

# **An Automatic Method of Above-water Iceberg 3-D Profiling Based on Autonomous Surface Craft (ASC) Using Surface Images and LIDAR**

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**ABSTRACT:** This thesis reports on an algorithm to build a 3-D model of the above-water portion of icebergs using surface imaging. The goal is to work towards the automation of iceberg surveys, allowing the Autonomous Surface Craft (ASC) to acquire shape and size information to fulfill the iceberg database. The core algorithm is made up with four parts: data collection, occluding contour finding, volume intersection, parameter estimation. With the analysis of the velocity of the drifting iceberg, the algorithm is very useful because of its robustness and adaptability. A compatible software is designed which could be used on ASC to perform automatic and fast processing of above-water iceberg shape and size measurement and determination. The resolution of the algorithm is calculated using the iceberg database from Program of Energy Research and Development (PERD). This method was investigated in field trials conducted through the summer of 2014 by surveying 8 icebergs during 3 expeditions. In order to improve the efficiency and accuracy, the author developed a compatible sensor system as well as a LIDAR system to profile the above-water iceberg in 2015.

**ALL ARE WELCOME!!!**