



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

**Master of Science in Engineering**

**Pim Kuus**

**Monday, April 28, 2008  
@ 10:00 am**

**Head Hall – Room E-11**

**Board of Examiners:            Supervisor:    Dr. John Hughes Clarke, GGE**

**Examining Board:    Dr. David Wells, GGE  
                                  Dr. Shachak Pe'eri, Ctr for Coastal & Ocean  
                                  Mapping, University of New Hampshire**

**Chair:    Dr. Richard Langley, GGE**

**Bottom Tracking Issues and Recognition Thereof using SHOALS3000  
Green Laser Beam in Dense Fields of Zostera Marina and Laminaria sp**

**ABSTRACT**

When a survey area is populated with biological growth such as kelp and seagrass, the range performance of lidar is challenged. Aquatic vegetation can lead to bottom miss-tracking or even absence of the optical signal return. The former results in shoal biased soundings; the latter results in datagaps. This last result is especially concerning, implying that marine life covered navigational hazards might appear as datagaps, while these are commonly assumed to be caused by lidar extinction depths. With ground truthing data (e.g. underwater photography, acoustics) vegetation presence or tracking of mid-water vegetation can be identified, although these datasets are commonly not available during a lidar survey. Incorporating characterized SHOALS3000 green laser waveform data yields a method to validate lidar soundings. This thesis presents an assessment of the SHOALS3000 lidar bottom tracking performance in submerged vegetated areas, and a method to identify improper bottom tracking.

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