

A Simple Mapping Program for Making Maps for Landowner Management Plans

Abstract

All forty of the Florida Division of Forestry County Foresters received new PC's in 1999. County Foresters in Florida, as in other states, develop management plans for landowners. The Division already uses ArcView extensively, especially on our State Forests. The County Foresters needed software to help them make maps for landowner management plans, but they really did not need all the functionality of ArcView. What we needed was a simple mapping program that would require little or no training. In June of last year I began development of the program using Visual Basic 6 and MapObjects 2. The application lets the user use a wide range of GIS and image data. The user can create and edit polygon, line and point shape files using images and other vector data as a backdrop. The user can store labels within the shape file and label features with these labels. Labeled features are stored in a label layer that can be saved to and/or loaded from a separate file. Areas of overlap between two polygons can be subtracted. Acres are automatically calculated for polygons. The application gives us an inexpensive mapping program that is easy to use by our field personnel.

Introduction

The Division of Forestry County Foresters are called on to do a variety of tasks. Developing management plans for landowners is only one of their tasks. It is not uncommon for a County Forester to be sent off on a project for weeks at a time. My experience with ArcView is that if you do not use it on a regular basis. You will forget how to use it. If a forester is sent off to fight fire for three weeks, he is probably going to have a hard time using ArcView when he gets back. ArcView is not hard but there is a lot of detail. We did not need most of the functionality of ArcView. What we needed was a mapping program so simple that most people could sit down and use it even if they had not used it for a month - a program that was easy to learn and use. At the same time, the program had to create good quality maps. It had to enable our County Foresters to do heads-up digitizing with a Digital Ortho Photos as a backdrop.

Methods

The choice of MapObjects 2 and Visual Basic to develop this program was fairly easy since we are an ESRI shop. ESRI's MapObjects (MO) is a collection of objects that can be used with a windows development language to add map functionality to an application. Visual Basic (VB) is the easiest and most widely used windows development system and most of the MapObject examples are in VB. I did not know VB or MO, so I went to training on both, and I had VB code samples from ESRI. One of the

code samples was an application called MoView, which uses a lot of the MO objects. There were also code samples that did editing and labeling. Basically, I wanted to use most of the functionality in MoView adding editing, labeling and printing. Being able to figure out how to code something if I have samples to work from, I was able to strip out the parts of MoView that I did not need and add editing and labeling.

The County Forester Mapping (CF) program allows the user to create polygon, line and point shapefiles from scratch. Only shapefiles that have been created in CF can be edited in CF. Other shapefiles, coverages, cadd drawing and images can all be used in CF but not edited. The structure of the program is not designed to edit shapefiles with large numbers of features, since landowner tracts are normally less than 100 acres. One feature that was added was the ability to subtract the area of overlap of two polygons. If you have a pine plantation with a cypress head in the middle of it, you have to subtract the area of the cypress head from the area of the plantation or you will be double counting the acres. This turned out to be a real problem due to some problems in the ESRI objects. This process sometimes creates multi-part polygons, which can create problems depending on the order in which the polygons are selected. The problem was finally resolved with ESRI help. The ability was added to select, drag, and drop vertices. Vertices snap to a snapping grid similar to the grid in an ArcView layout. This allows multiple layers, as they are edited, to snap to the same grid. The spacing of grid points can be changed by the user. Acres are calculated automatically for polygon shapefiles and written to an acres field in the attribute table. The user begins editing by selecting from the menu bar, *edit* either an *existing layer* or *create a new layer*. If he selects an existing layer, the active layer is edited if it is a shapefile and has been created in the CF program. If he selects creation of a new shapefile, he is queried for type, name and location for the new layer. Editing is turned off by selecting *edit/stop editing*. Adding labeling was not as involved.

To add labeling, a user-defined type was created that had a property called label. While a layer is being edited, the user can right click on a feature and a message box will pop up. The user enters in the message box the label he wants for that feature. The label is stored in the label property. Once editing is turned off for that layer the user can select the label tool and click on the feature and the program will label the feature with the text entered in the label property. With a polygon layer, the user has the option of labeling with either acres and or the text label entered. Once a feature has been labeled the label can be selected, dragged and dropped at a new location. Labels for all layers can be stored in a file and applied at a future time.

CF uses the ArcExplorer Legend object so that legends can be built on attribute values somewhat like ArcView. There are menu options to zoom to standard scales like 1 inch to 660 feet. There are also zoom-in, zoom-out and pan tools. Printing turned out to be difficult.

At the 1999 User Conference, ESRI released sample code for printing. It turned out that in this sample code scale was not calculated correctly and the windows API functions used did not work on most PCs for some reason. Eventually, it was necessary to hire a consultant to write it for me.

The aspect of the map on the screen is either landscape or portrait to show the user what will be printed out. There is a menu option that brings up the windows printer properties window. Changing the aspect of the printer changes the map aspect on the

screen. Clicking on the print button will bring up a window that allows the user to see a thumb-nail view of the map and to specify a title, sub-title and comments. When the user then clicks on OK a map is printed with the legend from the map, north arrow and scale.

The consultant also built an image catalog for the program. MapObjects does not support image catalogs but I had a code sample from ESRI of a work-around. The code sample works something like an image catalog. A user selects *build an image catalog*. He then navigates to a directory with images, selects an image, gives it a name and clicks on OK. A polygon shapefile is created of the extents of all the images in the directory selected. A tool is added to the toolbar that lets the user select as many images as he wants to turn-on on the map.

The hardest part of the project was building a setup program. I am now fully aware of the meaning of the term "DLL Hell". I have spent a couple of months trying to build a setup program for CF. I tried the VB Setup and Deployment Wizard first, then I tried InstallShield. With either program it is a trial and error process with few error messages and help. Technical support at InstallShield and at ESRI couldn't figure out what I was doing wrong. Finally, I hired the consultant back to build a setup. If you try building a MapObjects application of your own, I would recommend building a setup for each component as they are built.

Results and Conclusions

We have created a simple, easy to use program that is inexpensive and can easily be learned and used by our County Foresters. We bought forty copies for the County Foresters. Since then we have bought an additional 50 copies for our fire fighter supervisors. I will probably continue to work on the program for some time as the field asks for additional features. I already have requests to add a measure tool, the ability to create shapefiles from GPS data and larger print sizes. The present version only prints 8.5 by 11.