

# Quick Terrain Modeler™

## Application Notes: Coastal Management

### Background:

Coastlines change constantly and quickly. LiDAR is an excellent tool to monitor this change. Today's bathymetric and topographic LiDAR systems bring an unprecedented level of speed, accuracy, precision, and economy to the task. The technical cost of this precision is the enormous size of LiDAR data files. Users of LiDAR data need software tools that can embrace the large data sets, fuse multi-sensor data together, and accelerate the analysis process. The Quick Terrain Modeler gives coastal surveyors the ability to work with entire data sets in real time and perform critical analysis in seconds.

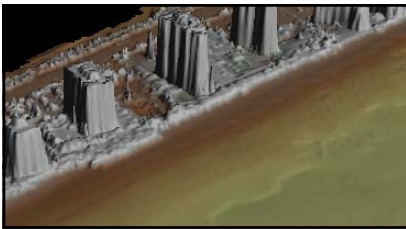


Figure 1: The Quick Terrain Modeler builds large 3-D models from LiDAR bathymetry surveys. These models are of the coast of Palm Beach County, Florida. Data collected by USACE JALBTCX.

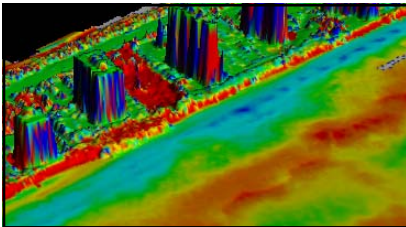


Figure 2: Change detection tools quickly highlight areas of erosion and deposition in the beach and near-beach region.

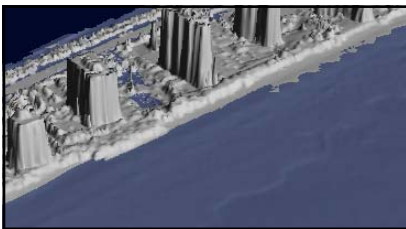


Figure 3: The flood simulation tool provides instantaneous visualization of coastal water levels. The user can set a water level based on known tidal conditions or forecasted tidal surges and immediately see and quantify the impact to the coastline.

Coastal Management Challenge	Quick Terrain Modeler Capability
Coastal LiDAR survey data files are too large to visualize in their entirety.	Quickly builds huge models (up to 77 mi <sup>2</sup> at 1m posting) without decimation or tiling and navigates through models in real time.
Change detection is very time consuming.	Performs change detection in seconds.
Volume calculations over large areas are difficult to perform.	Measures volumes - either absolute volumes or volumes of changes - in seconds.
Engineers need before/after cross sections of coastal areas.	Profiling tools allow rapid measurement and export of coastal transects. Transects can be imported from shape files, applied to all loaded models, and results exported to other applications.
It is difficult to predict the impact of rising water levels.	Flood simulation tool visualizes rising water levels, calculates water volumes and coverage areas, and can export the perimeter of inundated terrain as Shapefile or DXF.
Users need to fuse topographic and bathymetric LiDAR data with data from other sensors.	Quick Terrain Modeler can fuse topographic, bathymetric, multibeam, and other 3-D data into single models.
Users must overlay imagery on top of 3-D DEM's to assist in analysis.	Imagery overlay and editing tools overlay 2-D imagery on DEM's.

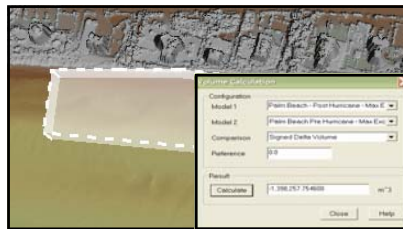


Figure 4: The Quick Terrain Modeler compares enormous DEM's of topographic and/or bathymetric surveys and calculates differences in volume. After a hurricane, the beach above lost 1.4 million cubic feet of sand in the highlighted area.

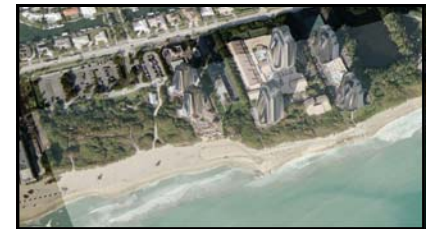


Figure 5: The Quick Terrain Modeler can overlay a variety of 2-D imagery on a 3-D DEM.

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