



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

**Master of Science in Engineering**

**Menelaos Kotsollaris**

**Wednesday, May 24, 2017 @ 9:30 am**

**Head Hall – Room E-11**

**Board of Examiners: Co-Supervisor: Dr. Emmanuel Stefanakis, Geodesy & Geomatics Eng.  
Co-Supervisor: Dr. Yun Zhang, Geodesy & Geomatics Eng.  
Examining Board: Dr. Weichang Du, Faculty of Computer Science  
Chair: Dr. Monica Wachowicz, Geodesy & Geomatics Eng.**

**A SCALABLE WEB TILE MANAGEMENT SYSTEM**

**ABSTRACT**

The core functionality of a tile management system is to provide tile images to the end user; several images combined visualize the web map. This thesis presents an end-to-end analysis for developing scalable web tile management systems. Three data structures are analyzed: The SimpleFormat, which stores the tiles directly on the file system; the ImageBlock, which divides each tile folder (a folder where the tile images are stored) into subfolders that contain multiple tiles prior to storing the tiles on the file system; and the LevelFilesSet, a data structure that creates dedicated Random-Access files, wherein the tile dataset is first stored and then parsed in files to retrieve the tile images. Several benchmark tests on local and cloud environments are developed and assessed under different system configurations to compare the data structures and provide a thorough analysis of their efficiency. These benchmarks showcased the efficiency of LevelFilesSet, which retrieved tiles up to 3.3 times faster than the other data structures. Peripheral features and principles of implementing scalable web tile management systems among different software architectures and system configurations were analyzed.

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