accurate, stunningly visual model of the entire city. This illustrates the value of capturing data and saying "This is beneficial for the citizens of our city". It's incredibly innovative and I think, in many cases, governments are at the forefront of innovation – they just don't quite get the credit they deserve.

**Combining unmanned aerial vehicles (UAVs) and laser scanning (Lidar) has been discussed at the conference several times. Is this the new magic formula for capturing reality?**

That's an interesting question. What we are seeing from these different capturing devices is the potential for them to be complementary, offering a new formula for the end users. Technology companies like Topcon have specialised in this for many years and offer some of the best solutions in the market. I can only talk from a software perspective, but we see the huge value in these technologies. Coincidentally, we issued a press release during the conference announcing a joint partnership with Topcon, resulting in the tight integration between Bentley's ProjectWise and Topcon's MAGNET Enterprise application. This partnership demonstrates a great level of commitment to integrate by software and hardware vendors. It means that the data captured using UAVs or laser scanning devices can be used in engineering workflows enhanced by software and managed with engineering precision. At Bentley, we fully believe this partnership offers real potential to enhance our offering, and I know Topcon is equally excited to leverage our technology for better reality capture. Certainly, enhancing or enabling technologies such as UAVs will help create those 3D models for better precision and better accuracy.

**Sometimes it seems like everyone nowadays can capture the environment, for example using cameras, UAVs and maybe even smartphones. But then comes the processing. Which 3D modelling solutions does Bentley offer?**

ContextCapture is an automated engine that creates a realistic 3D mesh from the digital photographs and point clouds. There is also ContextCapture Center, which is the large-enterprise opportunity to process huge amounts of data for some of the bigger projects. It helped with processing power in the Helsinki 3D+ project, for example. Processing power can potentially have huge limitations; we have announced a lot of advancements in our software through the CONNECT Edition, our next generation of software, which is enabled by Microsoft Azure's cloud platform. This means more computational power to deal with intractable files like point clouds, for example. Reality meshes are a lot more scalable, more lightweight and the hybrid modelling feature ensures reality models are easier to manage – further enabling that mainstream approach to reality modelling. Other reality modelling software we offer includes Bentley LumenRT, an application that helps to enliven designs. This adds what we might recognise as a gaming environment to infrastructure workflows. For example, it can visualise different types of environments for the captured reality, enlivening it with shadows, sunlight and vegetation to name but a few. Another very significant advancement this year has been the announcement of the availability of OpenRoads Designer. This comprehensive application goes from conceptual design through detailed design, right through to construction of a project. This is a collaborative 3D environment that enlivens designs but also includes the engineering data associated such as providing cost analysis instantaneously, offering varying options for the most optimal designs. We're seeing so many advancements with 3D, but it's important to note that geocoordination with the assets created is intrinsically built into our technology. In other words, we see the pervasive value of geospatial data being omnipresent as we develop our own platforms or ensure interoperability with other providers to ensure the 3D data created and consumed has a geo context.

**One of your solutions concerns land management and cadastral mapping topics that depend on local culture and laws. How do your solutions adapt to the regional differences?**

Given the variances in land management and cadastral mapping requirements, it does require a unique approach to providing software that can adapt to regional and local cultures and laws. Bentley Map, for example, provides users with a platform for mapping, analysing and publishing land or cadastral data. We've seen a broad level of adoption for such technology but, in most cases, users require the solution to be adaptable and robust. The platform itself is highly interoperable with other solutions such as Oracle Spatial, Esri ArcGIS or CityGML to ensure standards and specifications are met. Bentley is a platinum member of Open Geospatial Consortium (OGC), so we are committed to ensuring the software we provide is open. It's true that we see a very wide-ranging use based on the requirements of each region, and levels of mapping maturity vary. Some organisations are still using paper-based drawings for certain areas of their region, while others are already fully digital. We see focus areas and adoption in countries like the Czech Republic, The Netherlands, Mexico, Ireland, Finland, Singapore, the USA and Canada, to name but a few. The platform can be used as a stand-alone application or added to MicroStation – Bentley's flagship modelling application – to be installed on a desktop to provide web-publishing opportunities, which allows data to be published through a portal. So there's a lot of use cases that enable it to be utilised by various land administration agencies.

**Open source seems to be the new paradigm for many software developers all around the world. How does open source affect your business on proprietary solutions?**

There has been a huge amount of work done on open source data. With OGC, for example, we are very much involved in discussions based around open standards, open data and the benefits – and of course also the risks – associated. Being involved in that discussion helps us to ensure our software meets those needs and requirements. There is also a lot of discussion around cybersecurity and data governance, especially as we move to the cloud. People have their concerns about what that means for the data itself, and rightly so. But, at Bentley, data security is taken extremely seriously, and that's why we collaborate with Microsoft and the Azure platform, which provides our users with fast, reliable and safe environments for their data. We know that it's essential for many users, and our applications enable a connected data environment, which is what we call 'open and live': it's open, but not for everyone – it's open for interoperability with other solutions. But it's got to be open now; this is the new way of working and that's intrinsic in all our applications. We see publishing data and open standards as the way forward, especially for government accounts, for people consuming, accessing and making decisions based on that data. We're big proponents of making sure that our solutions enable open-data formats and standards.

