



Ten years ago, finding a desired paper map in Marion County, Ore., population 250,000, required fortitude, time and, most of all, endurance. The county's approximately 10,000 land records stood in paper stacks in the office, indexed by cards and without a visual component.

As a land surveyor or a citizen looking for information, not only would lady luck need to be smiling that day, she'd need to be incredibly generous as many record numbers were duplicated across townships or were filed at multiple sites.

But luck cannot pay the bills of a land surveying business—or a county, for that matter. The county needed a better and more reliable process, and thanks to the advent of geographic information systems (GIS) and the vision of the county surveyors, today the county offers land surveyors and citizens a one-stop shop for land records. The system, based on ESRI's (Redlands, Calif.) ARC/INFO, ArcView and MapObjects GIS software, presents information such as section, township, range, survey records, surveys, tax assessments, owner, address, deed, nearest GLO corner, all with the touch of a mouse at three informational kiosks.

The Vision

An ounce of foresight can make a world of difference down the road. In Marion County, the key moment occurred when Robert Nettleton, PLS, the county surveyor, was working on building a countywide tax-assessor's map database system about eight years ago. The inefficiency of the paper system he inherited made him wonder if they could tag the land records to the tax assessor's maps.

"The paper system was started in the 1950s, and much of it was incomplete," Nettleton said. "We began looking at ways other cities were handling the visual [component]. Of course, private surveyors wanted a visually based system. Today, with technology, computers and GIS, we're now getting started. It didn't make sense to go to a manual sys-

tem. I came up with the idea of linking the monuments through tax assessor's maps—we use that as a backdrop."

At the time, the tools were not available to do the job. As the technology began to catch up to the idea, however, the concept expanded to include more data.

"We first thought it was going to be only government corners," explained deputy county surveyor Mark Riggins, PLS. "But we thought, why stop there?"

Initially, the county surveyor's office funded a GIS position to begin work. The department eventually expanded to three positions to encompass the project's large scope.



The results of a pop-up query.

"One of the first things was to figure out how to do this," said county GIS analyst Craig Thompson. "The data was in so many formats: archives, historical data, microfiche, actual surveying logs, field notes, AutoCAD and electronic. In-house we were moving—about four to five years ago—into GPS for doing remonumentation [work]. There was a need to figure out how to present this [data] and bring it all into one shell."

After examining their options, the GIS staff decided to use ESRI's ARC/INFO and ArcView software and to tag the mounds of information by points.

"We were taking mounds of paper

and hand-digitizing on a base map to show where the survey attributes were," Thompson said. "We calculated it to take five to six years with three to four people working on it. We had an idea about what the interface would look like—we wanted it to be on a kiosk for the public to use and have the in-house ability to update it."

Dealing with the Data

The next step required entering the county's approximately 35,000 surveys. Marion County, located about 45 miles south of Portland, was beginning to experience population growth, making the system even more imperative. In fact, by March 1999, the number of surveys swelled to approximately 40,000.

To enter the surveys, the county uses a controversial source of labor: prison inmates. The prison has a GIS shop where inmates tag monuments to the tax assessor's map. Afterward, the county conducts quality control on the data to ensure that the all information is tagged to the correct parcels. All coordinates are in NAD 83/91, and all images in TIFF format.



The main form showing utilities layout.

"As we do this, we tie in corners with GPS," Nettleton said. "We take better data and rubber-sheet it to fit it into the hole.... When we do a check on a subdivision, it is transferred into ARC/INFO. To eliminate the duplication, the county numbers the surveys sequentially as they come in. The file name is the same as the survey

record (i.e., 13,000), and the file is coded based on its feature type.

On the User End

Despite the work on the county's end, customers' use of the system is remarkably easy. Users can query by section, township and range, or can enter just the address of a parcel in order to bring up a myriad of information.

For example, when a user sits down at the kiosk, which is a Pentium II-based workstation running Windows 95, they can enter the parcel's location. That query will bring up the nearby control points, the owner's name, each survey conducted which includes the parcel along with the year and surveyor. If the user desires, they can then select a survey, and the server will bring up the plat onscreen. The user can zoom in on the plat, which will bring up more data.

For surveyors in particular, an Oregon state statute requires that if geodetic



Graphic display of a query.

control is within 1/2 mile, it must be tied in. If a surveyor is working in a certain area, he or she can come in, enter the parcel and pick a radius. The system will pick up all information in that radius, sorting through the survey data, and listing the nearby geodetic control.

"You can imagine how long that process would take with paper," Thompson said. "Here we saw it in two minutes, with all the available information for the selected parcel. It's a laundry list of pertinent information; it shows control points, listing them from closest to farther away, as well as GLO data. You can pick and choose what you want. It brings up the survey images, control points, data including descriptions. You can add to the print

queue if you want a hard copy, which keeps track of all you've chosen. We keep a running total."

Prices for printouts range from 25 cents for deed copies, to 8 1/2"x11" maps at 50 cents, all the way up to 18"x24" maps at \$2 a piece. Larger maps can also be purchased at 50 cents per square foot.

The Next Step

Currently, the record is about 50 percent complete. As Nettleton stated quite simply: "Our goal is to put each and every record that we have in our office in there, so there's no doubt that you can find it." They expect to complete data entry by spring 2000.

Also, the system was moved into MapObjects in order to give the programmers more flexibility. Because MapObjects can be used in the Visual Basic environment, images are easily called up and manipulated while onscreen.

Riggins and Nettleton have even bigger plans for the system. Eventually, surveyors won't even have to come to the building. According to Riggins, the county wants to burn CDs of the information when it's finished entering the surveys. Surveyors could then download updates from the web.

On the GIS side, Thompson had his plans as well.

"The next phase is to incorporate all editing and maintenance into this application as well," he said. "Not only can people in-house read and maintain it, we can eventually post it on the Internet at the same time."

Undertaking a project like this, however, demands not only vision but a commitment through funding. As Nettleton cautioned, "It's going to be a fantastic project—but it hasn't come cheap."

But for the surveyors and citizens of Marion County, though, it is money well spent. ☺

For more information on this project, you may visit the county's website at <http://www.open.org/marionwork> or contact Bob Nettleton at bnettleton@open.org or Craig Thompson at craigtompson@open.org.

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