UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

Visitor Seminars - Research

Location: Room 113 (also known as L1), 1st Floor
310 Castle Street
Date: Tuesday, 23rd September 2014

School of
Surveying
Te Kura Kairūri

Cindy Wang

9:00 am – 10:00 pm

The Feasibility of Using Satellite SAR Images to Monitor Pasture in Australia

Abstract:

Because of all-weather working ability and sensitivity to biomass and moisture, synthetic aperture radar (SAR) satellite images can perfectly complement optical images for pasture monitoring. This research aims to evaluate the feasibility of using multiple satellite SAR data to estimate temporal and spatial variation of pasture properties at paddock scale in four different sites (Muradup, Gippsland, Ipswich and Otway) in Australia. A large number of ALOS PALSAR (L-band), ENVISAT ASAR (C-band), TerraSAR-X (X-band) and COSMO-SkyMed (X-band) images were used. SAR backscatter was correlated with NDVI, NDWI and soil moisture index (M.I), to evaluate the capability of SAR for estimating pasture biomass, plant water content and soil moisture. The results demonstrated that SAR overcomes saturation problem of optical and delivers more accurate measurements than optical. This study was the first attempt to analyse, at both the temporal and spatial domains, multiple pasture properties in Australia, by integrating SAR images at X-, C- and L-band with optical images.

Yushin Ahn

12:00 pm – 13:00pm

Photogrammetric mapping - Introduction to application

Abstract:

Photogrammetry is the science of obtaining reliable information about the properties of surface and objects without physical contact. Dr. Ahn, a certified photogrammetriest has been applying photogrammetric techniques to solve engineering/scientific problems and will introduce brief principles of photogrammetry and current trends. That includes feature tracking for glacier surface velocity from satellite images, time-lapse camera monitoring for glacier terminus, terrestrial laser scanning for campus/machine shop/mining site mapping and UAV LiDAR.

Robert Odolinski

13:00 pm – 14:00 pm

Multi-GNSS for short and long single-baseline RTK positioning

Abstract:

In this presentation we will focus on short and long single-baseline real-time kinematic (RTK) positioning combining four Global Navigation Satellite Systems (GNSSs). The GNSS receivers collect multi-GNSS code and carrier-phase observations with decimetre-level and millimetre-level precision respectively. However, only when the phase ambiguities can be solved to their true integer values is it possible to take full advantage of the precise phase measurements and solve very precise receiver positions. This technique is referred to as RTK. We will combine observations from the Chinese BeiDou Navigation Satellite System (BDS), European Galileo, American Global Positioning System (GPS) and the Japanese Quasi-Zenith Satellite System (QZSS). The short baseline refers to the case when the distance between the two GNSS receivers is so short that the relative atmospheric delays can be assumed negligible, whereas long baseline refers to when the ionospheric and relative zenith tropospheric delays need to be parameterized as unknowns. The RTK performance is evaluated by a formal as well as an empirical analysis, consisting of ambiguity dilution of precision (ADOP), bootstrapped and integer least-squares success rates, and positioning precisions. The ambiguity and positioning convergence times for the long baseline, when instantaneous RTK is not possible, will also be analysed. The real GNSS data are collected in Perth, Western Australia. It will be shown that the four-system RTK