



The future
was on display
and it was
looking bright



Agents of Change

I am not precisely a hick, but perhaps it is relevant to point out that the Venetian Resort Hotel Casino, site of Autodesk University 2006, is considerably bigger, spatially and in population, than my adopted hometown of Paonia, Colorado. Heck, the lobby is probably bigger. And it's got more marble inlay than Paonia has pavement, more chandeliers than Paonia has light bulbs, more fancy restaurants than Paonia has ovens... but you get the idea; the Venetian is big and opulent, a shrine to money and consumption and human engineering audacity, and entirely fitting as a showcase of Autodesk technology. While walking about at AU 2006, goggling at the indoor canal, the nightclubs, the blackjack tables and so forth, I was forcibly impressed by

the fact that surveying is a very small part of Autodesk's world, and that even the whole concept of computer drafting, as I know and use it, has become quaint when held against the backdrop of awesome technology and engineering accomplishment that Autodesk software not only embodies in itself, but facilitates in nuts and bolts reality – if indoor replicas of Venice's canals qualify as 'reality'.

7,500 Autodesk 'agents of change' (this year's theme) attended AU 2006, a 40% increase over 2005. They represented 60 countries and 3,000 firms and, according to my informal and inadequate survey, a large proportion of them were architects trying desperately to get a handle on Revit, Autodesk's 'building design and documentation system'. As one such architect told

>> By Angus W. Stocking, LS



AU 2006 attendees don special glasses for a look at moving, 3D displays, just like the movies! From, like, the 70s!

me, with just the slightest hint of panic in his voice, “Right now, if you know Revit, the world is your oyster.”

I am probably giving the impression that surveyors are becoming relatively unimportant to Autodesk, and that the sort of 2D drafting that we boundary specialists seem tied to is in danger of disappearing altogether. But that’s hardly the case. I am trying to point out that Autodesk sees itself as a major player in a big world indeed, and is consciously setting the terms and changing the direction of that world. We licensed surveyors can be rather conservative professionally, ruminating over legal principles that go back to the Magna Carta and the Bible. Still, we exist in the same river of time as the rest of the professions and are swept along just as inevitably by the swift current of change. If AU 2006 is any guide, and I think it is, surveyors will more and more be forced to think of ourselves as creators, gatherers and users of spatial data to be incorporated into increasingly comprehensive and ubiquitous GISs and 3D dynamic models. Agents of change indeed. Or, maybe, victims of change... our choice.

Models and Supermodels

The opening general session was held in the Venetian’s Palazzo Ballroom, a large and glitzy space even by Vegas standards. Attendees took their seats while a light show and the inevitable Tron-like 3D motorcycle graphics pulsed on the big screen. The keynote marked the AU debut of former COO Carl

Bass introduced AU 2006’s ‘big idea’: computer models – and supermodels – should be seen as the basis for virtually all design. An accurate model of a building, a machine, or an entire city, can be used as a single referent for plans, visualizations, parts lists, volumes, etc., and all of these are instantly updateable as the model is revised. “See it, experience

“To see an accurate 3D model of an entire city twirled about and zoomed upon in realtime was impressive and, frankly, made me feel a little tingly inside, as if I were living in a Jetsons’ cartoon and would finally be getting my anti-gravity shoes.”

Bass as Autodesk’s CEO and president – after 14 years, Carol Bartz has stepped down and is now executive chairman of Autodesk’s board. Bass was genial, in charge, and very comfortable on stage, as indeed he should be: The Bartz-to-Bass transition has been one of the smoothest in Silicon Valley history.

it, before it’s real,” said Bass, and then he proceeded to demonstrate what he meant with one of the riskiest high-wire acts I’ve ever seen at a convention keynote: a series of live demos, conducted by Autodesk customers, of big (really big) models being used in various scenarios. AU attendees are a fairly sophisticated

bunch, but there were plenty of oohs and ahs, and some spontaneous applause, during the show that followed.

First up was a model – make that supermodel – of London... all of London, including every tree. Created by a combination of photo capture and surveyed reference points, the supermodel is a way to satisfy London’s planning requirement for ‘verifiably accurate visualization’. The firm that made it uses it to demonstrate the visual impact of proposed new buildings, but once you have a supermodel you find all sorts of uses for it and it can even be licensed. To see an accurate 3D model of an entire city twirled about and zoomed upon in realtime was impressive and, frankly, made me feel a little tingly inside, as if I were living in a Jetsons’ cartoon and would finally be getting my anti-gravity shoes.

