Ontario Professional Surveyor

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ONTARIO PROFESSIONAL SURVEYOR

VOLUME 59, No. 4 Fall 2016

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ON THE COVER ...

Richmond Green Secondary School (RGSS) is part of the York Region District School Board and is located in Richmond Hill, Ontario. In 2014, John Negru, a Technological Design and Computer Engineering teacher at RGSS, created an "Introduction to Surveying" course that he has taught to grade 11 and 12 students for the past 2 years. The course material will be available this fall to other teachers and school boards across Ontario. See the article "Investing in the Future through Education" by former RGSS student, Claudia Kwok on page 22.

Professional Surveying in Ontario

encompasses the Disciplines of

Cadastral, Geodetic, Hydrographic, Photogrammetric Surveying & Geographic Information Management

President's Page

By Murray Purcell, O.L.S., O.L.I.P.

Well, it's September, and my excitement continues to grow with the wonderful things your AOLS Council, your Committees and Task Forces, and your AOLS staff have initiated and developed and continue to carry through my term. There are so many hard working people to thank.

When I think of my previous run on Council a little over 10 years ago, and reflect on how business was done; WOW, technology has changed our Association and how we all do business. Electronic digital calendars and day timers, portable computers (sorry ... laptops, tablets, iPhones and androids), Survey Monkeys, Webinars, and GoToMeetings. Our efficiencies and economies of communication have improved. This doesn't happen on its own. Someone has to initiate the change. Someone has to drive that bus. Blain and our impressive AOLS staff have clearly brought us into the 21st century! In my travels across the country I have yet to see a better oiled machine and the envy that I see from our Canadian and American counterparts is evidence that we in Ontario are industry leaders.

So this gets me thinking. As a private practitioner (and perhaps even in some government departments), have we moved our businesses forward over the last 10 years? It is funny how we focus on staying in tune and up to date with new tools and technology which typically includes GPS, LiDAR, drones, reflectorless total stations, and various CAD and calculation software. We need to be more than just good surveyors. To survive we also need to be good business people. We can often lose sight of the business benefits and expectations of a technologically advanced operation. How many of us over 40 years old (or maybe younger?) have discovered the benefits of "business management technology"? Are you scanning your products and or electronically filing your information? Are you doing business on-line? How many of us have a web site? How many consider it a site to be proud of? How many of us update our site on a timely basis? How many of us have recognized the benefit of social media, i.e. Facebook, LinkedIn, Twitter, and Instagram? More importantly, how many of us have recognized the detrimental impacts of negative social media? In earlier times, and I still hear it today, "We don't really promote ourselves…our business is built on word of mouth". Well word of mouth has gotten a whole lot bigger! It is no longer "he said - she said". Today it's "he said - they said". Do you know if there is any negative media posted about you and your company? Communication is key to our existence; communication with the public, and communication with fellow and future members.

So, here is a sample of some of your AOLS communication:

- The Certificate of Registration Task Force has your answers and comments regarding feelings and opinions on the future of C of R's, within AOLS. Thank you all for your genuine input. You have armed the task force with valuable information. They continue to meet and an action plan is forthcoming.
- The Standards Committee has your answers and comments regarding feelings and opinions on Sketches. There was enormous response to this questionnaire. Thank you for your genuine input and for your patience to resolve this important topic. An action plan is being developed and is forthcoming.
- Financial statements are on point with our 2016 budget. As we know, the magical question for our finances surrounds legal costs within the Constitutional Challenge and our Discipline Hearings. These have been reasonably tame up to our third quarter.
- A letter of concern has been delivered to the office of the Minister of Government and Consumer Services, Honorable Marie-France Lalonde regarding the closure and relocation of Land Registry Offices and the title research fee increases that have been passed on to our client, the public. We are awaiting a response.
- This year's Complaints Committee and Discipline Committee reports are short. It seems that our Continuing Professional Development program is working. Thank you to the membership for fulfilling this professional obligation.
- This current issue of the Ontario Professional Surveyor has a new column from Tim Hartley, our Survey Review Department Manager and the next issue will include a regular column from Blain Martin. A further step towards more transparent information being delivered to our membership.
- The Annual General Meeting Committee has delivered notice of accommodations for the upcoming 2017 meeting. Visit www.surveyors2017.ca for details. Do not procrastinate on this. We have rooms blocked at several hotels. Remember there are members from two other Associations plus an abundant number of other provinces and states who are interested in attending this gala celebration. The committee meets every other week for about 2 hours and works hard between meetings to move the agenda forward and provide updates. The logistics of bringing together 3 associations with their own ideas, agendas, and points of interest is difficult to say the least. We have hired an event planner to help us. She is working her way through the details and logistics but it is like the joining of families for a wedding procession. More exciting details on speakers and events will be provided as they unfold.

