



## Quick Terrain (QT) Modeler

### A Software Review

For the past ten years the major geospatial software packages have offered little to no support for LiDAR data. Visualizing and analyzing LiDAR data often entailed hours, days, or even weeks of processing time, and even then the results were typically less than ideal. This is understandable, many GIS and image processing software packages have to be the jack-of-all-trades and master of none.

Quick Terrain (QT) Modeler, produced by Applied Imagery, is designed for one thing—working with LiDAR data. The software lives up to its name in that it is extraordinarily fast. Within a matter of seconds a user can load, visualize, and analyze massive LiDAR data sets. It is no wonder the software has such a strong following among forward deployed military units who need functional and effective tools for working with LiDAR data.

QT Modeler is not a comprehensive LiDAR production system along the lines of MARS or Terrasolid. Rather, the software is built for end users of LiDAR data, and it excels in this capacity. QT Modeler can read and write LiDAR data in a variety of formats, including the commonly used LAS format. Although it is very effective for working with raster surface models, point clouds are where it shines. LiDAR point clouds can either be loaded into the software as a point cloud or as a

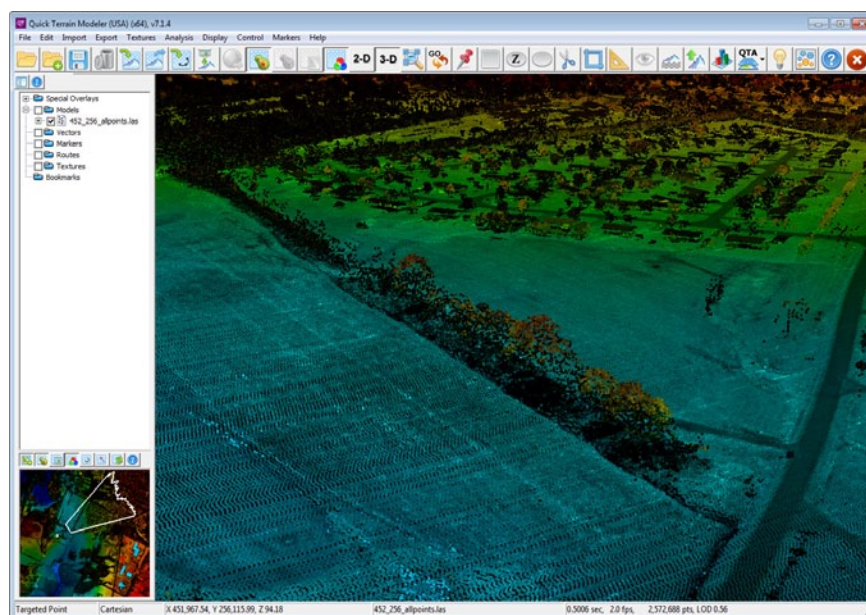


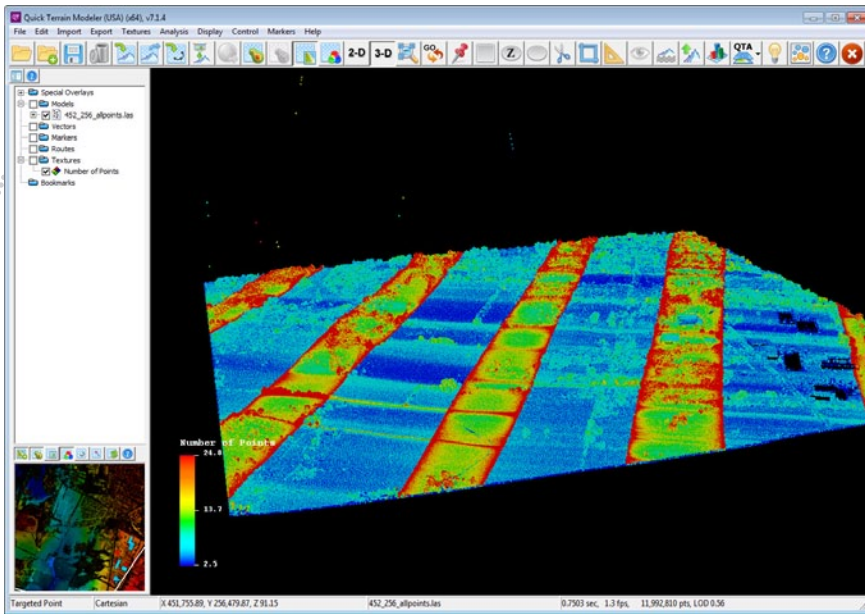
Figure 1. QT Modeler interface.

gridded surface model. Point cloud data sets containing tens of millions of points can be loaded in a matter of seconds. Zooming and panning is smooth and seamless, with the experience being more analogous to Google Earth than what you would find in your standard geospatial software package.

