Building a Map-Based Management Information System on a Budget

By Kevin Royal

What does it take to put together a full Management Information System for a property management business on a budget? No matter what type or size of business you have (independent crop consultant, farm management company, or a larger farm with multiple landlords), a Geographic Management Information System (GMIS) can allow you to pull together all of the different pieces of data you generate and publish them as map-based information for all individuals with an interest in that property. And putting together such a system doesn't need to be very expensive at all.

One of the file management options in TNTmips®, the image processing and geospatial analysis software from MicroImages, Inc. of Lincoln, Nebraska, can be used to bring together all of these pieces of data into a GMIS where the separate pieces of data can become information. This map-based filing cabinet is a way to publish and distribute your hard won information to anyone who is involved with any property in your trade area, including yourself.

It is easy to see that no one software package does it all. You generate useful data from accounting packages, spreadsheets, databases, Geographical Information Systems (GIS), and calendar schedules. Don't forget Internet web sites, digital cameras, and all of those megabytes of digital data from yield maps and variable rate application equipment.

How often is useful data stored on hand written pieces of paper? Legal documents like leasing agreements and property titles with signatures, load sheets from custom applicators, and hand written notes from landlords and tenants are important. Even old diaries from past owners and operators (grandma's interesting histories in her own handwriting about the farm) are good to have around when tied to the right field map.

Pulling together all of those different pieces of information generated from managing a property and attaching it to a map-based filing cabinet is really the most sensible way to go. Most people are spatial types, with a "geographic memory." Starting with an overview of your trade area and drilling down through a point and click, consistent, map-like interface has real advantages over training your clients, partners, and coworkers to use all of the different software used to generate that data.

You also need to be sure that any digital data you distribute can actually be viewed on your target audience's computers without spending a lot of money and training on extra viewing software. This software must have minimal cost, friendly distribution policies, easy to use and well-known interfaces and, all this must be available from within that geographic filing cabinet.

When all of these different types of data are compared, the GIS data is going to be the largest (in megabytes) set of data to manage. It also has unique properties that you will want to preserve. Things like spatial location, accurate acreage measurements, soil and yield data, and improvements to properties (tiles, terraces) are important to maintain. It makes sense to make the GIS component the determining factor in the overall form of the GMIS. TNTmips has the tools to build up all of the GIS layers you would ever need. Image processing, yield maps, soil maps, GPS positions over moving maps, and even 3D digital movie flybys can all be created using the tools in this geospatial software package.

You do not need to train everyone that needs your GMIS to use all of the tools built into TNTmips. TNTmips can create geospatial data that can be published in a TNTatlas®. TNTatlas becomes the centerpiece or glue that holds together your GMIS. The simplified database, image analysis, and measurement tools included in TNTatlas allow beginners to

do quite a few advanced spatial tasks. They can also manipulate and navigate huge geospatial data sets very quickly.

The HyperIndex navigation tools in TNTatlas allow you to point and click to drill down from an overview of your trade area to the smallest field you want to visit. They also allow you to "link" to external files by clicking on your property locations. Since the largest component of your GMIS is taken care of within TNTatlas, organizing the other data types within your system is now a matter of linking to these other files. Total cost for viewing and distributing your geospatial data to others is $0.

The next type of data you would want to organize and attach to your maps are actual photographs of anything associated with each field. Fences, drainage systems, grass conditions, livestock, terraces, and other improvements can easily be associated with the right place on the map. Film-based photography was slow and difficult to organize, but cheap digital cameras can instantly grab a snapshot in time. Microsoft Explorer can easily display these images on your PC.

Spreadsheets and databases are another important source of data. You are probably generating several reports and estimates, making "What If…" projections, and tracking other information in accounting programs like Quicken or Quickbooks, and database programs like Microsoft ACCESS. You may also be generating planting, irrigation schedules, and grazing rotation calendars with a program like Microsoft Outlook. What you really want to attach to the properties in your GMIS are the reports and schedules generated from this analysis. Microsoft Office 2000 has a very useful ability to make any of these reports into HTML documents that can be viewed in standard (and free to download) Internet browser programs like Explorer and Netscape. You can work with your crop management, grazing, and financial models from spreadsheets and then save your final analysis reports into an HTML file. Link that HTML file to the section of the map that the analysis belongs with to help improve your geographic memory. Total cost for the viewer to display and distribute your digital photographs and reports stored in HTML format is $0.

Now for those hand written bits of wisdom that need to go with a property. As we covered in the first section, legal documents like leases and deeds, fertilizer and chemical load sheets, as well as other notes can be useful when they are made easily available in your GMIS. The first step is to get these items scanned and into a useful digital format. Scanners can be purchased for under $100. You don't need photographic quality, just something good enough to read and maybe print out from your PC when necessary.

