



Editorial

>> Marc Cheves, PS



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Connections

Whether you're a liberal, conservative or an independent, I think it's safe to say that all surveyors share a deep respect for our environment, and I suspect it bothers most of us to see unwise uses of our resources. I recently watched a program on television that showed how phosphorus, picked up by the wind in Bodele Depression in Africa, is carried across the Atlantic to the Amazon where the dust falls as fertilizer. Thanks to satellite sensors, this inter-connection of our planet's weather systems and climate is undeniable.

This month's lead cover feature, "A Classified Success," by Mary Jo Wagner, underscores the main reason many of us gravitated toward surveying as a career—the opportunities to work beyond the confines of an office and enjoy the beauty of the outdoors. You will note there are no "product" images in the article, which focus instead on the grand setting in which the project took place. Here at *The American Surveyor* our goal has always been to report on cutting-edge technology in an attractive format, and hopefully establishing a connection for our readers.

As I read the article, I was surprised to see a familiar name: Jarlath O'Neil-Dunne. Connection number two: Jarlath has been a regular contributor to our *LiDAR Magazine*. Jarlath runs a very successful program at the University of Vermont, a program that incorporates the latest in technology, in this case to address a very real problem in our world, over- or under-exploitation of resources. To deal with this problem, in 2007 Spot Image and Esri created Planet Action, an organization that couples geospatial technology and expertise to address our world's environmental challenges.

The lead cover feature discusses three Planet Action projects, all of which involve either deforestation or land use, and what Jarlath and his team are doing with technology to address the problems. The technology being used is Trimble's eCognition, software acquired by Trimble from the German company Definiens.

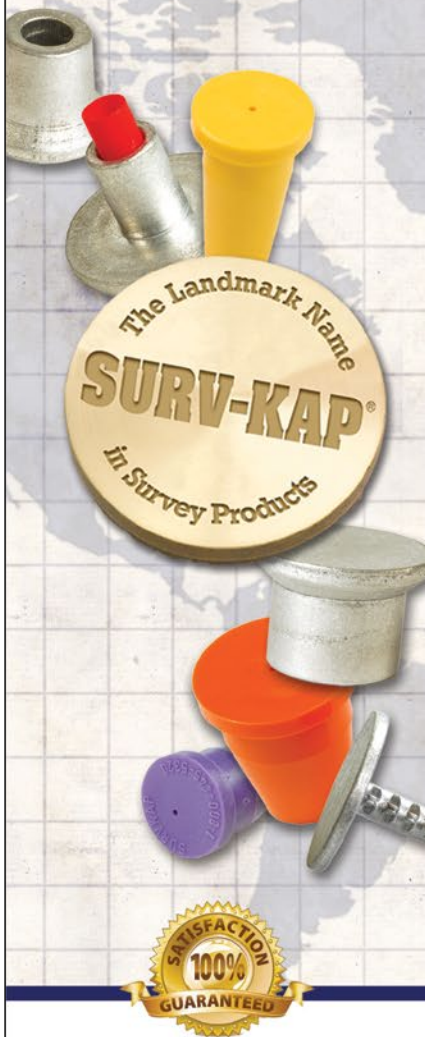
Shortly before Trimble acquired eCognition, we had the pleasure of visiting Definiens in Munich after Intergeo in Karlsruhe. Definiens began as a research institute in 1994, founded by Dr. Gerd Binnig, a Nobel Prize winner in physics for co-inventing the scanning tunneling microscope, which can form an image of individual atoms. We had the privilege of spending more than an hour with Dr. Binnig as he described his transition from 25 years at IBM to the leader of the brain trust at Definiens.



Dr. Gerd Binnig

He had written a book titled *Fractal Darwinism* that discussed creative processes in the human mind. A journalist asked him if his theory could be Dr. Gerd Binnig applied to software that could deal

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Our visit to Definiens coincided with Oktoberfest, and we ended it by sitting with the company employees in one of the large beer halls.

with the world's increasing complexity. An example of this is automobiles and the coming network connectivity that will enable traffic tuning. Something Binnig realized is that 2D isn't enough, and that a 3D look would be required.

Even though Binnig's theories are applicable to everything from medicine to biology, the company focused on image analysis. The first problem that cropped up was computer storage and processor speed. The next problem was establishing rules that would not only handle one image, but multiple images as well. It was fascinating to listen as he explained how the company applies logic to extracting such things as structures and land cover from aerial imagery. From there, these objects can be used, for instance, to determine pervious versus impervious cover, and as you can see in the article, much more.

Over the years I have written many times about the Holy Grail of automatic feature extraction. And while a computer never overlooks something, the human eye and brain—although not as systematic as a computer—notices subtle differences and can exercise judgment in what Definiens calls off-patterns. Our brain does this unconsciously, without us even knowing it.

The explosion of data, whether satellite or terrestrial, is providing a



wealth of information, but without the ability to first segment and then classify this data, it has far less use. Faster, cheaper storage, combined with dual and quad processors that allow simultaneous analysis are part of the solution. Intelligent algorithms, such as those employed by eCognition, are the other part. As you can see in the article, first the rule set was developed. According to Jarlath, the largest value is in having the 'process tree,' the step-by-step procedure of how the software was instructed to identify vegetative types. Essentially, the user can train the software to recognize objects.

The connections I describe above will, without a doubt, play an increasing role in how we deal with this in the future. We recently met with Bryn Fosburgh, a Trimble VP, and learned that although sensor manufacturing will continue to be an important part of the company, software will play an increasing role. The capabilities of eCognition will be a part of that equation. 