



By **Stephen C. Blaskey, PS**

Stephen Blaskey is a branch manager with Coastal Surveying of Texas, Inc., a mid-sized land surveying company in Galveston County, Texas. Both an RPLS and a Licensed State Land Surveyor in Texas, he also holds a degree in Geographic Information Science.

Myth #3: Getting Current Job Data on a Map is Too Difficult

Now that one third of the GIS System has been built it is now time to implement the rest of the system, the Mapping Engine and the Linkage. Building the Mapping Engine is going to take some exploration on the part of the GIS System developer, as the developer will have to search all available data sources and collect different data sets that will “Fill in the Picture” of the mapping interface. Building the linkage will require an analysis of the collected datasets for an appropriate method to bring the Database together with the Mapping Engine.

Building the Mapping Engine

Determining which datasets to input into your Mapping Engine will be based on two things, your needs from the GIS System, and what data is available for you to obtain. These datasets will be of two different types, vector and raster. Vector datasets are composed of points, lines, and areas, while raster datasets are images.

Exploring different governmental data sources is always a great place to start, for instance the U.S. Department of Agriculture has numerous aerial photographs that are available through the National Agriculture Inventory Program (NAIP) which can readily be imported into your Mapping Engine. While National

Datasets are great for wide coverage also explore State, County, and local data sources, as this data will typically be more developed than nationally scaled data. Your County Appraisal district or taxing authority may have GIS ready datasets, such as a parcel map or street line files that can be used. Also keep in mind that any dataset you decide to use may have to be updated, and balance

the data for what it is, and do not expect everything to exactly overlay and be correct. It is your job as the Surveyor to survey the true boundary, not the taxing authority. Remember the GIS System is not a Survey, in fact I tell GIS users that GIS stands for Get It Surveyed.

Now that you have collected all of the data that will be in your mapping system it is time to bring them all into

“Step back a moment and look and what you have created... Welcome to a simpler way of managing your business.”

your need for data in the Mapping Engine with how much effort you are willing to take to keep it up to date.

At this point I always get the question as to accuracy of the data being imported from sources such as a County Taxing Authority, which granted is not survey accurate, but could be close enough to reality to help you to start to get a developed picture of the area your GIS System is designed to cover. Use

one system. I suggest that you select a coordinate system that you work in most, if not all, of the time and re-project all of your data sources into that same system. While Mapping Engine software can handle data of different coordinate systems at the same time, called on the fly re-projection, this is slow and will make your mapping engine work hard to keep up with what it is doing, nothing is worse than

Methods of Georectification

Method	Example	Fields required in Database
Direct	Survey Accurate Parcel Map	Northing and Easting of each corner of tract, or unique identifier of polygon in Parcel Map.
Indirect	Obtaining Latitude and Longitude from other source	Approximate Latitude and Longitude of center of project.
Calculation	Use of Street Address of project and geocodable street file	Street address of project
Association	Use of Taxing Authority GIS Layer	Unique parcel identifier assigned by taxing authority

waiting for a map to load when you need a quick question answered.

Also be mindful of how the file structure is set up on your GIS computer, save things on its hard drive in a logical place so it can easily be found. Keep Aerial Photographs in a separate folder from Parcel data, doing so will help you update the data as new data becomes available.

Building the Linkage

Now that your Mapping Engine is up and working we can now bring it together with the Database with the Linkage. The way the Linkage works in your system is going to depend on what data sources are available in your Mapping Engine, the process to do this is called georectification and there are four methods. For the linkage to work there will have to be a geographic link from your Database into your Mapping Engine.

Method 1: Direct Georectification

Direct Georectification is accomplished by directly measuring the entity to be georectified with a GPS receiver of sufficient accuracy to meet the needs of the GIS System, and for a Surveyor this means RTK GPS. While the most expensive and time consuming method of georectification, it is by far the most accurate. This method is typically the goal of the Surveyor, not the starting point. Having a survey accurate parcel layer of all parcels in the area you work would be a prized possession, not typically something for download off of the internet.

Method 2: Indirect Georectification

Indirect Georectification is the method by which you can obtain a Latitude and Longitude for a project that can be tied to a given project. This can be done by using a program like Google Earth, or your Mapping Engine, to come up with a project location for each project. This will add a step to every project you complete as someone will have to come up with the project location and add it to the project information. While adding a step to each of your projects this method will work regardless of the type of datasets you have available in your area of work, that being said I recommend this method as only a method of last resort if neither of the last two methods will work for your situation. Building the linkage with this method of georectification will require you to add the fields LATITUDE and LONGITUDE to your JOB_ORDER table to associate geography to the Database.

Method 3: Georectification by Calculation

This method involves the use of a dataset in your Mapping Engine and performing a calculation with this dataset to come up with a project location. The best example of this method is geocoding an address, this involves a street centerline file that is built up of line segments that have address ranges associated with them. The address for your project is then placed by its address onto the street centerline file in an approximate location that can be used. This will not be a dead on location of your project, but at least you

will know that you have done work on a given block and give you a hint as to where to begin looking as you complete another project in the same area. While not great, the advantage to this method is that it can be automated to happen in the background. The linkage in this method would be the address of the project, which is already being captured by the database.

Method 4: Georectification by Association

Georectification by association is the process by having a dataset in your Mapping Engine that contains an attribute exactly equal to a field in your Database. This will require an extremely developed dataset in your Mapping Engine that may or may not be available in all situations. I find this method to be the easiest to implement, provided that all of the pieces can be located. A Taxing authority parcel file is the best example of how this method can work best in your GIS system. Each parcel having a unique identifier as supplied by the Taxing authority is a simple field that can be added to your existing Database for use as the linkage.

Bringing It All Together

Now that you have your Mapping Engine built, selected a method of georectification, and added the fields necessary to perform the Linkage you are ready to import the database into your Mapping Engine. The steps to do this will vary depending on which type of Mapping Engine software you have chosen, but it should be relatively straight forward, a quick look to the software's user manual and you are up and running with a fully functioning GIS System to handle all of your surveying business' needs from this point forward.

Step back a moment and look at what you have created, you now have a system that will show you where you have work to do, where you have done work, create an Accounts Receivable report, and list out what your draftsman needs to be working on. Welcome to a simpler way of managing your business.

This begs the next question, "How do I get my historic data into this GIS system?" which we will tackle in the next installment... 