NOTICE OF
UNIVERSITY ORAL

GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Douglas Luiz Pereira

Tuesday, May 26, 2015 @ 9:00 am

Head Hall, Room E-11

Board of Examiners: **Supervisor:**   **Dr. John Hughes Clarke, Geodesy & Geomatics Eng.**

Examining Board: **Dr. Marcelo Santos, Geodesy and Geomatics Eng.**
Dr. Jonathan Beaudoin, QPS Canada Ltd.

Chair: **Dr. Emmanuel Stefanakis, Geodesy & Geomatics Eng.**

IMPROVING SHALLOW WATER MULTIBEAM TARGET DETECTION AT LOW GRAZING ANGLES

ABSTRACT

Beyond ~ 60º incidence angle, many modern multibeam echo sounders have difficulty maintaining sufficient depth accuracy and seabed target detection to comply with International Hydrographic Organization (IHO) standards. In some cases, a target at such a low grazing angle is not detected due to limitations of the existing bottom detection method and filters applied by the manufacturer. In lieu of clear positive bathymetric indicators, a data gap within the bathymetric surface or a shadow in the backscatter image may be the only indication of the presence of that target.

This research presents a refined bottom detection algorithm based on the Bearing Direction Indicator (BDI) method. The algorithm can be applied in post processing as long as the water column data is retained. This approach can markedly improve target detection capability at low grazing angles in shallow waters by independently discriminating each echo's direction of arrival irrespective of the beam spacing. Two test datasets were collected using an EM 2040D employing angular sectors as wide as +/-82°. Data were acquired over a site with multiple IHO compliant anthropogenic objects to assess the ability to detect low grazing angle targets prior to, and after, application of the newly-developed algorithm. Results obtained clearly illustrate that the BDI algorithm can enhance low grazing angle target detection capability.

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