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GEOMATICS ENGINEERING

UNIVERSITY OF CALGARY

DEPARTMENT OF GEOMATICS ENGINEERING

Geomatics News

Message from the Head

Dear Readers,

This Newsletter is the last issue for the academic year of 2004. It has been a very prosperous year. It also marks a lot of new *beginnings* for our faculty, students and department. This deserves special congratulations to a job well done and well wishes for the journey they have ahead:

Our Fourth year students who are graduating this year; well done on finishing your studies. As you begin your careers as Geomatics Engineers, we will work with you to ensure that your investment in your skill set is maintained and that when possible, to further such investment. Our commitment to you is to work hard to ensure that the reputation of this institution is maintained, and hence the value is as good as the day you left; however we cannot do it all alone. We need your help – please continue to maintain your work relationship with the Department. Let us know the industrial challenges you face; we might have a solution, or we could work with you in finding a solution giving both of us a much needed competitive edge.

Our graduate students who have won internationally acclaimed awards. Well done. You have achieved the status of recognition that is proof of your good work and dedication.

Our world-class faculty. Dr. Elizabeth Cannon for winning the very prestigious APEGGA Frank Spragins Technical Award and Dr. Susan Skone for winning the best paper presentation award at the European Navigation Conference GNSS 2004.

This year was also the beginning of a new awareness campaign in which our Institution together with Calgary Geomatics Cluster, the National Research Council's GeoConnection program and our industrial sponsors play a leading role towards better recognition of the science and practice of Geomatics. Together with our sponsors, we have launched the Geomatics posters depicting the role of geomatics in other practices. The posters are targeted at high school and university students to encourage them to consider geomatics as a possible career.

A CCLS accreditation team made a site visit in April. Our faculty and technical and administrative staff went beyond their call of duty to present a tour de force – a wonderful and very thorough presentation – as to the uniqueness of this institution and its continued commitment towards the practice and teaching of Engineering.

Finally, the next newsletter will witness the beginning of Dr. Elizabeth Cannon's tenure-ship as the head of department. This will also mark another new beginning – the first female to head a Geomatics Engineering Department in Canada and all over the world! I would like to take this opportunity to wish Elizabeth all the best with this new role.

Naser El-Sheimy,

CRC

Interim Head

Inside this issue:

Faculty members at the Annual Strategy Meeting, May 6, 2004

Congratulations

- Professor Ayman Habib, Dr. Young-ran Lee, and Michel Morgan (current Ph.D. candidate) are the recipients of the Second Honourable Mention for the Talbert Abrams Award for the year 2004 for their paper entitled, *Automatic Matching and Three-dimensional Reconstruction of Free-Form Linear Features from Stereo Images.*

- Michel Morgan has been awarded the 2004 ASPRS Robert E. Altenhofen Memorial Scholarship. The Scholarship is intended to encourage and commend college students who display exceptional interest and ability in the theoretical aspects of Photogrammetry.

- Cameron Ellum, current Ph.D. candidate supervised by N. El-Sheimy, has been awarded the ASPRS 2004 Leica Geosystems internship.

- Dr. Elizabeth Cannon was awarded the Frank Spragins Technical Award at the APEGGA Summit Awards held in Edmonton on April 23.

- Dr. Susan Skone won the best paper presentation award at the European Navigation Conference GNSS 2004.

- Congratulations to Rita Cheng, supervised by Dr. Ayman Habib and Lance de Groot, supervised by Dr. Susan Skone, who won the Ingenuity MSc Studentship Awards

- Eun Shin and Dr. Naser El-Sheimy won a best paper award at the IEEE PLANS (Position Locations and Navigation Symposium) 2004 conference for their paper *An Unscented Kalman Filter for In-Motion Alignment of Low Cost IMUs.*

- Dr. Matthew Tait received an Imperial Oil Research grant for his project entitled *Monitoring Permafrost Deformation in the Mackenzie Delta*. This project will follow up on Dr Tait's previous metrology work in the NWT.