It's able to achieve this stunning performance by loading the data into memory. This can be a drawback if your computer has little RAM, but in today's world where memory is relatively inexpensive and even laptops that cost under \$1000 ship with 64-bit operating systems, it's nice to see a software

package that can leverage modern computing architecture. The maximum number of LiDAR points I loaded into QT Modeler during testing was 1.4 billion. The import operation took a little over 30 minutes, but the performance once the data were loaded was impressive.

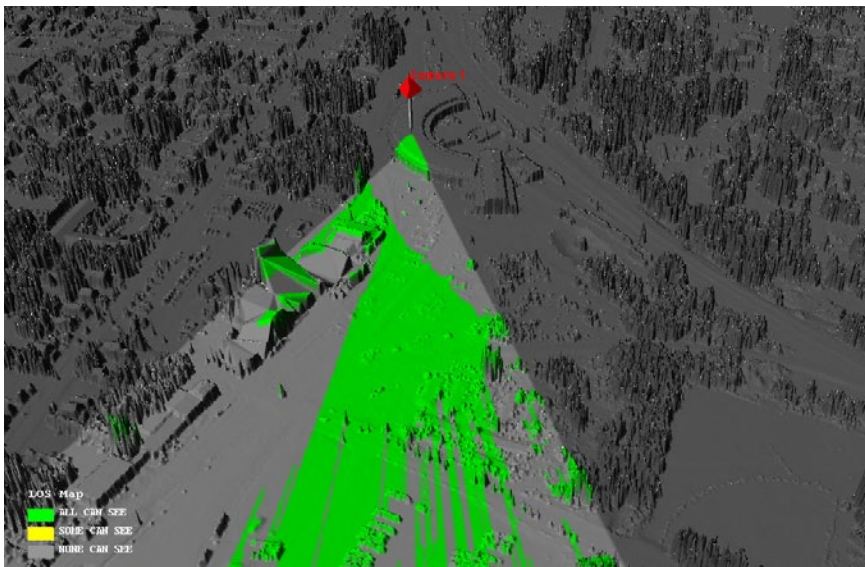
While the scientific community is often dismissive of qualitative analysis, my experience in working with dozens of LiDAR collects over the past few years is that key errors in LiDAR collects are often not recognized because no one bothered to look at the point cloud. With QT Modeler one can



**Figure 2.** Displaying statistical information, such as the number of points per unit area, can assist with quality control and help to better understand the data.



**Figure 3.** Imagery draped on top of a LiDAR point cloud to create a photorealistic effect.



**Figure 4.** Line of sight simulation for a proposed monitoring device.

change the height coloration, display by attributes (intensity, classification, number of returns, etc.) and have the results displayed instantaneously. This takes the frustration out of visualization, allowing one to develop a deeper understanding of the data and spot errors. So much of what I've learned about LiDAR over the years has come through simply playing around with the data in QT Modeler.

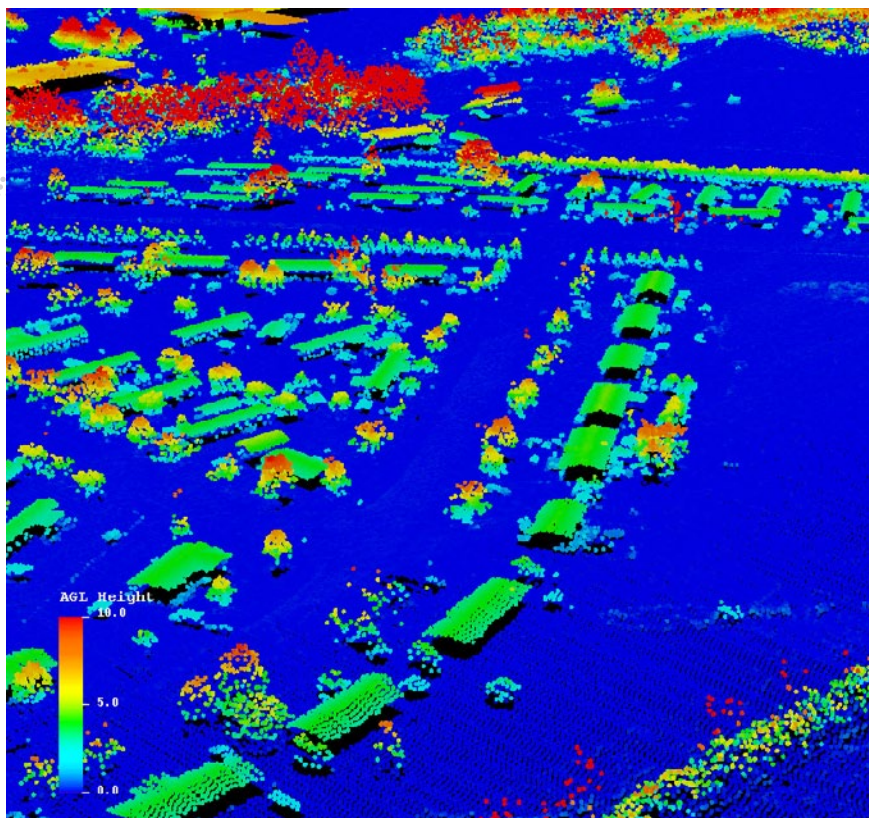
QT Modeler is not a full-fledged GIS package, but it has some key features that make it much more than just a collection of LiDAR tools. It can colorize point cloud and surface models using imagery and it takes the hassle of finding out which image tile(s) intersect the LiDAR data in the viewer through its image search tool. It can import and export shapefiles and is tightly integrated with Google Earth, providing both KML export functionality and linked viewing in which QT Modeler and Google Earth are synchronized during zooming and panning.