I am in the final lap of my term, with meetings still to attend in Nova Scotia and New Brunswick before our "big show" in March. There is still some heavy lifting to do before then, however rest assured, your AOLS bus is speeding ahead in the right direction.

L.V. Rorke, Mile of Gold Surveyor

By Bill Glover

"Who named my Northern Ontario birthplace on the Mile of Gold?"

"A surveyor L.V. Rorke named Kirkland Lake in 1907 after Winnie Kirkland, a secretary at the Ontario Department of Mines in Toronto". This was the one line answer but who were these people? In order to hunt down their century old secrets, I polished my motto, "You can run but you can't hide".

"Lady Lac" dredging gold from Kirkland Lake, Northern Ontario.

My first breakthrough was a full name. Louis Valentine Rorke was born on February 9, 1865 on a farm in Heathcote, Grey County, Ontario to Quakers Thomas Jacob Rorke and Sarah Valentine Richardson. Louis was the fourth of eight children with 3 older sisters and 2 younger brothers amongst the brood. His parents were born in Upper Canada but shaking the family tree would expose some very green Irish roots.

Louis' grandfather William Rorke was the family patriarch who immigrated to Canada from County Waterford, Ireland in 1921 with his brothers and recently widowed father John. After being shipwrecked off the Gaspé Peninsula on route to York, William and his brother John started a bran business in Picton, Ontario. When his grain business went belly-up in 1846 following the "Repeal of the English Corn Laws", William lost everything. He regrouped by purchasing cheap land in "Wild County" at Lot 24, Concession 12 in Collingwood Township, now Simcoe County near present day Heathcote. The little farming community is situated half way between Barrie and Owen Sound, on County Road 13 or up the Beaver River from Lake Huron's Nottawasaga Bay. In 1847 before modern roads, William Rorke sent his two oldest sons George, age 17 and Thomas, age 20 (Louis'father) with a wagon team and instructions to clear land, develop a farm and construct a log house. William, his wife Martha and their five other children came later from Picton and the log home was later replaced by a larger wood-framed house.

Grandfather William established the first area post office in his home and was the first postmaster to serve the Collingwood area. Originally named Euphrasia Post Office, it was later changed to Heathcote in 1861. Entrepreneur William also established a general store, selling tools and groceries, plus he traded in cattle, pigs, wheat, peas, and hens. William expanded his business as a land agent, processing deeds, mortgages, leases and wills. William's son Thomas would take over the duties as Postmaster from his father, a post Thomas held until 1900 in addition to overseeing the family businesses.

At a Quaker church gathering, Thomas met young Sarah Valentine Richardson, whose own mother Elizabeth was the Valentine family matriarch who emigrated with her family in 1832 at age 17 from Belfast, Ireland to Pickering, Ontario. Elizabeth Valentine married an Irishman James Richardson there a year later in 1833 after James converted to the Quaker faith. Sarah Valentine Richardson was born 4 years later in 1837 at their house named "The Willows". Sarah was 22 in 1859 when she married Thomas Rorke in a Quaker ceremony, then moved north to Heathcote and Louis was born 6 years later.

