Tools, Tips, and Workflows
Adding the 3rd Dimension to Imagery
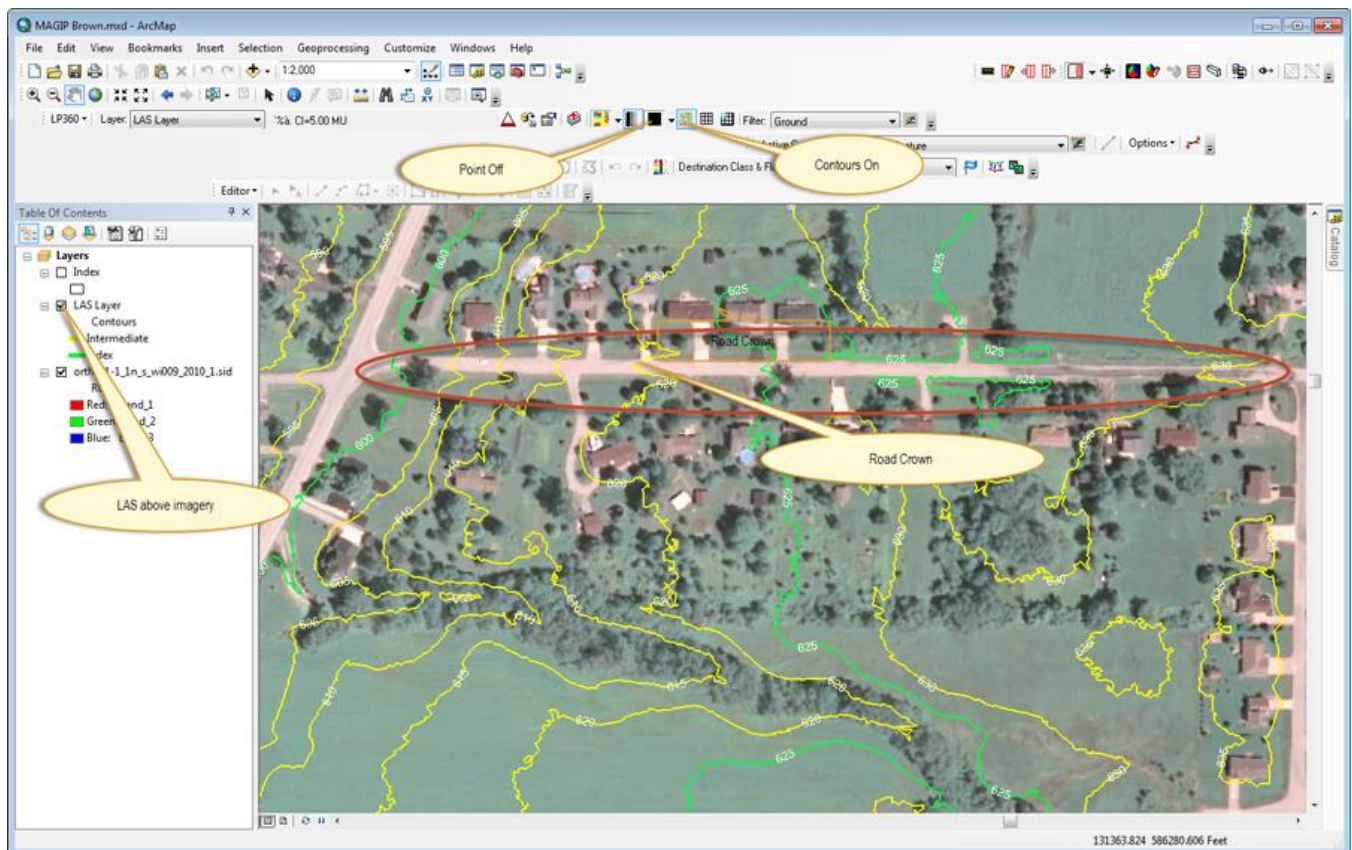LP360

B S A U | A W G

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We often think of using LIDAR data either in simple operations for generating derived products, such as creating gridded elevation files, or for more esoteric operations, such as automatic extraction of building footprints. However, LIDAR data included as a standard layer in your ArcGIS® project (using LP360 for ArcGIS®, of course) can prove very useful, simply for dynamic visualization.

For example, I like to keep a layer of LIDAR data for helping to visualize terrain while looking at more familiar ortho imagery. Figure 1 shows a configuration for displaying dynamic contours over an ortho image base. To achieve this view, make sure the LIDAR data is above the image data in the Table of Contents (TOC). Then, set the LIDAR points display to Off (I bet you wondered why anyone would want points turned off!). This is the control pointed to by the left bubble in Figure 1. Then, turn contours on (right toolbar bubble) and adjust to the intervals and colors that are suitable for your visualization purposes. Note the clarity of the road crown in Figure 1. You can also clearly see the drainage in the field below the road.