The supermodel smackdown continued with looks at ‘infrastructure supermodels’, which are ‘single parametric supermodels for multi-building projects’. Models of Seattle and Dubai were shown; frankly their resolution and accuracy – their sheer beauty – were a little staggering, and it only seems logical to predict that fairly soon any self-respecting city will have to commission a model of itself, just as kings and presidents are required to sit for portraits in oil.

The use of military models created from satellite data was demonstrated. Apparently they are used for realtime planning and route finding prior to missions in Iraq – I found the game-like visualizations of real life battle scenarios a little unsettling.

Oh, and models were created on the fly, and used to prototype complex machines, and to design cars, and to create visualizations instantly, and to create parts lists and on and on proving, ultimately, that 3D models can be used to beat an audience to death.

Bass also ‘took a meeting’ in Second Life, the online community. Autodesk is providing tools to import architectural models into Second Life, in hopes that it will become an important alternative to teleconferencing; clients and architects are able to walk around in the model while discussing its merits.

GIS Rising

“Spatial data is becoming just another data type for the IT guys to keep track of,” said Autodesk Vice-president of Infrastructure, Chris Bradshaw, in an



Left: Autodesk Technology Evangelist Pete Kelsey

Below: Carlson was one of many survey-oriented companies going all out at AU 2006.



interview. In other words, spatial data, usually captured in a GIS, is becoming ubiquitous, and Autodesk is assuming that this already huge industry is going to get even huger and become the ‘operating system of reality’, to coin a phrase.

Autodesk isn’t alone in this belief. In a January 3, 2007 press release, Autodesk and Oracle announced a ‘strategic relationship’ that will bundle products from both companies, allowing Autodesk to take advantage of Oracle Database’s non-proprietary spatial data structure.

‘Non-proprietary’ is key. Autodesk continues to embrace open source GIS, and the source code for Map Guide Open Source has been downloaded more than 23,000 times in its first year of availability. And Autodesk continues to be a sustaining sponsor of the Open Source Geospatial Foundation (OSGeo.org) the non-profit that “maintains these leading edge open source tools for public benefit” according to Executive Director Tyler Mitchell.

“Google Earth changed everything,” according to Autodesk Technology



Evangelist Pete Kelsey, in an interview. "It's a GIS system that's basically free." And also, according to Bradshaw, "Proprietary formats makes the market smaller." So Autodesk is working hard to be data agnostic, and banking on the innovation that comes from a vibrant open source community. The company seems to genuinely believe that GIS is becoming a major way for humans to interact with the world, and that riding the open source wave is the best way to benefit. When asked if this emphasis on open source undercuts traditional GIS heavyweights like ESRI, Kelsey replies laconically, "Hope so."

The Importance of LIDAR

LIDAR, or laser scanning, was a major presence at this year's AU, which stands to reason. If models and GISs are to successfully model the entire globe, which appears to be the goal, rapid methods of data acquisition will have to emerge. LIDAR is one such method (Z+F USA, for example, claims that their Imager 5006 can collect half a million points a second). "The writing is on the wall. LIDAR is not a passing fancy," says Kelsey. "It's much like GPS in the 90s," he continues, implying that early adopters will reap similar rewards. "If I get my way, Autodesk will take a leadership role."

Bradshaw agrees, and says that Autodesk is working on more and better ways to incorporate LIDAR data. But



Leica Geosystems may be ahead of Autodesk in one important respect: data sharing. Since point clouds generated by scanning are usually quite large, much processing is usually required to make the data useable by interested parties. But Leica's TruView system gets around that. At their booth in the exhibit hall, Leica demonstrated fast, intuitive zooming and

"3D drafting will someday be as wildly popular as 3D movies."

panning of minimally processed point cloud data, as if from the scanner's point of view. Just as PDF files are standard for sharing and viewing text and graphics, and Autodesk's DWF files do the same for vector files, Leica's Truview aims to be the standard for point cloud data.