Louis, age 15 and his sister Fanny, age 18 attended Pickering College in 1880-81 in Newmarket. Louis left for Toronto on a false career start as a pharmacist's assistant but soon had his true calling, land surveying. Louis passed his initial surveyor's exams in 1887 and articled for two years at the firm of Elihu Stewart and J. F. Whitson, P.L. Surveyors in Collingwood before becoming a full-fledged Provincial Land Surveyor in 1890 at the age of 25. His career was likely influenced by an adventurous spirit, disdain of store duties and perhaps by a neighbour, Andrew Fleming whose son Sir Sanford Fleming was Canada's most famous surveyor.

Armed with his surveyor's license in 1890, Louis became partners with James F. Whitson with offices in North Bay and Sudbury, then both in Nipissing District. For the next 14 years, Louis surveyed northern Ontario town sites including Sudbury, where he superintended the first water works and electrical infrastructure in North Bay, Wawa, Gowganda and Haileybury, where Rorke Street is named after him. He also ventured into Northern Manitoba. On the 17th of February 1898, 33 year old Louis Rorke married a 23 year old American girl named Maude Charlotte Killaly, ten years his junior who had recently immigrated to Canada with her family. He quickly moved her to the rough and tumble mining town of Sudbury where they resided during the 1901 census with a live-in French Canadian housekeeper. In 1904, the Rorkes moved to Toronto where their only child Cedric was born on July 21, 1904. From 1905 to 1909, Louis was employed on surveys for the Ontario Government where he met and worked with Winnie Kirkland who became his office assistant.

Mary Winnifred "Winnie" Kirkland was born on July 21, 1879 in Alliston, Ontario to Matilda Fraser and Alexander

Mair Kirkland, a bank manager who had emigrated from Scotland as a young man. Only 7 years old when her father died, Winnie and her 35 year old mother Matilda were almost destitute when they moved to Toronto. Matilda had been the fourth daughter of 8 children born in Ontario to Martha and Hugh Fraser, a labourer with limited means. My local museum, the Museum of Northern History once the home of Sir Harry Oakes, provided me with a newspaper clipping and the only known photo of Winnie.

Left, Louis Valentine Rorke (1865-1943), credit AOLS. Right, Mary Winnifred "Winnie" Kirkland (1879-1960), credit Kirkland Lake Museum of Northern History (http://www.museumkl.com)

Next I hit pay dirt with Louis Rorke's biography surfing the "Association of Ontario Land Surveyors" website. Enter Maureen Mountjoy who not only provided a photo of Rorke but requested I write this article. The Rorke biography provides an excellent account so rather than duplicate, I decided to borrow some highlights and fill in the blanks.

In 1907 Louis climbed aboard the new TNO Railway from North Bay through Cobalt and north to the new Swastika siding while the Blanche River bridge was under construction and where gold was recently discovered. From Swastika, Louis travelled on a crude trail five kilometres east to survey Teck Township. That is where he came across a handsome, unnamed lake, a lake he named Kirkland Lake after his 28 year old assistant and stenographer, Winnie Kirkland. Another nearby lake he named Winnie Lake. Was there some hanky-panky going on or was Louis just scratching for names? A distant relative speculated that Winnie may have requested the naming herself. Louis and Winnie were both born in rural Simcoe County but belonged to different churches. In 1907 Louis was 42 years old, happily married to a younger woman with a 3 year old child. Winnie was 28, still single and living with her mother. There may have been office flirtations but nothing to suspect anything more than a work relationship.

And whatever became of them? Winnie's ailing mother died in Toronto in 1925 and 2 years later in 1927, 48 year old Winnie married a widower named Frank Edward Josselin at an Anglican church in Toronto. It was her first marriage and second for Frank, who at age 51 was a valuator with the Ontario Department of Crown Lands in Toronto. He had lost his first wife Anna 2 years earlier. Following their government careers, Winnie and Frank retired in Scarborough, north of Toronto where Frank died on December 29, 1959. Winnie died at age 80 a few months later on May 14, 1960. They left no descendants and both were buried with Winnie's parents at Toronto's Necropolis Cemetery.

