

# LiDARUSA

Using Global Mapper to analyze stream morphology for erosion control

## Case Study Overview

### INDUSTRY

LiDAR collection and terrain analysis

### CUSTOMER PROFILE

Alabama-based LiDARUSA was founded in 1999 and is a leader in the fields of geomatics and mapping using the latest scanning and imaging technology. The company serves a wide array of markets from civil engineering to agriculture to forensics, with a particular focus on 3D applications including ground-based LiDAR collection and processing.

### PRODUCT

Global Mapper and the Global Mapper LiDAR Module

### CHALLENGES

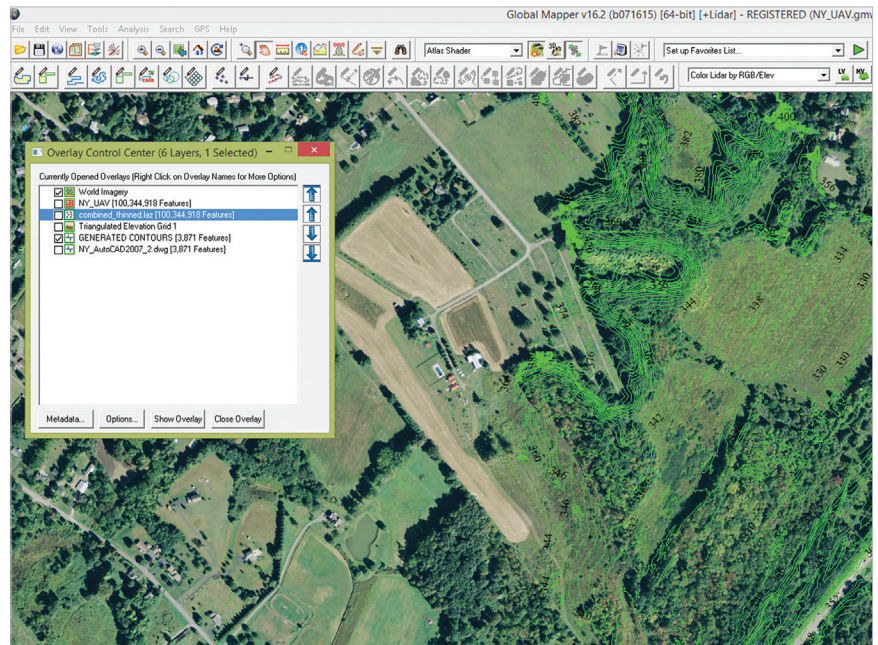
Working with very high density point clouds, often containing several billion individual points, LiDARUSA technicians need a LiDAR processing tool capable of efficiently and effectively converting raw point cloud data into a usable commodity.

### SOLUTION

Global Mapper along with the accompanying LiDAR Module offers an array of LiDAR management tools and has been optimized to work with extremely high volumes of point cloud data.

### BENEFITS

- Support for very large LiDAR files
- Automatic ground classification
- Point cloud cross-sectional visualization
- Accurate volume calculation



