Fusing terrestrial and hydrographic LiDAR data to map the coastline in Cape Town.

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SUMMARY

Cape Town has been experiencing the effects of coastal erosion and sea level rise for a number of years. With Seabed 2030, the decade of hydrographic surveying is well underway. Fusing terrestrial and hydrographic datasets would benefit local governments in many areas. This research aimed to test the fusion of terrestrial and hydrographic data in order to gain a better understanding of the coastline in Cape Town. The research questions were concerned with the equipment capabilities and availability, as well as data acquisition methods. The hydrographic data collection involved a tilted multibeam echosounder with a terrestrial laser scanner also present on the hydrographic vessel. Terrestrially, two surveys took place (airborne laser scanning and mobile terrestrial laser scanning) which allowed for various comparisons to be made regarding the fusion possibilities. There was an issue with the ground control points which resulted in the City of Cape Town's LiDAR dataset being used as an independent reference in the accuracy assessment (completed using the M3C2 plugin). Main findings included accounting for tidal variation when executing the surveys to ensure maximum overlap between the various point clouds, tilting the multibeam echosounder was very beneficial for mapping all possible navigational waters, and GPS & IMU integration on the platforms is critical for data fusion along the Cape Town coastline.