Louis Valentine Rorke went on to have an illustrious career as a Civil Engineer and the top surveyor in Ontario from 1918-35. Following the 1917 death of his predecessor in office, Louis became Director of Surveys for Ontario, and with government reorganization, Surveyor-General for Ontario in 1928, a post he held until his retirement in 1935

Bill Glover at the south arm of Kirkland Lake.

at 70 years old. Louis served as the Secretary of the Association of Ontario Land Surveyors until he died at age 77 of Pulmonary Edema on January 3, 1943, following a period of heart disease. His wife Maude died in Toronto 19 years later in 1962 at 87 years old. Their son Cedric Killaly Rorke served overseas in the Royal Canadian Artillery during WW2 and became a surveyor in his own right working on surveys which included the Alaskan Highway. Cedric's marriage to an American girl named Martha Olivia Howard ended in divorce but produced 2 daughters, Olivia and Victoria, and one legitimate grandchild. When Cedric died in 1980 in Saanich, British Columbia, he was interred alongside his parents Maude and Louis Valentine Rorke at the Forest Lawn Mausoleum in Toronto.

Winnie Kirkland would never once visit her namesake Kirkland Lake. Louis Rorke was known for being fair but firm and served his profession well as Ontario's Surveyor General for 17 years. Louis's great-grandson Douglas Barr told me recently of Louis' illegitimate granddaughter in Britain fathered by Cedric during WW2. It seems you can run but you can't hide.

Bill Glover is a Canadian mining engineer and author of the Mad Miner books.

Remote Data Capture
Opportunities for Surveyors

By Brian Kerr, O.L.S., C.L.S., O.L.I.P.

In 1996 I employed a young graduate engineer as a CAD draftsman. He was intelligent, innovative and creative, and a lot smarter than me. Together we envisioned a concept we christened "Lo 'n Slo" mapping. We imagined taking multiple photographs of small properties from a radio-controlled helicopter or tethered mini-dirigible, using a simple snapshot camera. We would install targeted ground control points, perform an aerotriangulation adjustment and map the properties. I had the idea we could target property corners and conduct legal surveys this way. It was a scaled down version of conventional photogrammetric mapping, without the expensive piloted aircraft or aerial camera.

It didn't 'fly', of course, because there were no stable miniature aerial platforms, no affordable digital photo-processing systems and no desktop mapping software. It was a great idea!

Now, a scant 20 years later, it is not unusual to see Unmanned Aerial Vehicles (UAVs), or drones (as the hobbyists like to call them) and symposiums are being held globally about the new industry of UAV mapping. We hear about Aerial Photogrammetry, Airborne LiDAR, Multi-Spectral and Infrared Scanning.

This form of data capture is not restricted to our airspace, however. Scanners (most using laser ranging equipment) are also being deployed on ground vehicles, set up on fixed ground points, and used in hand-held "walkable" forms to capture locational data wherever it is of interest to users. Multi-beam sonar is deployed on boats to capture subsurface data.

A few examples:

- Terrain and feature modeling and mapping
- Seafloor mapping
- River and lakebed modeling
- Building and roof inspection
- Crop health monitoring
- Forest monitoring and mapping
- Soil health and moisture measurement
- Search and rescue
- Infrastructure modeling and inspection
- Public safety surveys
- Pre-engineering surveys for highways, bridges and dams
- Aggregate resources volumetric measurements
- Flood control
- Wetland rehabilitation
- Accident surveys
- Wildlife monitoring
- Building modeling
- Construction layout and as-built surveying

Some specific examples of project types illustrate the wide variety of situations in which remote data capture technologies have been effectively used.

