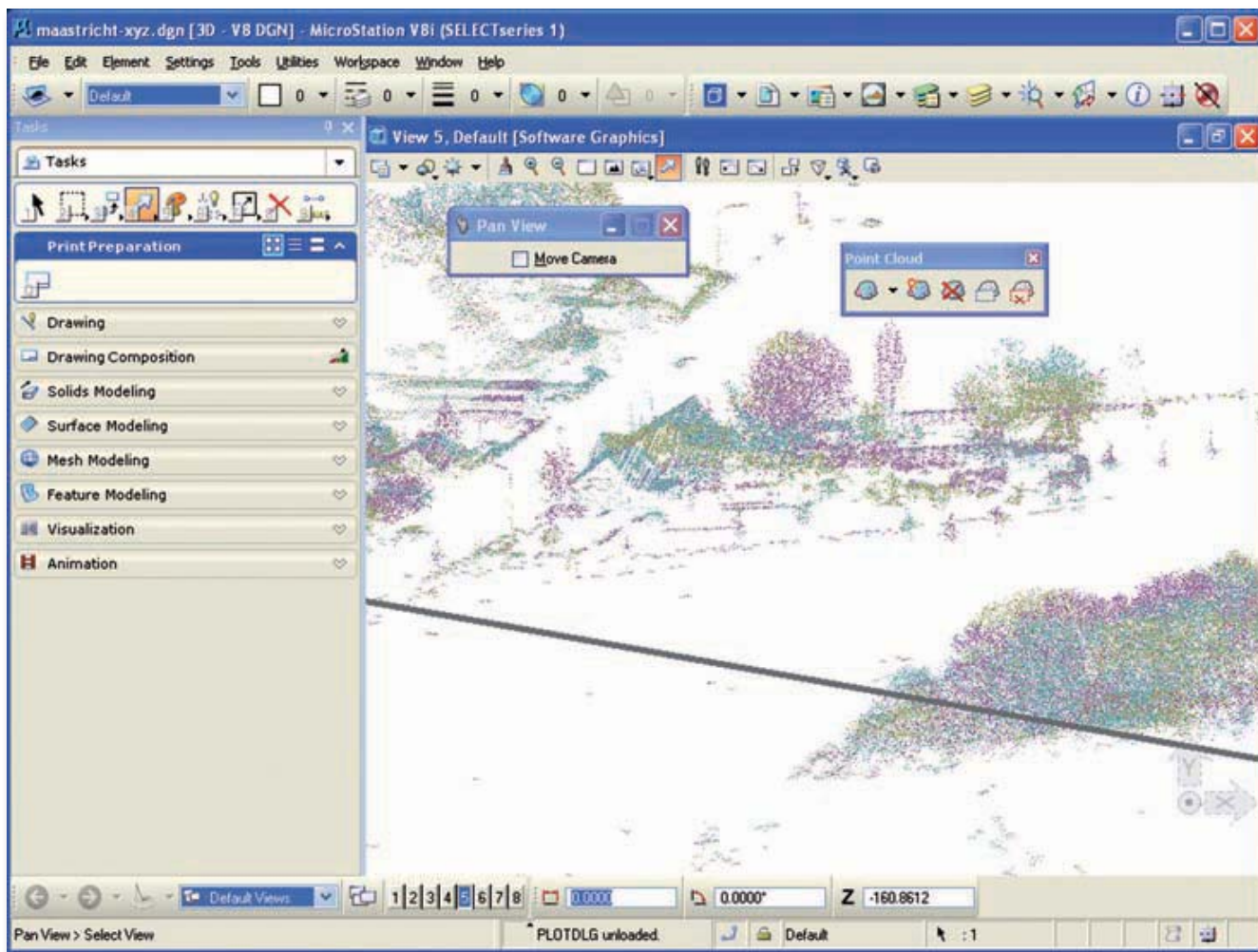


3D Smart Editing, FME Integration and Object Oriented Data Acquisition

Bentley Systems and 3D GIS

The release of Bentley's V8i (SELECTseries1) offers a series of new functionalities involving 3D GIS. Gijsbert Noordam, Senior Consultant, Geospatial Center of Excellence at Bentley Systems, explains the possibilities of 3D City GIS, the recent cooperation between Safe Software and Bentley Systems, and the potential of object oriented data acquisition and the use of point cloud data.

by Eric van Rees



New MicroStation tools for working with point cloud data. Here, height data are used as reference in MicroStation. Data courtesy of the Gemeente Maastricht.