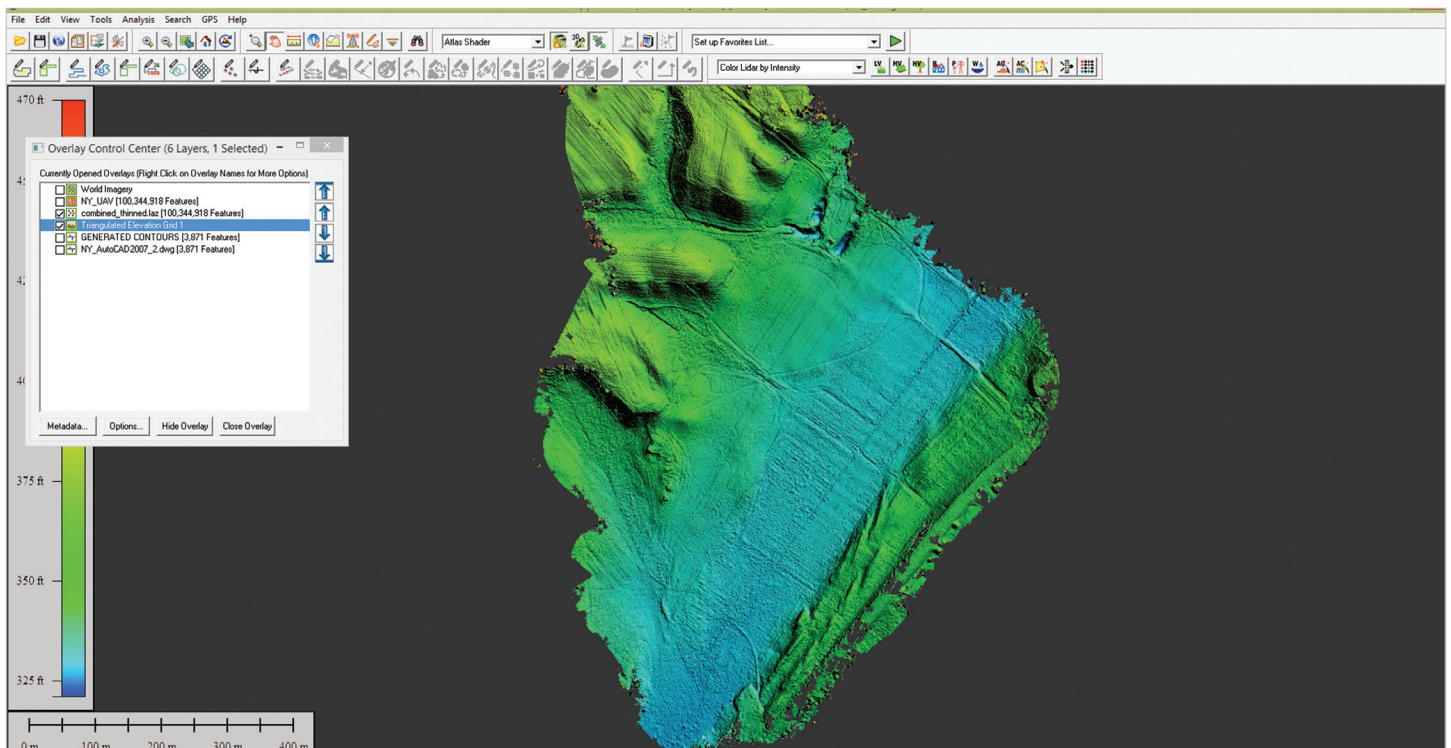
## BACKGROUND

LiDARUSA employs a variety of airborne and terrestrial data collection and processing technologies to provide clients with accurate terrain models and volumetric measurements. The stream study project, which was spread across several non-contiguous areas in Western Tennessee, initially required the acquisition of a series of high-density point cloud datasets, each containing billions of points. This data was then processed to identify and reclassify ground points, which were filtered to create a high-resolution ground model.

As part of an ongoing analysis process, additional data will be captured over a prescribed time series and incremental changes in the stream morphology will be measured and analyzed to instigate erosion control procedures.



**Learn more about LiDARUSA**  
at [www.lidarusa.com](http://www.lidarusa.com)



## CHALLENGES

Because of the nature of the terrain and vegetation cover, neither traditional survey methods nor fixed wing- or helicopter-based data collection were viable options in this project. Instead, LiDARUSA technicians employed a UAV mounted LiDAR collection platform, which is quick and relatively inexpensive to deploy.

While the raw data accurately represented the surfaces that were encountered, there was no distinction made between bare earth and any non-ground features such as tree cover or other obstructions. In order to be of value in the terrain analysis and ultimately in the change detection process, the nature of the surface detected by each point had to be identified and those points representing anything other than ground had to be removed before creating a ground model.