1. In New York City, the very first map of tree species distribution has been prepared from remotely captured data, to safeguard the health and sustainability of the city's prized tree-lined streets.
2. John Deere incorporates GPS-based horizontal and vertical locational data sensors into farm equipment to ensure the most effective furrow spacing and depths in all parts of a planting area. Planting regimens and fertilizer allocation are automatically varied based on detailed information for each field, previously acquired by UAV-mounted thermal and soil moisture sensors.
3. A high-rise building in Hawaii with an unusual asymmetrical curtain wall was laid out by a surveying company using terrestrial LiDAR scanners, enabling continuous and accurate monitoring of the construction in 3D space, as it occurred.
4. A large building project in Shanghai, incorporating a curtain wall that is able to rotate with changes in wind direction, was built in record time using Building Information Modeling (BIM) technology.

RME Geomatics Inc. staff Morgen Parks and Matt Peschisolido launch the custom-designed Renegade UAV on a combined LiDAR/aerial photography mission.

5. The City of Myrtle Beach, South Carolina conducts regular inspections of the beach and offshore seabed using LiDAR and multi-beam sonar to track changes in the form of the beach, decimated by Hurricane Hugo in 1989.
6. The U.K. government has this year mandated the use of Building Information Modeling (BIM) during construction of certain public buildings.

The New UAV Industry

The advent of UAVs has happened over the past 3 or 4 years, but like most new technologies, it is growing rapidly. A quick online search will turn up hundreds of types, manufacturers and capabilities of remotely controlled aerial platforms.

For as little as $100, people can take good videos from a palm-sized quadcopter, controlled by a simple remote control unit.

For $1000, you can have a powerful quadcopter capable of 30 minutes of flight time, able to take 4k videos, self-navigate using onboard GPS, and fly completely 'hands-off' using a built-in autopilot. Most are pre-programmed to fly specific flight paths that the operator picks out on a Google Earth image, follow the operator or circle a point of interest, all with no active input during flight.

And for $10,000 and upwards, there are aerial platforms used for everything from Hollywood filming to digital terrain mapping.

It is the last of these which is of most interest to professional surveyors.

The Remote Data Capture Industry

Since the advent of aerial mapping in Canada after the First World War, this field has been the sole province of photogrammetrists. Canada became a world leader in this field for the same reason it was a leader in bush plane manufacturing: because of the vastness and sparse population of our country, we had to be.

The conventional approach to photogrammetric mapping continued relatively unchanged for decades, using piloted aircraft, bulky high resolution optical cameras, ground control targeting, very time-consuming mechanical adjustments and extremely expensive stereoplotters.

The advent of affordable miniature remote sensing equipment, digital technology, improved battery performance and small portable aerial, ground and marine platforms has transformed a once expensive, slow-moving industry into an industry that would be unrecognizable to the early photogrammetrists.

Should Surveyors be in the Data Mapping Business?

Besides the thousands of legal surveys completed during the career of a professional surveyor, we are often asked to locate a variety of geographical and physical features. Most of us with a few years of experience in surveying could compile a long list of our experiences beyond boundary surveying, the core of our practice.

During my career as a professional land surveyor, I have been asked to locate or map pipelines, tunnels, underground utilities, radar stations, highways, archaeological finds, wetlands, wind turbines, oil refineries and many other non-cadastral installations. I have completed endless topographic and site detail surveys for site planning purposes, measured the locations of thousands of panel arrays in solar farms, and provided constraints mapping of proposed developments, including zoning, land use, floodplain, topography, utilities, environmental and species at risk information.

Until very recently, this work has been completed using Total Station and RTK GPS methods, one observation at a time. But lately, a new fleet of remote data capture sensors and platforms has burst onto the scene, enabling surveyors to capture millions of data points where we used to capture only hundreds. Having all this new technology has provided us with the means to increase our productivity and data acquisition significantly.

The new technology has created a great opportunity for anyone with a modest amount of capital to set up a business in the spatial positioning industry. Without any real knowledge of mapping projections, control networks, adjustment methods, error propagation, or quality control, any hobbyist can now buy a drone, open a business, download freeware, secure a few clients, and produce impressive looking aerial photos, LiDAR point clouds or thermal images which may have little or no connection to actual coordinates.

