

Bentley to Highlight Its Reality Modeling Asset Management and Visual Operations Offering at AICHEMA, June 11-15

*New Solution Effectively Documents Brownfield Conditions
and Spatially Links Asset Information*

Reality modeling-enabled visual operations is a compelling new solution for owner-operators of industrial facilities seeking to streamline their operations and decrease inspection costs. By combining asset information with a 3D reality mesh automatically created from photographs, asset managers and field technicians can more easily access information and obtain intelligence about their assets. This solution provides a comprehensive digital twin that effectively documents brownfield conditions and spatially links asset information providing the “where” to asset management.

At the AICHEMA, June 11-15, Bentley will demonstrate Visual Operations offered as part of the AssetWise asset performance management system and available as both an on-premise and cloud-service solution.

Visual Operations Workflow

To classify assets in Visual Operations, a 3D engineering-ready reality mesh is first generated. Ground, or aerial photography (for example, a drone, helicopter, or airplane) is automatically converted into a 3D reality model by ContextCapture. This can also be augmented with laser scan data captured using static or handheld scanning devices. Next, the ContextCapture Editor is used to attach design and asset information to the 3D reality mesh. Lastly, the resulting model is published and is ready to be viewed in a web browser, which enables the navigation of the scene in Visual Operations.

The Visual Operations web application enables visualization of the reality model of the asset and allows users to:

- Create and display classifications on the reality data objects
- Link the classified objects and assign asset properties from AssetWise
- Link asset objects to documents and other operations or inspection information
- Access key documents associated with the assets
- Display classified asset properties and information from the design file
- Access navigation capabilities to easily explore and view the asset scene

The following examples use reality modeling technology in the process industry, and they demonstrate how this technology has now become an essential part of both brownfield and greenfield plant projects.

UCB, a global biopharmaceutical company, is using reality modeling for its iconic manufacturing plant in Belgium (which was established in 1928) to assess options and communicate ideas to help this complex and established site become carbon neutral by the year 2030. ContextCapture was used to create an engineering-ready 3D model of the entire complex, including all the buildings, production facilities, roads, and parking areas, using both drone and terrestrial photography. This context enabled the engineering team to quickly produce a 3D model to convey ideas and determine options. Point-cloud data from laser scans was then added to the model to enable accurate quantities to be calculated and precise measurements to be given to contractors for the priority work packages.

ABS Steel needed to modernize the fume extraction system for its large steel complex in Udine, Italy to meet new regulations. It did not have a survey of the entire site since the complex was the result of a merger of two plants in 1988. **ABS Steel** awarded the contract to **BM Engineering** to survey the site. It used laser scanning for inside the plant and photography for outside the plant, creating a combined engineering-ready model in MicroStation using ContextCapture and Bentley Pointools. The model was read into AECOsim Building Designer and used to design the new fume extraction system. The model was then used to test the structural integrity of the aging parts of the factory. By using a drone to capture photos of the roofs of the industrial buildings, and using ContextCapture to accurately create the 3D model, the project avoided the need to construct at least 70,000 temporary structures (guardrails, walkways, ladders, PPE, etc.) to conduct the survey work.

Flightline Geographics LLC (FlightlineGeo) solved a problem for an owner of an ethanol plant in the state of Kansas, United States whose plant expansion was impeded by a lack of a drainage plan that would satisfy the local municipality. Traditional alternative methods, such as ground surveying and either ground or aerial LiDAR, were eliminated as possible solutions due to the short time frame and limited project budget involved. It was decided to use a drone (UAV) and, once survey ground control was placed, the UAV capture of the 200-acre site was completed in a single one-hour flight. The team used ContextCapture to produce the 3D model that engineers needed to quickly calculate the results for the drainage and construction study, which was presented to municipal authorities a few days later. Moreover, the team leveraged the same work to create a 3MX reality mesh that could then be used for visualization within the ContextCapture viewer. It took just one week to conceive, capture, process, and deliver the project, and gain approval.

