NOTICE OF UNIVERSITY ORAL

GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

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Thursday, November 21 @ 1pm

Head Hall – Room E-4

Board of Examiners:

Supervisor(s):	**Ian Church, Geodesy & Geomatics Eng.**
Examining Board:	**Marcelo Santos, Geodesy & Geomatics Eng.**
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Automated Processing of Arctic Crowd-Sourced Hydrographic Data While Improving Bathymetric Accuracy and Uncertainty Assessment

ABSTRACT

Melting sea ice has led to an increase in navigation in Canadian Arctic waters. However, these waters are sparsely surveyed and pose a risk to mariners. Recognizing this issue, the government of Canada has granted funds to develop a pilot program to begin collecting bathymetric data through a trusted crowd-sourced approach. As part of this project, the University of New Brunswick's Ocean Mapping Group is tasked with the processing of the collected data. Through an automated approach the software will process the data with the end product being a final depth measurement. The software has been broken down into several modules to complete the task at hand.

This Crowd-Sourced Bathymetry (CSB) program will utilize proprietary hydrographic equipment that has been designed to be simple to operate yet providing valuable data. With the help of local communities in the North, surveying of bays and coastlines will begin. Once the data is collected it will be sent to a server for data processing through automation and then finally visualized on a web platform. The primary concerns of this paper are with the automation of the processing workflow with interests in mitigating errors and achieving transparency in the uncertainty assessment. The primary motivation surrounds how to efficiently process crowd-sourced bathymetric data (CSB) through automation while improving final depth accuracy and assessment of uncertainty.

Throughout this paper we touch upon the issues with gathering accurate hydrographic data from the Arctic and analyze different methods to process the data efficiently. These challenges include obtaining a reliable GNSS signal through post-processing, qualification of the GNSS data for vertical reference, methods of reduction from ellipsoid to mean-sea level, obtaining accurate tidal heights, utilizing the HYCOM hydrographic model to collect sound velocity profiles and the identification and quantification of uncertainty as part of the Total Propagated Uncertainty (TPU) model.

All Faculty Members and Graduate Students are invited to attend this presentation.