



**NOTICE OF
UNIVERSITY ORAL**
GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Krista Amolins

**Wednesday, May 21, 2008
@ 10:30 am**

Head Hall – E-11

Board of Examiners: Co-Supervisors: **Dr. Yun Zhang, Geodesy & Geomatics Eng**
Dr. Peter Dare, Geodesy & Geomatics Eng
Examining Board: **Dr. David Coleman, Geodesy & Geomatics Eng**
Dr. Ming Zhong, Civil Engineering
Dr. Don Kim, Geodesy and Geomatics Eng
Chair: **Dr. Sue Nichols, Geodesy & Geomatics Eng**

MAPPING OF GDOP ESTIMATES THROUGH THE USE OF LIDAR DATA

ABSTRACT

The positioning accuracy of the Global Positioning System (GPS) and other Global Navigation Satellite Systems is affected by the configuration of visible satellites. Dilution of Precision (DOP) values are a measure of the strength of the satellite configuration but the software tools currently available for calculating DOP values have a limited ability to take into account obstructions. Determining when the best satellite configuration will be observable at a particular location requires identifying obstructions in the area and ascertaining whether they are blocking satellite signals.

In this research, Light Detection and Ranging (LiDAR) data were used to locate all the obstructions around each terrain point by extracting and comparing two surfaces, one that represented obstructions and one that represented the terrain. Once all the obstructions in a selected area had been identified, GPS satellite location data were used to determine satellite visibility at different epochs and to calculate GDOP (Geometrical DOP) at locations where at least four satellites were visible. Maps were then generated for each epoch showing the GDOP values over the selected area. Some small differences were noted between the clear sky GDOP values calculated by the proposed method and those output by an available software planning tool and in a few cases there was a discrepancy in the number of visible satellites identified due to slight differences in the calculated satellite elevations. Nevertheless, the maps produced by the proposed method give a much more accurate representation of the GDOP values in the field than do traditional methods or other software tools.

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