Much of the analytical capabilities, such as line of sight and helicopter landing zone analysis, although designed with tactical defense users in mind, have a broad range of other uses. These tools work incredibly quickly, often delivering near instantaneous results. Even though I mentioned that QT Modeler is not a production tool, it does have robust point querying and filtering capabilities, and makes select tools available for batch scripting. Given that the point cloud classification functionality is limited, it's best to work with LAS files that have been processed in another package such as MARS, TIFFS, or Terrasolid.

I started using Quick Terrain Modeler over four years ago when I found that

my existing tools were just not cutting it when it came to working with LiDAR point cloud data. While the core functionality of the software has remained unchanged since that time (a good thing), version 7.1.4 sports a redesigned interface and many new capabilities not typically associated with a “dot-dot” release. This latest release now includes a layer tree, which is immensely helpful in organizing layers. The new “mini Map” displays the location and the view extent from the main window on top of the entire loaded model. One new tool that I find myself turning to time and again, regardless if the project I am working on includes LiDAR, is the indexing tool. Quick Terrain Modeler can scrape directories containing thousands of raster, vector, and point cloud files within a matter of minutes and plot out the extents of the files as either a shapefile or KML file for use within Google Earth.


Although QT Modeler is an excellent stand-alone package we have found it

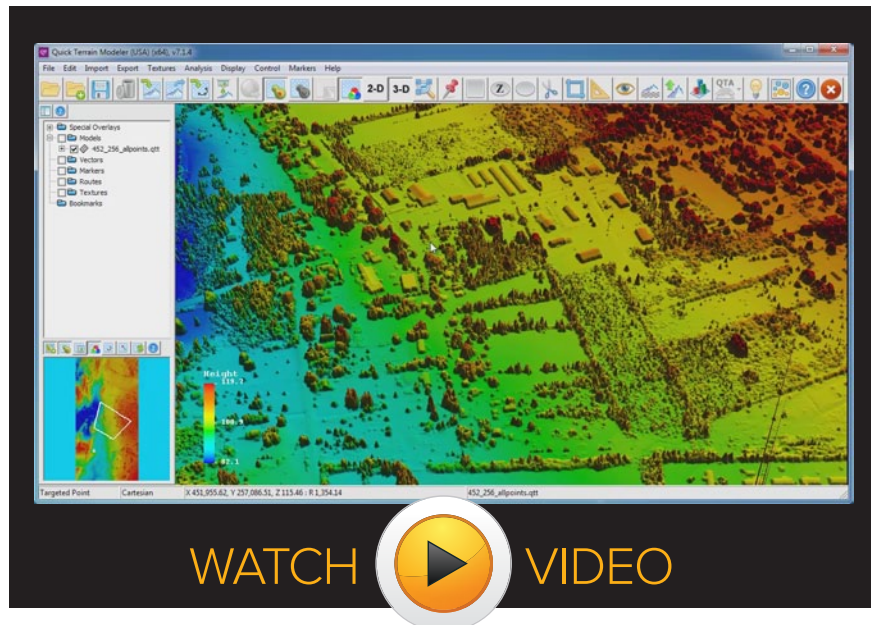


**Figure 5.** Above ground level analysis. The height of the points is computed relative to the ground.

greatly complements more traditional GIS software packages such as ArcGIS due to the speed at which it can create raster surface models from LiDAR point clouds. In our testing we found that QT Modeler was seven times faster

than the closest competitor. If you are in a LiDAR production shop QT Modeler is likely not the only piece of LiDAR software you’ll need, but if you work with LiDAR in any capacity it is a tool you will want to have.

QT Modeler comes in both 32-bit and 64-bit versions (I highly recommend the latter). Licenses can be node locked, tied to a USB key, or delivered via a license server. The software only runs on Windows, but performs equally well on XP, Vista, and 7. We have contacted support numerous times over the past three years and have always received a response within 24 hours. 



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