At the end of 2009, Bentley's V8i (SELECTseries1) was released with new versions of Bentley Map, Bentley Descartes, Bentley Geospatial Server and Bentley Geo Web Publisher. Bentley itself calls the release a breakthrough in 3D GIS, because it is not just about designing 3D Cities, but about making 3D models intelligent. Noordam explains why 3D design and 3D GIS are logical developments for Bentley: "Microstation, our desktop software, was already 3D at the

end of the 1980s, so there has always been a technological base for 3D at Bentley. The developments around 3D GIS accelerated with the CityGML specification of the Open Geospatial Consortium (OGC), an organisation for developing international GIS standards. Also, within Bentley there are a number of other disciplines that come within reach once you start working in 3D, such as BIM, Civil Engineering or Plant Design. CityGML is on the cutting edge of those disciplines."

3D Smart Editing

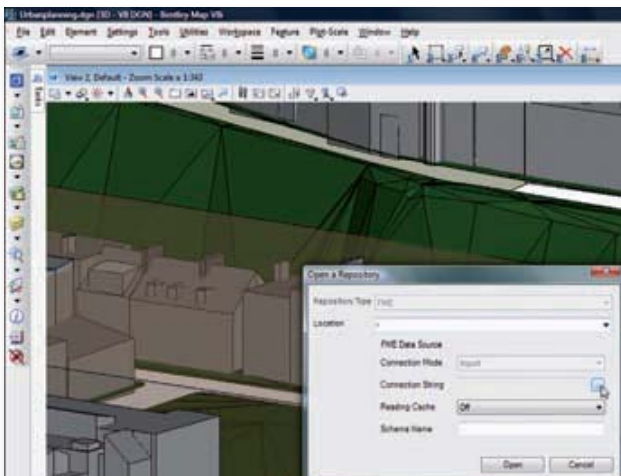
The desktop product Bentley Map V8i is the center of the new 3D City GIS functionalities. At the heart of this is 3D Smart Editing, a collection of functions with which you can manipulate the shape of objects, assign features within the object, as well as information to the object itself.

“With Smart Editing users can make ‘features’ of existing data. A 3D object by itself is no more than an empty shape located in space, but by adding attribute data to the object it becomes intelligent. This is comparable to a traditional 2D GIS, where you create an object model, assign a feature and add object information to it. Think for example of assigning a name to a building, or information about an elevator shaft, or the total floorspace. From that moment on you can do lots of interesting things, such as analysis, thematic representations, 3D spatial analysis and the like.”

Bentley has a nice starting point when it comes to 3D analysis, states Noordam, namely clash detection, a concept from the plant world. Noordam: “Clash detection means analyzing spatial relations inside of large objects; what you’re looking at is if objects fit inside a large space or not. This is used for maintenance or moving large objects in a plant, for example. This technology can be applied to 3D analysis. We are now working on bringing this concept into Bentley Map for 3D GIS analysis.” An example of analysis is a 3D city model, placed on top of a 3D height model, that is used subsequently to see if new objects fall within height limitations for building new objects, by using 3D visualisation. Noordam expects that these developments will yield interesting analysis tools.

Cooperation with Safe Software

The growing importance of the CityGML format in Bentley's software has been an impor-



Bentley Map and FME. Data courtesy of the City of Quebec.

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tant motive to work more closely with Safe Software, according to Noordam. The result of this is the integration of Bentley Map with Safe Software's FME Desktop technology. This technology is used by many GIS vendors to enable exchange between different data formats and structures. In many cases, a user buys an FME extension for the geospatial products he or she is working with, but in the case of Bentley, a different solution has been chosen.

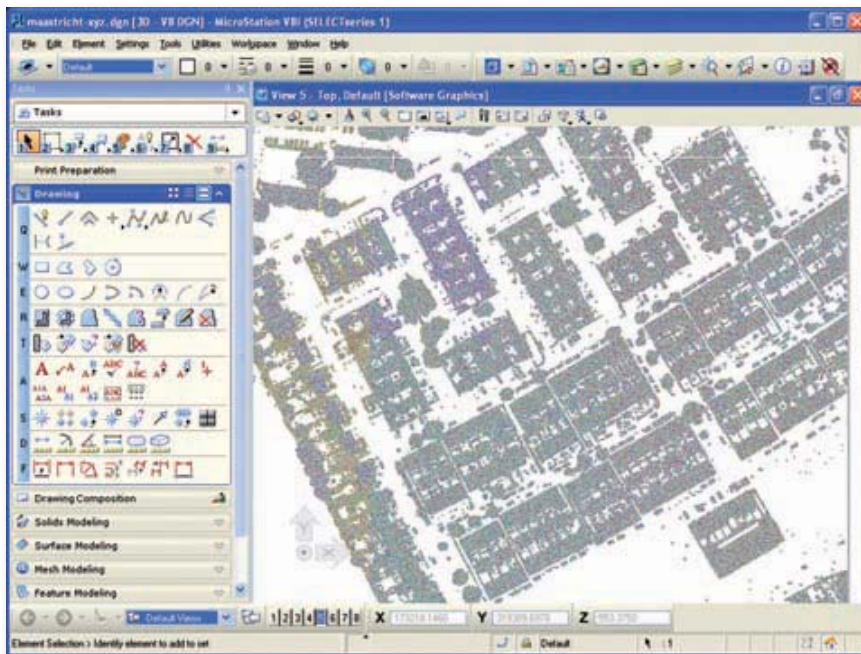
Noordam explains why: “At a certain moment you have to make choices as a company, when it comes to reading, writing and exporting data. Do you want to make this a core activity, or do you opt for working with a spe-

cialized party? It has always been the aim of Bentley to have a special Bentley-FME extension, but for a number of reasons this didn't work out. Now, every Bentley Map user who starts working with SELECTseries1, is supplied with an extension for FME. From the moment a user has FME Desktop, it can use Bentley Map to plug into FME. This is different from what happens in many other cases, but the result for the user is effectively the same."

