

3-D Map of Furman's Campus

The plan:

The original goal of the project was to use GIS to create a three-dimensional, spatially accurate map of the Furman University campus. The plan was to obtain CAD information for each of the buildings on campus, create their "footprints" in an accurate manner, and attach elevation (height) information for each. Finally, once this was achieved, orthographic photography would be used to give a more realistic feel to the map.

The action:

After visiting Facilities Services to obtain building information, the amount of CAD data obtained was slightly less than ideal. Not all of the major buildings were drawn in a computer format limiting the amount of initial data. Next, the use of GPS to place the footprints in a spatial projection was quickly ruled out because of its poor accuracy (5-10m with the available system). Instead, the footprints were matched to the aerial photography, which led to its own set of problems. The orthographic-photography was taken in 1999 and several buildings have been constructed since that time. The resulting map with limited building footprints and the limit of the photograph can be seen in Figure 1.

Next, the elevation information for each of the buildings was added to create a three-dimensional view. This allowed the footprints to be "extruded" in ArcScene as shown in Figures 2 and 3.

Finally, a TIN (Triangulated Irregular Network) was created from DEM (Digital Elevation Model) data available to the public. The building extrusions were added to the TIN to create a complete three-dimensional model of the area. Using the features of ArcScene, the ortho-photograph was then draped over the TIN to give it a texture. The result is shown in Figure 4.

The result:

The result is a three-dimensional fly-through of Furman's campus. The general elevation of the area is visible as well as the basic dimensions of the buildings.

Working with Facilities Services, there is a great potential for increasing the breadth of this project as well as its usefulness. Newer software packages from ESRI would also allow a more aesthetic model to be generated, one that might be used on the University website or for other purposes.



Figure 1. The building footprints (in red) are laid out on top of the orthographic photo.

Figure 2. A view of the extruded buildings sitting on top of the orthographic photo.

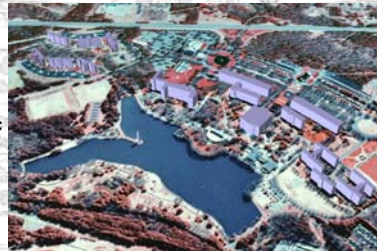


Figure 3. Another view of the extruded buildings sitting on top of the orthographic photo.

Figure 4. A shot from the final "scene" showing the orthographic photo draped over the three-dimensional model.