Once you get these documents scanned, make them into Adobe Acrobat Reader files. Converting any of your scanned documents into this format makes them very portable and compact. They are also ready to view in the free Adobe Acrobat Reader software that you can supply.
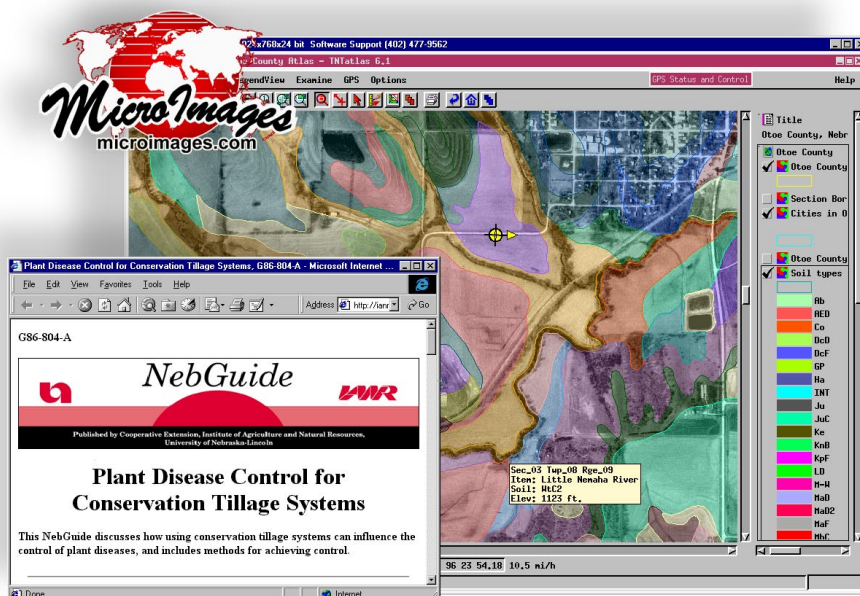
Geographic information meets web data when you link to Internet sites from within your farm maps. Any updates to this page will automatically be available from your map link. As long as you are connected to an ISP from anywhere in the world, the latest information can open from your local map-based file cabinet.
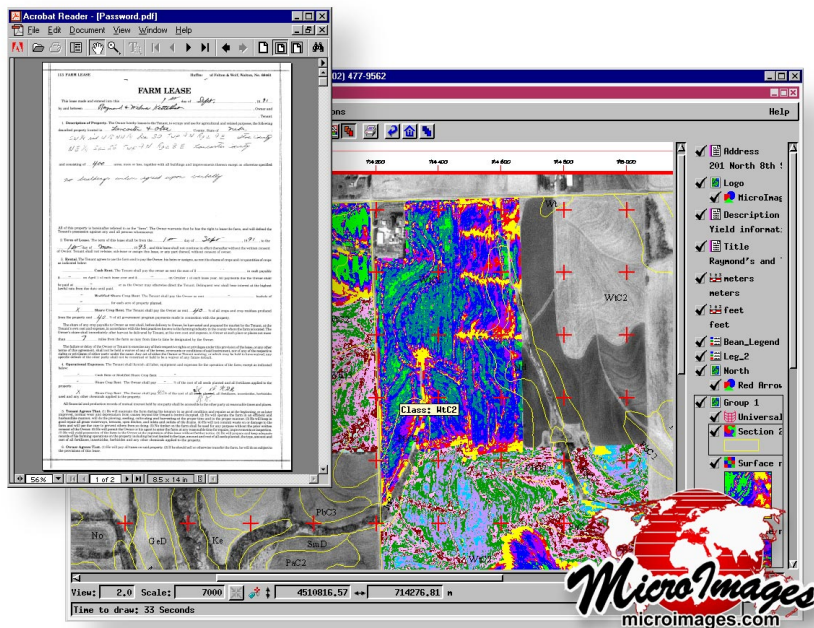
Any hand written documentation can be added to your GMIS. Adobe Acrobat distilled this 40Mb scanned file to a 1.4 Mb Acrobat Reader file. With password protection from Adobe Acrobat, this file can be distributed on your GMIS CD with a very high level of security, no matter who is viewing the geospatial data within TNTatlas.

searchable tag with the associated Acrobat file. With these tags in place, even your scanned documents will show up on any searches you do on the GMIS data with personal search engines, such as AltaVista™ Discovery. Total cost for viewing and distributing scanned and other digital documents with password security built in is $0.

Your customers can also download it from the Adobe web site.

You can also make any other digital document, such as a word processing file, into an Acrobat file. Some of the new tools in the latest version of Adobe Acrobat 4.0 can also allow you to capture entire sections of Internet web sites into a compact Acrobat file for inclusion in your GMIS. For example, most seed companies post seed traits for all of their varieties as web pages. If you want to link this seed trait information to the fields they were planted in, use Adobe Acrobat to capture the right section of the web site to your local hard drive for inclusion. Chemical labels, agronomic recommendations, really an entire wealth of information are available for download and personal reference in the GMIS you create.