Because a UAV-mounted collection platform was in relatively close proximity to the target surface, the concentration of points and subsequently the volume of data was enormous. Each point cloud contained billions of points with over 1,000 points per square meter so the LiDARUSA team needed to find LiDAR processing software that was able to process extremely high amounts of data in an accurate and efficient manner

## SOLUTIONS

Global Mapper and the accompanying Global Mapper LiDAR Module were chosen by LiDARUSA because they included all of the required point cloud processing capabilities and they



provided the means to maximize the return on investment in LiDAR data.

This versatile, fully functional GIS application has been steadily gaining an eager and dedicated worldwide following among geospatial professionals. Recent development work has focused on the visualization and analysis of 3D data, especially LiDAR and other point cloud formats. Global Mapper has allowed LiDARUSA to meet the challenges of processing large amounts of raw data into a usable commodity for its clients.



## GLOBAL MAPPER AT WORK

Global Mapper played an essential role in the stream morphology project. The automatic ground point detection process provided the necessary data intelligence to allow non-required points to be quickly and easily removed from the point cloud. Using a customizable algorithm applied to the geometric structure and other attributes of the unclassified data, ground points were identified and isolated prior to creating an elevation grid.

An innovative cross-sectional viewing function in Global Mapper was used to display a cutaway view of a swath of points and to allow manual reclassification or removal of erroneous points. The extent of the swath from a defined linear path was adjusted to allow a more focused view of a target area.

Global Mapper's powerful gridding tool was then used to convert the ground points into a terrain model, forming the basis for many of the software's terrain analysis functions. The resolution of this gridded raster layer was optimized from the average point spacing in the original data. Tools in Global Mapper allow the raster layer to be cropped, feathered, tiled, or reprojected before being delivered to the client in any one of dozens of elevation data formats.

To analyze the degree of change between current and future

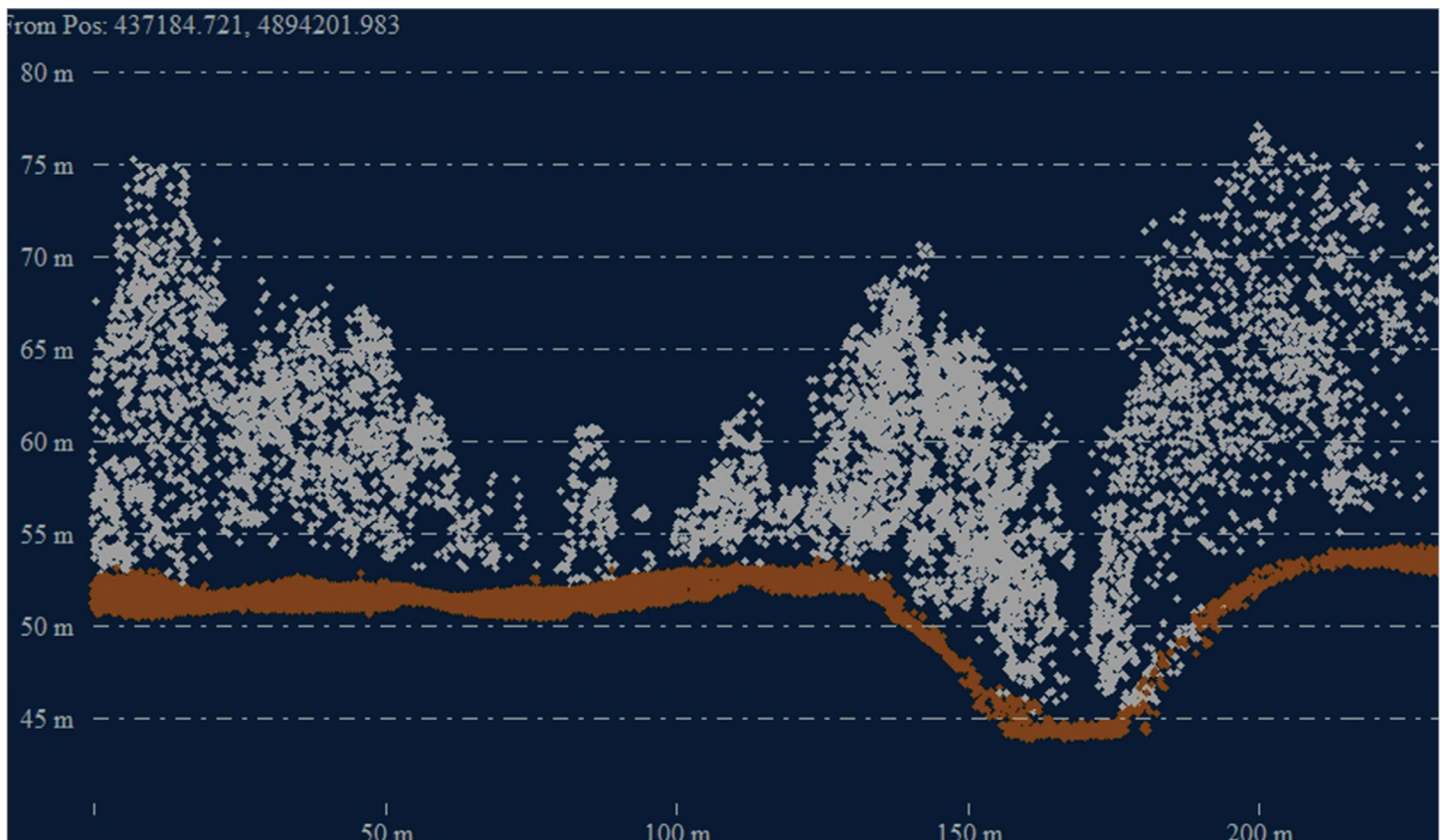
*"The automated ground classification tool is worth its weight in gold for classifying data in a timely and stress free manner."*