- Congratulations to students who defended their theses: Rami Al -Ruzouq, PhD, Rossen Grebenitcharsky, PhD, Zhizhao Liu, PhD, Yong Jin Moon, MSc, Michel Morgan, PhD, Kyle O'Keefe, PhD, and Minha Park, MSc.

Rami Al-Ruzouq successfully defended his PhD thesis

Student News

- The Geomatics Engineering students organized a very successful Career Day which was held February 5. There were 34 companies in attendance.

- Caltech Surveys Ltd. Hosted a student Meet and Greet on February 12.

- The following graduate scholarships will be available in 2004. Eratosthenes $1,000; Innovation in Mobile Mapping Award $3500; The C.F. Gauss Award $3000, The J. Cartier Award $3,000; and The F.R. Helmert Award $3,000.

- New undergraduate scholarships include a Future Leadership Award of $1500 and GESS is supporting two new scholarships of $500 each.

Message from Aaron Ho, GESS president: As the academic year comes to a close, I hope that everybody had as much fun as I did being a student in the Department of Geomatics Engineering. Taking a step back and looking at all the things that we've done together as a class has brought a warm sense of friendship and unity between all my classmates and I wish all of them the best of luck in their future endeavors. For the second, third and internship students, I wish the best for the remainder of your academic year. Don't forget to study hard and to play hard as well, to make the most of time spent at the University.

Fugro SESL display at Career Day

Visitors

- A CCLS Accreditation evaluation team was here for a site visit April 5 and 6. Members of the team were:
  - Graham Bowden, Marshall Macklin Monaghan
  - Teresa Myrfield, Pacific Land Surveying Ltd.
  - Dave Thomson, Challenger Geomatics Ltd

- David Manning, Professor of Soil Science, School of Civil Engineering & Geosciences, University of Newcastle visited the Department investigating possible collaborative links.

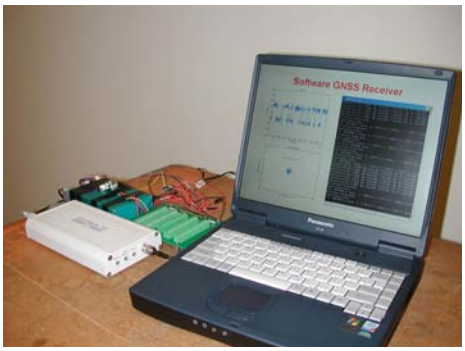
CCLS accreditation team along with faculty members. LtoR: N. El-Sheimy, M. Rakai, T. Myfrield, M. Barry, G. Bowden, D. Thomson

Research Spotlight

Software GNSS Receiver Design by PLAN Group

Software GNSS receivers are becoming more and more important because they provide a flexible platform that enables research on advanced GPS/Galileo signal processing techniques and acts as an interim step to a commercial receiver. The PLAN group, led by Professors G. Lachapelle and M. E. Cannon, is working in this area to develop such an advanced software GNSS receiver system. Based on NDL™, a navigation toolbox also developed by the PLAN group, the receiver is derived using a generic architecture that can simultaneously process both GPS and Galileo signals. To be highly adaptive, the software is designed as a multi-threaded program where subsystems are realized by independent threads, thus allowing the receiver to be upgraded easily for novel applications. The capabilities of the platform include RF signal collection, multiple channel base-band signal acquisition and tracking, navigation message demodulation, navigation solution calculation, and aiding information processing. The receiver is being used for numerous research projects, including ultra-tight integration with inertial sensors, anti-interference techniques, fast signal acquisition and tracking, AGPS, etc. Publicly available information can be downloaded from

http://plan.geomatics.ucalgary.ca/gnss_simulator.html as it becomes available.