B LP360 Basic Edition
S LP360 Standard Edition
U LP360 sUAS Edition
A LP360 Advanced Edition

A ArcGIS
W Windows
G GeoCue

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Figure 1: Visualizing Dynamic Contours

This sort of display is dynamic because the contours are being generated at display time by LP360 software. This is much more flexible than simply loading a pre-generated layer of contour vector data into the TOC. Using pre-generated contours forces you to the compromise of using the same contour interval throughout the working session. Often, however, you will want to vary the interval depending on what you are trying to visualize. For example, if you are examining drainage in a fairly flat area, you will need a very tight interval spacing. On the other hand, if you just need a general idea of slope in a broader area, a larger contour interval will be more appropriate. Thus using LIDAR data to dynamically generate the visualization layers is much more useful.

I find another very useful visualization capability is the LP360 profile tool. Refer to Figure 2 where I have drawn an ad hoc cross-section of the road. The crown of the road, as well as the drainage ditches on both sides, are clearly visible in the Profile Window provided in the ArcGIS® window by LP360. You can dynamically move the cross-section along the road by simply scrolling the mouse wheel. When you are finished with the ad hoc visualization, just close the profile view by clicking the Profile Window tool in the LP360 toolbar. This tool is useful for all sorts of visualizations ranging from simple questions, such as "how does this slope look," to measuring bridge clearances.
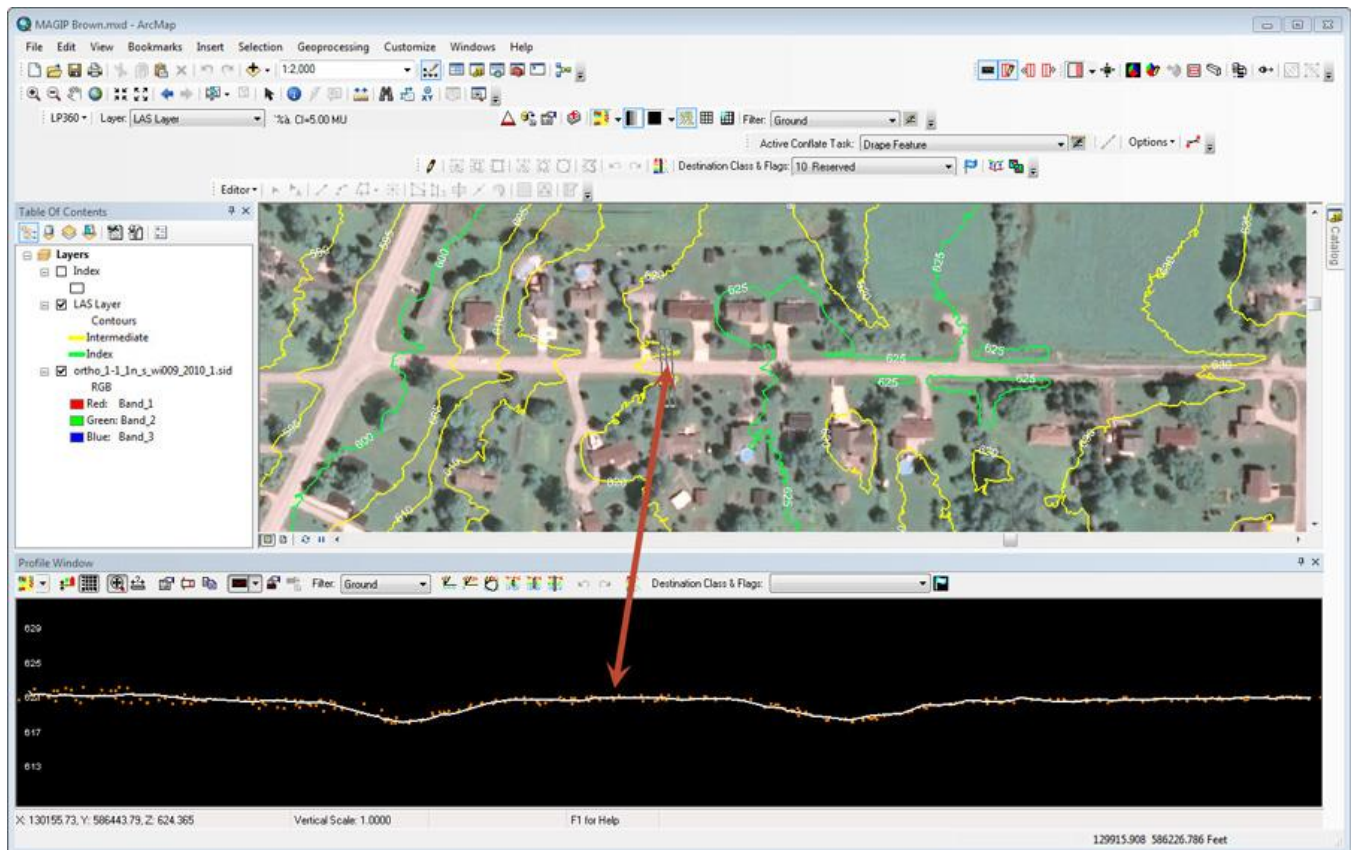