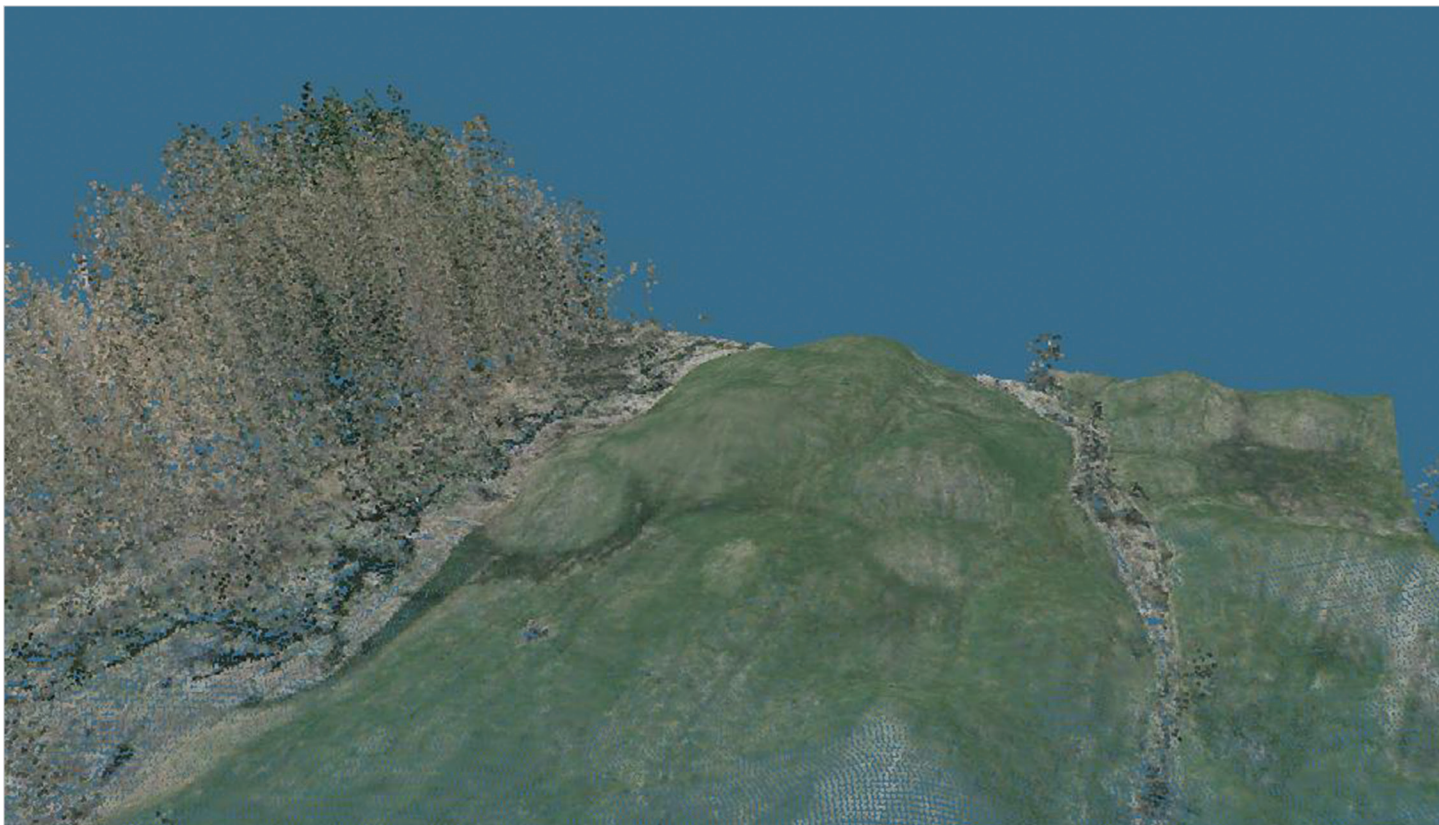
**Daniel A. Fagerman** | Chief Technology Officer