Bentley chooses to keep supporting a number of file formats directly, without using FME. Noordam: "There are three reasons for this: not everyone has FME and is willing to buy it. Some formats are so widely used that they require a standard provision, think for instance of ESRI Shapefiles. And finally, because you require process integration with other system when you are using one common data store in what we call 'collaborative environments'. In that case the ProjectWise server environment is used as an intermediary between the Bentley Map and for example Oracle Spatial or ESRI Geodatabases, by coordinating the process of extracting, modifying and posting the data. Multiple GIS clients then have access to the same data simultaneously. Conflicts are being avoided because ProjectWise fully respects the versioning mechanism of the underlying data store."

Object Oriented Data Acquisition

At the moment, Bentley is working with a number of partners to add value to acquiring data based on aerial imagery. Currently, allocation of intelligence often follows after acquiring the data, but this can happen sooner, according to Noordam: "Our intention is to have 'object

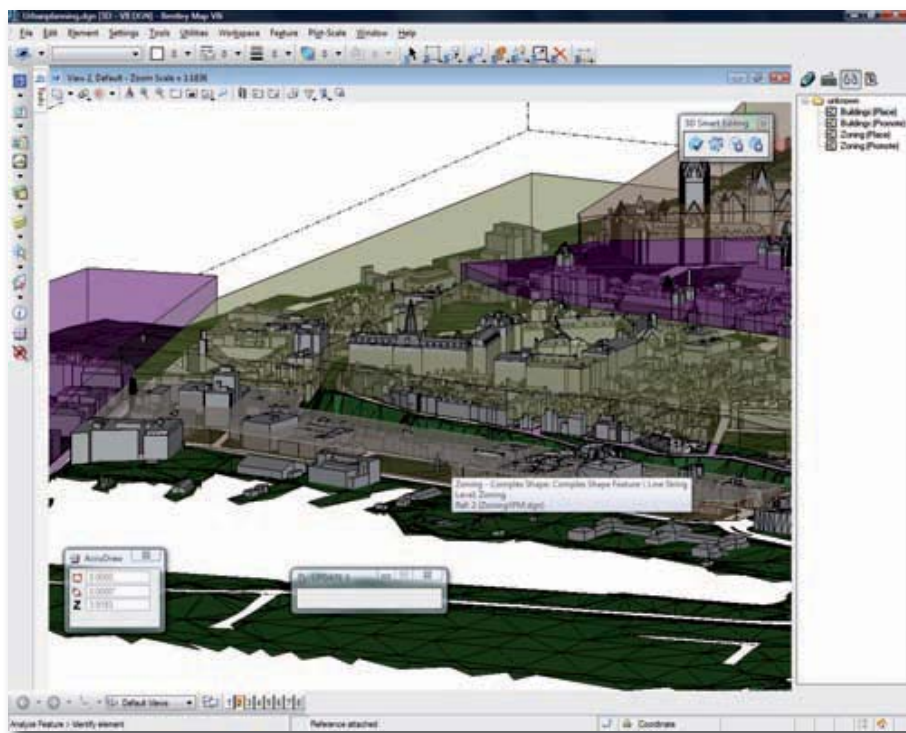


Point Cloud data in MicroStation. Data courtesy of the Gemeente Maastricht.

oriented acquisition' as early as possible in the process, because then you can immediately bring added value to your data."

Apart from aerial imagery, Bentley is enhancing the possibilities of using point cloud data in 3D data acquisition, starting with the ability to reference it. Noordam: "Very soon there will be an extension to MicroStation based on Pointools technology where you can directly access point cloud data like a reference file. Because point clouds consist of large amounts of data, there's a lot of debate on what is most effective: producing 3D vectors on a large scale from point cloud data or adding more intelligence to the point cloud itself. Large scale adaptation of this – for many people new – data source will show where the discussion is heading. Until now, companies such as TerraSolid already offer point cloud solutions for the Bentley platform, but its use is relatively small scale and mainly by specialists. The threshold of using point clouds as a data source is lowered by including default support for it in Microstation."

Eric van Rees is editor in chief of GeoInformatics. For more information, have a look at www.bentley.com.



An example of 3D Zoning. Data courtesy of the City of Quebec.