Five Stages and Three Levels

The 'geospatial value chain' has become an important method for Autodesk to understand the geospatial market. Simplified greatly, the 'chain' describes five stages of spatial data integration and sharing. Stage one, the lowest, describes a company that still produces mainly

paper or Mylar maps. Data is being produced, but it's static and can't be shared or reused. In stage two, emphasis on electronic files makes data sharing possible, and reuse of information is routine. In stage three, databases are tied to electronic maps to create GISs. Data is organized and standardized, creating lots of readily exploitable value. In stage four, the organization focuses more on data, spatial and otherwise, using databases as interfaces to modify spatial models and vice-versa. Staff may be manipulating models and maps without being aware of it. Stage five refines and consolidates the gains made in stage four. Spatial data is central to all operations, and is easily scalable so that data sets can be extremely large. "The higher in the chain you go, the more you benefit," said Geospatial Product Line Manager Andrew Mackle.

Similarly, Bradshaw discussed three levels of drafting ability. In the first, companies are producing strictly 2D maps. "For some projects and industries, the benefits of 3D don't outweigh the 2D ease of use," he says. "That's why lots of enhancements remain in the 2D world. AutoCAD LT, after all, is still the highest volume product we ship."

Level two companies are beginning to be 'vertically oriented' using models to, for example, create topo maps. At level three, "full dynamic model-based design" is the standard, with the key word being 'dynamic', meaning that when a model is updated, associated data, like cuts and

fills, is also updated automatically. Civil 3D is a dynamic, model-based program.

Bradshaw says, "We believe it doesn't make sense to go from level one to two - a company might as well go right to level three." And what about survey companies that are resisting model-based design? "Well, I think there are two kinds of companies: those in denial versus those who are progressive."

And denial is a river in Egypt, not a successful business strategy.

Infrastructure Main Stage

AU 2006's final day featured the 'main stage' presentation for the Infrastructure



New Autodesk CEO Carl Bass says technology lets designers “see it, experience it, before it’s real.”



division, and it was quite a show. There were, inescapably, more demos of 3D models being put through their paces, with one interesting twist: 3D glasses were handed out – yes, the kind with red and blue plastic lenses – and used to view 3D animations of, for example, construction sites. It was pretty impressive, and convinced me that 3D drafting will someday be as wildly popular as 3D movies have become.

Senior Project Manager for Civil 3D Dave Simeone had some startling figures concerning the rate of Civil 3D adoption, compared to Land Desktop. In 2005, about 10% of potential users were on Civil 3D, with another 30% on the pilot program. But in 2006, those figures had jumped to 30% and 40%, suggesting that Land Desktop might go away even sooner than expected. Simeone listed three criteria for successful adoption of Civil 3D:

- 1) Planning – use the pilot program and come up with a transition strategy.
- 2) Investment – not just in the software, but in the necessary training and transition projects.
- 3) Proper Expectations – don’t think that you’re going to be creating super-models of London the same week you take delivery of the software.

Someone also discussed an interesting bit of arcana regarding performance issues. It seems that patches to the software have been reducing time for some operations dramatically. This was demonstrated (again, live by customers) with a very impressive sequence that imported Google Earth data into Civil 3D for use in modeling, and also by a ridiculously fast import of a Civil 3D file into Map 3D, with subsequent rapid conversion into a full-fledged GIS attached to public data.

One strong impression made was that the Infrastructure division is feeling very confident: their software is working reliably. And this impression was bolstered by the many customers willing to take a turn on stage, and by my conversations with users during the convention. The software is working and it’s being used to do some amazingly neat stuff. I fairly often had the feeling that the future had arrived, at least when it comes to engineering and geospatial software.

Agents of Change

So here we are, early in the 21st century and change, more than ever, is in the air. There are plenty of doomsayers, and many dark warnings about the evils of technology and consumption. But

from where I was sitting, in the Palazzo Ballroom’s press section, the future was on display and it was looking bright. I was in the middle of the planet’s most improbable city, a glittering monument to excess in the middle of a desert. And I was watching, on a giant screen, yet more improbable creations, virtual cities, slick and glittering and very beautiful, put into service by planners, architects, engineers and, yes, surveyors. And all these cities, the real and the virtual, were... working.

So who are the agents of change? Users, certainly, and Autodesk itself. But also, the very models and systems being created. As humans get better and better at manipulating virtual worlds, isn’t there at least a chance that we’ll eventually master the tangible world we inhabit? Isn’t it possible that we’re getting better, not worse, at the difficult task of managing reality? *AS*

Angus Stocking worked for 17 years as a land surveyor in several different states. Nowadays he writes professionally (see www.ColoradoWriting.com) and specializes in surveying and related topics. And also, of course, he is occasionally called to settle survey-related happy hour disputes.