Two other important features of Adobe Acrobat 4.0 are worth using in your GMIS. The first is its ability to password protect files when you create them. For example, you may want to create a GMIS CD for distribution to several clients or landlords. You wouldn't want all of them to be able to read each other's profitability studies or lease agreement details, would you? Simply password protect those sensitive Acrobat files when you create them.

The other important feature is the ability to enter keywords, creation dates, and other important details within any Adobe Acrobat file, even scanned documents. These included keywords become a

As a consultant or property manager that needs to send updated reports to a client throughout the growing season, you may want to build up an Internet-based reporting system. You may be a small operation whose business is on a tight information budget and is not yet ready for a full and dedicated Internet web site. How can you build an Internet presence without a lot of expense? How can this be done while still allowing your customers access to these updates from the interactive geographic filing cabinet of your GMIS?

Sure, you can build a large web site serving up GIS and other background data, but the largest component is still the GIS data, and your clients are probably limited to dial up Internet connections at a slower rate. Why not deliver that GIS data on a CD to your clients and make Internet connections to only those changing documents and reports on your company's low cost personal home page supplied by your Internet Service Provider (ISP)? Most ISPs will allow you to store around 20 megabytes of data as personal home pages for a small business as a part of a normal dial up account for somewhere under $20 per month, and additional space is available for a slightly higher monthly fee.

It is easy to add these time sensitive reports with a little pre-planning when designing the CD-based GMIS for distribution. Link from a desktop

map supplied on the CD at the beginning of the season to updating HTML pages on a your company's web pages by saving shortcuts to these "to be added" documents on that initial CD. After a specified calendar date or when you email your client about new information, additional reports, schedules, or analysis are appended to the client's local map through that link to your company's new web pages.

When your client (even while traveling) inserts his CD and clicks on the map on his GMIS to access the new report, his favorite web browser launches, the modem dials up his local ISP, and the latest report is displayed from your web site on his PC.

At the end of the season, simply use the web site capture tools in Adobe Acrobat to capture each client's section of your own web pages to an Acrobat file and add them to next year's CD before you mail it to your client or landowner. Delete those old files from your web site to make room for next year's timely reports and calendar.

So once your GMIS is put into place, the total cost of your CD based information distribution system can be zero, using the free TNTatlas as the key organizational tool. Your pre-installed Internet browser and the free-to-download Adobe Acrobat Reader 4.0 become "helper" applications for TNTatlas, easily managing all of the pieces of information that are tied to your spatial data through TNTatlas, with password protection for sensitive documents when necessary.

With some small changes to the Internet account and web space from the ISP your business probably already has, you can establish an Internet presence for timely delivery of any reports. These reports are integrated into the GMIS through the Internet as easily as any other document on your and your client's computer desktop. Your business can deliver an advanced geospatial management information system that can compete with any large organization. It is really just an extension of the tools you may already be using.

Adobe Acrobat can capture entire sections of web sites for inclusion on your GMIS CD. It can be invaluable to have the latest information stored with the right map and just a mouse click away. You can use this web site capture ability to clear your web site of last season's reports, capturing them to Acrobat Reader files for distribution with the next CD.
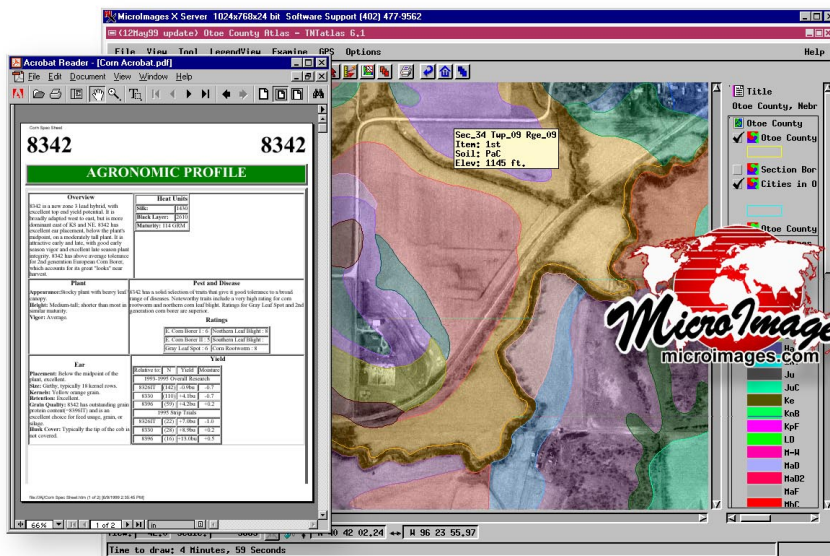
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