collection periods, LiDARUSA's technicians will be able to create a model of the difference between two gridded layers by subtracting the Z-values embedded in the pixels of each overlapping layer. The result will be a difference model in which areas with the most change are easily distinguished using either a stock or custom elevation shader. Furthermore, Global Mapper's volume calculation capability will be used to provide precise measurements of the degree of erosion over the time period.

## BENEFITS

The choice to use Global Mapper was an easy one for LiDARUSA. According to Daniel A Fagerman, Chief Technology Officer, the most important considerations were the low cost of the software, the availability of the LiDAR Module, and the ease-of-use of the required tools.





## ABOUT GLOBAL MAPPER

Global Mapper is an affordable and easy-to-use GIS application that offers access to an unparalleled variety of spatial datasets and provides just the right level of functionality to satisfy both experienced GIS professionals and beginning users. Equally well suited as a standalone spatial data management tool and as an integral component of an enterprise-wide GIS, Global Mapper is a must-have for anyone who deals with maps or spatial data. The supplementary LiDAR Module provides a powerful set of tools for managing point cloud datasets, including automatic point classification and feature extraction.

## ABOUT BLUE MARBLE GEOGRAPHICS

Trusted by thousands of GIS professionals around the world, Blue Marble Geographics is a leading developer of software products and services for geospatial data conversion and GIS. Pioneering work in geomatics and spatial data conversion quickly established this Maine-based company as a key player in the GIS software field. Today's professionals turn

*"Global Mapper is easy to use and constantly being updated. If there is something we need to do with the LiDAR data we collect, there usually is a tool or feature in the software that will make it easier."*

**Daniel A. Fagerman** | Chief Technology Officer

to Blue Marble for Global Mapper, a low-cost, easy-to-use yet powerful GIS software tool. Blue Marble is known for coordinate conversion and file format expertise and is the developer of The Geographic Calculator, GeoCalc SDK, Global Mapper, LiDAR Module for Global Mapper, and the Global Mapper SDK.



**Blue Marble** GEOGRAPHICS  
*Mind the gap between world and map*

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