School of Surveying Summer Bursary Project Presentations

Engaging in Remotely Piloted Aircraft Operations at the School of Surveying

Dr. Pascal Sirguey & Ryan Cambridge

Remotely Piloted Aircraft Systems (RPAS) offer new opportunities for surveyors as many can now engage in aerial mapping without the logistical burden and cost associated with airplane operations. In this context, the School of Surveying has started operating a fixed wing RPAS, namely the Trimble UX5 imaging rover. In order to conduct consistent, safe and reliable operations, a specific operational structure was designed that complies with the regulatory framework of the Civil Aviation Authority (CAA) current controlling RPAS operations in New Zealand. This presentation will review RPAS regulations, introduce the Trimble UX5 imaging rover and describe the operational structure established for its safe operation.

Assessment and Analysis of Trimble UX5 Imagery

Ryan Cambridge & Dr. Pascal Sirguey

The focus of this Bursary project was to assess the quality and accuracy of photogrammetric products that derive from the Trimble UX5 and are processed with the Trimble Business Centre (TBC) photogrammetry module. The project was based on the Otago Peninsula at Okia Flat, whereby 44 signaled Ground Control Points (GCPs) and 20 natural features were surveyed with centimetre accuracy to support control and check of the photogrammetric processing. The area was imaged with 3 flights of the UX5. Several adjustment scenarios were tested in terms of the number and distribution of GCPs to assess the accuracy of the derived surface under different conditions. Results show that centimetric accuracy can be achieved within several hundred metres from a ground control. However, accuracy quickly deteriorates when the distance from control increases. Our experiments also show that the survey of natural features subsequent to the flight can be sufficient to adjust the model and derive products with a competitive although degraded accuracy but allowing fieldwork cost to be reduced.

Navigating Continents

Chris Page

Historically, the measurement of crustal deformation was carried out using terrestrial techniques such as the theodolite and level. Such methods required line of sight, large field parties, skilled instrument person(s) and, due to the inherent precision of the equipment, long periods of time between sets of measurements. The Global Positioning System (GPS) has allowed for datasets to be recorded with a smaller work force and at a high precision over significantly shorter periods of time. As New Zealand is located on the boundary of two plate tectonics, there are several plate boundary geophysical processes occurring throughout the South Island. The summer vacation field work involved collecting GNSS/GPS data for post-seismic studies of the 2010-11 Christchurch earthquake events, the measurement of active deformation along a profile across the Haast Pass and the measurement of active slipping in the Cascade (South Westland).

As surveyors it is important to understand these processes and the implications they will have on day to day survey practices. Locally these processes may be negligible due to relativity, however with the introduction of GPS, observations can be made at regional scales, and therefore these need to be accounted for. Data has been collected at various epochs dating back to 1995, and I will analyse the data as part of a dissertation.

12:00 noon, Thursday, 5 March 2015

L1 Lecture Theatre

School of Surveying

310 Castle Street

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