Current research on airborne lidar bathymetry (ALB) shoreline mapping

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Current methods of deriving tidal datum-based shorelines typically involve manual compilation from stereoscopic, tide-coordinated aerial imagery. While these methods have been well-tested and proven over several decades, there are a few limitations, including the sun angle, tide and weather constraints of this passive remote-sensing technique, as well as subjectivity in the manual compilation process. These factors lead to the investigation of airborne lidar bathymetry. The goal of the investigation is to produce a tidally-referenced shoreline that meets NOAA charting standards. Current research is focused on the SHOALS airborne lidar bathymetry system using lidar waveforms and the derivative digital elevation model (DEM). Study results from investigation of five different land-water algorithms using lidar waveforms as inputs show that all algorithms perform well but the most robust land-water algorithm is the infrared-saturation algorithm. Procedures have been developed to produce a land-water vector from the lidar-point dataset according to NOAA's charting standards. Tidal datum-based shorelines (MHW and MLLW) produced from each of the following are investigated: the land-water interface dataset; a DEM generated from the lidar; and tidal information at the time of the survey. Also, further investigation of smoothing and generalization has been conducted on the land-water shoreline and the tidal-datum shorelines. Results from the study provide a potential alternative solution in areas that are problematic for passive remote-sensing techniques.