

2015-3

## Lightening Strikes Twice for DIT Geomatics

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### Recommended Citation

Martin, A. (2015). Lightening Strikes Twice for DIT Geomatics. SURVEYORS JOURNAL. Vol.5.No. 1 Spring 2015. doi:10.21427/egf6-jf93

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## **Lightening Strikes Twice for DIT Geomatics**

**Dr. Audrey Martin FSCSI FRICS**

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The Dublin Institute of Technology (DIT) is rapidly becoming known as an international centre for excellence for all things geospatial. In September 2014, Kevin O'Mahony, a final year BSc Geomatics student at DIT (<http://www.dit.ie/geomatics/>) won the international Trimble Geospatial Student competition. Kevin, who recently graduated, is the second consecutive DIT student to win this prestigious award following on from the success of David Hyland (BSc Geomatics) in 2012. Both students submitted their papers under the supervision of Dr. Audrey Martin FSCSI FRICS, Chair of the recently accredited by SCSi DIT MSc in Geospatial Engineering.

### **Student Competition**

The world-wide student competition is held every two years to coincide with the Trimble Dimensions Expo event in Las Vegas. It is open to all undergraduate and postgraduate students at Masters and Bachelors level, studying Geomatics and related disciplines. To enter students must submit a written paper of 1500 words or more which describes an application and use of Trimble Geospatial Solutions during the course of their studies. Trimble (<http://www.trimble.com/>) is probably best known for Global Positioning Systems (GPS/GNSS) technology, but it is at the forefront of geospatial technology and integrates a wide range of positioning technologies including GPS, laser, unmanned aerial imaging, optical and inertial technologies. Trimble products and services, provided by Korec in Ireland (<http://www.korecgroup.com/>), are used in construction and engineering projects, surveying, mapping and GIS, mobile and aerial 3D mapping. They have formed an integral part of the surveying syllabus in undergraduate and postgraduate programmes in DIT over the past 15 years.

### **Student and Institute Prize**

The student prize includes full registration to attend the 4-day Trimble Dimensions user conference in Las Vegas, Nevada, 4 nights' accommodation at the Mirage Hotel and round trip airfare to the event. It is valued at approximately \$5,000. The advanced positioning technology conference attracts more than 5000 participants and includes presentations from professionals and academics on how new technology can transform architecture and design, construction and infrastructure, mapping and GIS, mining, positioning, surveying, utilities and energy. Student winners must present their paper to conference attendees.

In addition to the student prize, Trimble also donate significant piece of cutting edge equipment to the students' Alma Mater. In 2012, DIT received an R10 GNSS Rover valued at approximately €25,000. Whereas in 2014, the prize consisted of a V10 Imaging Rover complete with an R10 GNSS receiver valued at \$50,000. In both cases the survey equipment were launched at the conference.

### **Trimble DIT Connections**

2012 was the first time a DIT student entered the competition and David Hyland was the first Irish person to win. David's winning paper, entitled '*An Assessment of Ocean Tide Loading on Network RTK and Mitigation Methods in Ireland*', examined the effects of the tidal weight on heighting accuracy measured using GPS. David subsequently applied for and was accepted onto Trimble's graduate training programme. This two-year programme based in Trimble's head office in Denver, Colorado provides graduates the opportunity to apply their recently gained knowledge in a variety of settings. Graduates complete rotational programs in various positions throughout Trimble before being placed into a long-term role. Trimble has subsequently hired two further DIT BSc Geomatics graduates who have joined David on this highly sought after programme.

In 2014, the second DIT entry to the Trimble student competition was also successful. Kevin O'Mahony's paper entitled '*An analysis of the achievable accuracies from online Precise Point Positioning (PPP) Post-Processing Services in Ireland*' analysed the achievable accuracies in Ireland from the newest satellite positioning technique – Precise Point Positioning (PPP). As PPP is a new positioning technique with little research undertaken to-date in Ireland a synopsis of Kevin's work is given below. Both papers were based on the students' final dissertations which were supervised by Dr. Martin from the Spatial Information Sciences Group in the School of Surveying and Construction Management, DIT. Following from the success of the two DIT students, Trimble are now in consultation with DIT exploring the possibility of an internship programme for Geomatics students. In addition, Trimble intend on visiting DIT Bolton Street in late 2015 to search for the best and brightest Geomatics students to join them on their graduate programme.

### **2014 Trimble Winning Paper Synopsis**

*'An analysis of the achievable accuracies from online Precise Point Positioning (PPP) Post-Processing Services in Ireland'*

Global Navigation Satellite Systems (GPS/GNSS) are a powerful tool for modern survey techniques, capable of computing highly accurate coordinates. Survey techniques such as DGNS, RTK and Static are frequently used by Irish surveyors however, these methods rely on an expensive national infrastructure usually operated by the National Mapping Agency – Ordnance Survey Ireland (OSi) and/or private third party service providers. An emerging alternative to these differential techniques is Precise Point Positioning (PPP). PPP is not reliant on national infrastructure as it operates in stand-alone mode however, there is currently a lack of information available concerning the performance of PPP within Ireland.

In recent years, several free post processing services have been developed to process PPP solutions. Kevin's research outlined an effective methodology for using online services and transforming the resulting computed positional information from International coordinate systems to the Irish national system – Irish Transverse Mercator (ITM). Furthermore, his research analysed the accuracies achieved from a number of static surveys using online international PPP post-processing services on an existing OSi control point on the roof of DIT Bolton Street. The raw data was processed using Trimble Business Center (TBC) and the fieldwork was completed using Trimble's R10 GNSS receiver DIT received as part of the 2012 student prize.

The results of the PPP positional data were remarkably accurate when compared to the true value of the control point and surpassed many international tests using PPP. This research was a seminal study evaluating PPP for the Irish context and proved it to be a suitable alternative technique for establishing control in Ireland at the centimetre level.