GNSS Receiver Software

P^{3TM} – Software Package for Precise Point Positioning

Dr. Yang Gao's Positioning and Mobile Information Systems Group has developed a software package called P^3 for precise point positioning. The software applies precise orbit and clock products that are currently available from various sources to provide globally attainable positioning accuracy at centimetre to decimeter level and to eliminate the need for base reference stations. Ultimately the software reduces labor and equipment costs and simplifies operational logistics. By-products from the software include precise timing at 0.1 ns and absolute zenith tropospheric delay estimate at millimetre to centimetre level. The software is featured with easy-to-use interface, on-line view of processing results and useful utilities. Capable of both post-mission and real-time processing, P^3 software is currently available as an executable or as C++ source code and can be obtained through University Technologies International Inc. (www.uti.ca).

ENGO 500 Project

The objective of the fourth year Geomatics Engineering Projects course ENGO500 is to develop skills that are essential for working in the geomatics industry (and beyond): cooperative research, project management, and oral and written technical communication. Groups of four students have been working over the past two terms on a project under the guidance of a faculty member.

Project topics cover the full range of the geomatics discipline: from developing autonomous navigation systems, to analysing satellite imagery, to monitoring avalanche hazard, to relative gravimeter calibration.

This year's best project award went to Lana Bily, Jack Carter, Ryan McKellar and Andrew Metheral-Christian for their project "First nations Land Management".

An ENGO500 novelty and highlight this year was the poster presentation session at the 1st Faculty of Engineering Design Open House, April 15. This event served as a showcase of 4th year project work from the entire Faculty of Engineering to the wider campus and industry communities.

For next year's projects we welcome interaction with and participation from industrial partners. For further information, please contact geomatics@geomatics.ucalgary.ca.

Alumni Voice

Chuck Dawkin, BSc. '92 It's been 12 years since I have graduated from Geomatics "Surveying" Engineering. Being married and having two daughters has made my journey since graduation quite exciting. I began my career in the Gulf of Mexico doing Hydrographic Surveying, but I never could get my sea legs. I later crawled onto the shores of Texas and received my R.P.L.S. in 1999. After exploring several companies, I have settled down with a Houston surveying/engineering firm. I currently oversee our El Paso office and serve as Sr. Project Manager for our Houston based survey projects. In this latest position, I also contribute to our Business Development / Marketing team. The UofC has left me with many good memories, a strong degree and the introduction to my wife (BComm. '92) and for all this, I'm truly grateful. I wish everybody success in their future.

Chuck Dawkin, BSc, '92

Please visit our website at www.tscengineering.com

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Graduating Class 2004

Department Activities

- Winter session exams ended April 30 and we are graduating 43 BSc.
- The "University of Calgary—Calgary Geomatics Cluster" Poster Project has been very successful. Posters are now being mailed to High Schools and Universities nation wide.
- The 25th anniversary celebration planning is well underway and over $80,00 has been raised by faculty and industry/government towards the 25th Anniversary Bursaries.
- Drs. Elizabeth Cannon, Gerard Lachapelle, Naser El-Sheimy and Cathy Valeo taught a half-day course on "Geomatics in Alberta: Present and Future" on April 23 as part of APEGGA's Professional Development Courses.
- Geomatics Engineering Liaison Committee met February 4
- The Microlab was updated with 22 Intel Pentium 4 2.8 GHz computers with 17 inch flat panel monitors. The new computers have one gigabyte of RAM and high speed gigabit ethernet adapters.

Updates to the Geomatics Engineering Microlab

Coming Events

- Professional Development Courses: Inertial Navigation Systems and GPS/ INS Integration (June 14-16); LIDAR (August 30 - 31)
- Special Graduate Courses: GPS Receiver Design, June 14-25; Estimation with Application to Navigation, July 5-16; LIDAR, Hyperspectral Imagery and Fusion August 16-27
- 25th Anniversary Celebration, October 28-29, 2004. More information at: http://www.geomatics.ucalgary.ca/

Sites to Visit:

- *http://www.discovergeomatics.com*
- *http://www.geomatics.ucalgary.ca/25th_Anniversary/*
- *http://www.eng.ucalgary.ca/CCIT/index.html*
- *The Department Publications: www.geomatics.ucalgary.ca/research/publications/index.php*