Figure 2: Ad hoc cross-section

Then, of course, there are ad hoc 3-dimensional views. Illustrated in Figure 3 are ortho images draped on the LIDAR data in the 3D view of LP360 (using the "GIS Fusion" tool in LP360). The LIDAR data filter is set to "all points," so we get a surface model rendering. These views are very nice for visualizing an area of an ortho image – effectively putting the third dimension in the ortho.
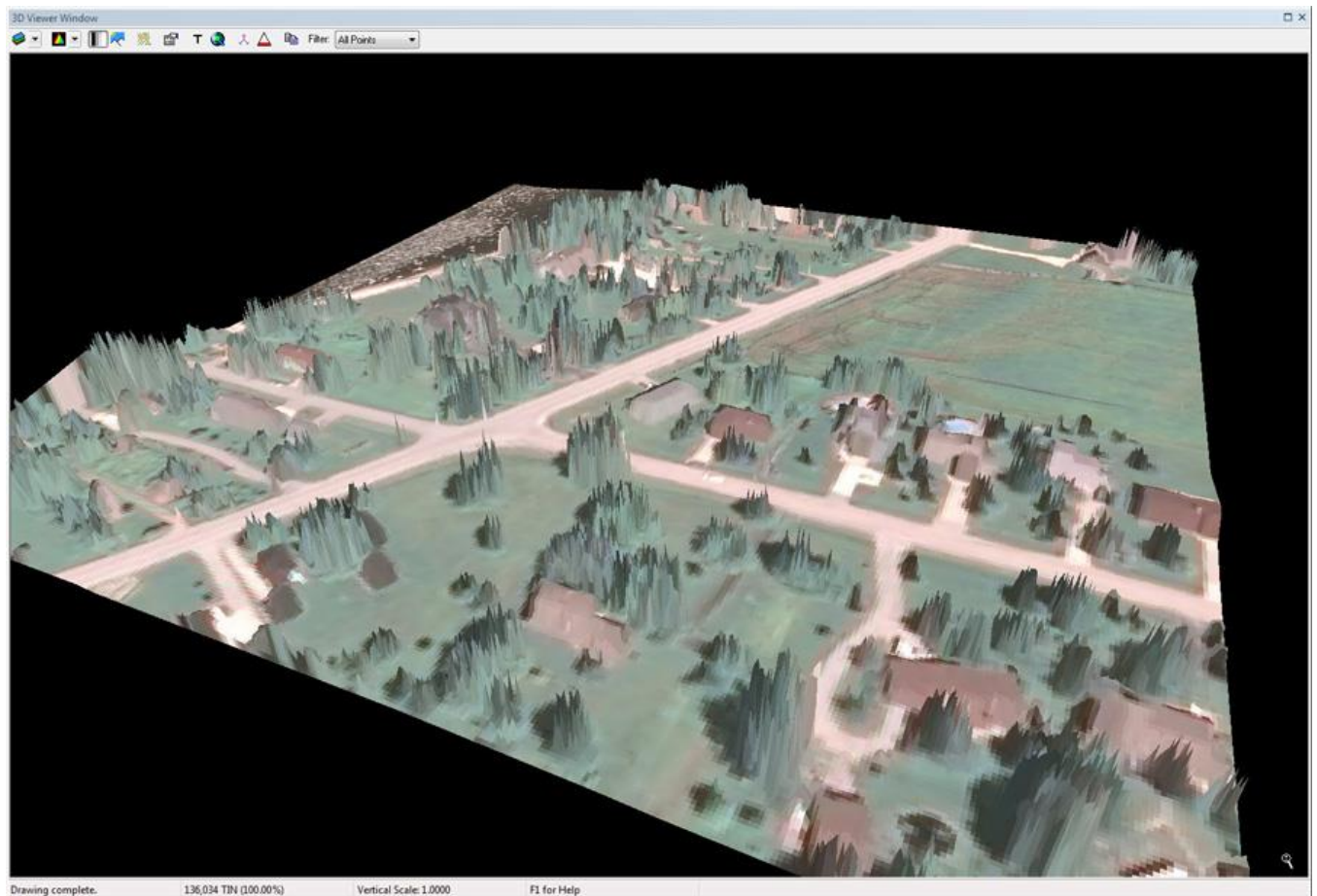
Figure 3: 3D Rendering via GIS Fusion

Now the best part of these examples is that they require no knowledge of LIDAR data whatsoever. You simply load the base layer of LIDAR data (in LAS format or converted to LAS by LP360, if your LIDAR data source is ASCII). With a 15 minute tutorial, you can be adding the third dimension to your local data set. Since LP360 is fully integrated into the ArcGIS® map view, the LIDAR visualization will seamlessly integrate with all of your data layers – vector, imagery, etc.

This "3D enhancement" of base data is the best immediate use for LIDAR data that I can think of. Many state and local agencies have LIDAR data that is sitting on shelves, completely unused. By simply copying these data to an inexpensive USB drive and connecting to your computer, you can have a rich 3D experience