Technical Solutions International (RBI) is a world-class engineering inspection company headquartered in Durban, South Africa. RBI has deployed a solution that combines the use of unmanned autonomous vehicles (UAVs or drones), 3D reality modeling software (ContextCapture), a geographical information system (Bentley MAP), and engineering documentation management (ProjectWise) to manage the entire inspection process. Its clients include petrochemical, pulp and paper, power generation, and telecommunications firms. The new process enables RBI to deliver more competitive services to its clients that speed survey time considerably and increase the value and visibility of its inspection survey data.

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Reality modeling of part of the production area at UCB's site in Belgium

Image Attribution: Image Courtesy of UCB

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LiDAR data adds definition to reality mesh for steel plant.

Image Attribution: Image Courtesy of BM Engineering

[Plant1.png](#)

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A drone was able to survey this 200-acre ethanol plant site in one hour.

Image Attribution: Image Courtesy of FlightlineGeo

Quotes:

“UCB SA is driving a ‘smart factories’ initiative, leveraging Industry 4.0 and Bentley technology. Our objective is to reorganize production so that we are more adaptable and effective in the allocation of resources. We store our engineering data in ProjectWise for better collaboration among colleagues. Using ContextCapture for 3D modeling of our site provides geo-referencing and allocates geographical coordinates to our data. Analyzing the 3D model together with the orthophoto drawings provides the official record of our land registry data, waterways, and buildings. We can also bring this 3D model into AECOSim Building Designer to support any building design changes. For proposed modifications to our production facilities, we use OpenPlant Modeler and OpenPlant Isometrics to provide precise 3D data for contractors and to automate the detection of clashes between pipes, structures, and equipment.”

Joseph Ciarmoli, Head of CADengineering, UCB SA

“The interoperability of Bentley products has made it possible to optimize and significantly reduce the survey and reality modeling time, while also allowing a BIM model to be created that can easily be used by all stakeholders (structural and plant designers), who have decidedly and significantly improved the efficiency of their integrated design, allowing the implementation of the first revamping phase to be reached just three months after delivery of the BIM model.”

Eng. Marco Barberini - Geom. Gianluca Rovituro. BM Engineering srl

“Reality modeling using ContextCapture from Bentley enabled FlightlineGeo to process a large amount of data into information for the client in near real time. The project was completed ahead of time and under budget, allowing the company to acquire its expansion permit and move on with production of renewable energy.”

Devon Humphrey, CEO, FlightlineGeo

“Bentley’s range of products and integration between their products and our automated UAV systems gives us and our clients an added advantage against an ever-improving competitive market. The future we live in today.”

Stanley du Toit, Technical and Solution Director, RBI Technical Solutions International

About ContextCapture

ContextCapture is Bentley’s reality modeling software that can quickly produce 3D models of existing conditions for infrastructure projects of all types, derived from simple photographs and/or point cloud. Without the need for expensive or specialized equipment, ContextCapture enables users to quickly create and use these highly detailed 3D engineering-ready reality meshes to provide precise real-world context for design, construction, and operations decisions throughout the lifecycle of projects. Project teams can easily and consistently share reality modeling information, consumable and accessible, on desktop and mobile devices, in many formats, including native use within MicroStation for use in any engineering, operations, maintenance, or GIS workflow. For additional information, visit www.bentley.com/ContextCapture.

About Bentley Systems

Bentley Systems is a global leader in providing engineers, architects, geospatial professionals, constructors, and owner-operators with comprehensive software solutions for advancing the design, construction, and operations of infrastructure. Bentley users leverage information mobility across disciplines and throughout the infrastructure lifecycle to deliver better-performing projects and assets. Bentley solutions encompass *MicroStation* applications for *information modeling*, *ProjectWise* collaboration services to deliver *integrated projects*, and *AssetWise* operations services to achieve *intelligent infrastructure* – complemented by comprehensive managed services offered through customized Success Plans.

Founded in 1984, Bentley has more than 3,500 colleagues in over 50 countries, \$700 million in annual revenues, and since 2012 has invested more than \$1 billion in research, development, and acquisitions.