**Building information modelling (BIM) is a hot topic, and the role of BIM will continue to grow. The construction industry sometimes seems to be reluctant to incorporate BIM into the bigger picture of 3D geoinformation, often leaving BIM as unconnected, isolated islands of information. How is Bentley contributing to the integration of BIM and GIS?**

Let me first explain how Bentley defines BIM. We see BIM as a coordinated set of processes supported by technology, so it's not necessarily just about the model in isolation. If we agree that BIM is a process, BIM is less about the isolated model itself – the models created by engineers add far-reaching value and could be described as digital engineering models. The entire asset lifecycle to facilitate the process of BIM has been a major focus for Bentley for many years, grasping the importance of connected data environments to ensure a collaborative BIM. It is also vital to connect BIM data to other sources of data. Bentley's AssetWise CONNECT Edition platform ensures the potential of BIM is realised as it connects different sources of data, such as IT, operational technology (OT) and engineering data. The data created by engineers in early phases enables digital engineering models to carry asset information through all phases of the lifecycle. If all this data can be converged in a connected data environment, then this open and live platform can be a mechanism for exchange of rich asset data at different stages of the infrastructure lifecycle. The UK is a leading force in standardising BIM processes as the government recently mandated BIM Level 2 on government-funded projects to ensure collaboration and consistency. One telling sign is that this BIM process has already yielded positive results. It does mean a disruptive change for architecture and engineering design firms that need to adhere to certain standards to participate in those government projects, but their value is being collectively recognised throughout the entire project. The construction industry is becoming more aligned to a better format and it will essentially benefit projects, leading the industry to become more tech-savvy and a better adopter of technology. Thus, we will see better cost savings and, in a time of reduced budgets, it can drive more value for owners. Of course, we must not forget the value of having

geocoordination in these models that are full of rich asset data that includes spatial information. There is a lot of noise in the industry about integration between GIS and BIM, and I expect this to continue in the years ahead as a mutually beneficial process.

### **In 2015 Bentley acquired Acute3D. How does this acquisition complement Bentley's business?**

Acute3D is now known as ContextCapture, which gives us the ability to reach new audiences, and it also offers us the opportunity within our current user base to expand their skills and understanding of how to capture real-world conditions with the far-reaching potential of a reality model. It has made engineering very interesting, very relevant, very visual and more affordable. I can imagine that every maintenance crew will soon be armed with a UAV and a software licence that allows them to continuously survey their assets, for ongoing construction, for whatever purpose they may have.

### **Many technology companies in the US and EU are facing increasing competition from Asian countries. How do you cope with global competition in terms of dedicated solutions, regional support to customers and price-setting?**

The way we look at it is that competition helps drive your business. The innovations that we've seen at our Year in Infrastructure Conference are reflective of a company that is making huge advancements in software, and our users are incredibly excited. I think that's also reflected in the mood at this year's conference; we've completely sold out, we've got to look for bigger venues in the future, so if you look at it from the point of view of our users and the feedback that we get, then the competition will look after itself, I suppose.

### **What have been some of the key highlights of the 2016 Year in Infrastructure Conference?**

The highlight for me, every year, is our 'Be Inspired' awards, which recognise the best infrastructure projects around the world. We've had more submissions than we could ever anticipate, and the quality of the projects gets better every year. It gives us a good opportunity to reflect on how our software is used around the world to advance infrastructure but also to sustain it. It gives us that nice feeling as a company that, from a software perspective, we're making a difference. Let me give some inspiring examples from the Innovation in Reality Modelling category alone. I've already mentioned the Helsinki 3D+ project, but another project that is worthy of a mention is the Los Angeles College District's BuildLACCD that's helping to improve campuses by delivering new buildings and remodelling existing ones. The new educational facilities aim to retrain some of the students in software usage, offering a BIM track of study that looks at how digital engineering models can be used extensively. I would say the Los Angeles College District, which won the award for Innovation in Government, is a pioneer of a BIM approach in the US, fully understanding the connected data environment, and was a worthy winner. The Los Angeles College District has over 500 different project participants are all utilising the same digital engineering models and it has yielded some significant returns on its investment outlay. Some great projects have been presented here, reflecting the wide range of possibilities our solutions offer, and we're already looking forward to next year's edition in Singapore!

### **Aidan Mercer**

**Aidan Mercer** is an industry marketing director at Bentley Systems for water and wastewater, electric and gas, communications and government. He has held various roles in geospatial and utilities marketing within Bentley and previously held various marketing roles in similar high-tech organisations. Mr Mercer fills a variety of roles on technical committees and industry bodies related to geospatial and smart cities.

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