For surveyors who are interested in the new business world, there are many vendors of purpose-built mapping systems. You will see these systems advertised by suppliers of survey equipment, and offered by a whole new wave of manufacturers. Much of that equipment is of excellent quality, contains many of the features we might want, and may even have very good proprietary software included.

Surveyors are beginning to adopt the new remote data capture technologies, but are finding themselves faced with a steep and sometimes discouraging learning curve before they can successfully deploy the technology.

Flying the UAV or programming the radio-controlled boat are the simpler parts of the process. The real expertise in this industry is qualifying the data and editing the millions of acquired datapoints to a file size which is manageable in a CAD format, while still maintaining the integrity of the digital model which is being built. It is this expertise that is lacking in many data capture companies. In fact, results have been so unreliable among the 'hobby' mappers that the term for editing has come to be inauspiciously described as 'decimating the point cloud'.

There are companies who are excellent at qualifying and editing data, but there are many more who are not. The proliferation of under-qualified practitioners has prompted the American Association for Geodetic Surveying (AAGS) to propose the new professional designation of 'Geospatial Practice' for professional surveyors who wish to specialize

in remote data capture.

Those who embrace the new remote data capture platforms, UAVs, terrestrial and mobile scanners and marine platforms, tend to be non-professionals who are more interested in the platforms than in the applications and the accuracy. Too many are hobbyists and amateurs who don't know what they don't know.

Those who are expert in data management, adjustment and end-user applications tend to be professionals who are not as engaged with the new platforms. Many in this group are skilled survey practitioners who seem reluctant to take the step of applying their expertise to a newer data capture method.

Only a few are both professionally qualified and competent in the new remote data capture technology.

As professional surveyors, we are once again at a crossroads. Professional surveyors in North America have been collecting, qualifying and editing data for over 125 years. The new technology is different than the old, but it serves the same end: to maintain the quality and consistency of land-related data, whether it is used to define ownership or to construct a major highway. Without the willingness of professional land surveyors to continue to exercise leadership in maintaining the integrity of the land-related fabric of our society, the amateurs will be very happy to take over.

If you are interested in a short primer on how to get into the remote data capture business as a professional practitioner, I highly recommend an article by Paul Braun titled "Cutting through the Hype" which can be found on page 16 of the 2016 Special Edition of Heights magazine at the following link http://bt.e-ditionsbyfry.com/publication/?i=294003

Brian Kerr is an Ontario Land Surveyor and Canada Lands Surveyor, as well as a Freelance Business-to-Business Copywriter specializing in applications of remote data capture technology. He can be reached at **kerrbw48@gmail.com**

Sites to See

GeoAlliance Canada Projects Portal

http://projects.geoalliance.ca/en

As the national umbrella organization for the Canadian geomatics, geography, and geospatial community, *GeoAlliance Canada* has launched an online portal to showcase and support the work taking place within the community and foster collaboration. A newly-formed Projects Advisory Committee will review and refine the project ideas.

Why should I insure my business insurance with the same insurer as my professional liability insurance?

By Mark Sampson, BBA, FCIP, Arthur J. Gallagher Canada Limited, formerly the CG&B Group

The CG&B Group (now called Arthur J. Gallagher Canada) has partnered with the AOLS for over 30 years to provide the Professional Liability Coverage for its members and their firms. A few years ago, some of the members asked me if it was possible to create a similar insurance program for their firm's business insurance as it was easier for them to deal with the same person/firm. With the support of the AOLS, I created a business insurance program specifically designed and priced for surveying firms.

There are many advantages of keeping your business insurance (surveying equipment, office contents, general liability, and vehicle insurance) with the same broker (Arthur J. Gallagher) and the same insurer (Novex Insurance) who provides your professional liability coverage.

1) Insurance Coverage designed for Surveyors

Many survey firms that I have dealt with have their business insurance covered under a general small business insurance package. The coverage is normally "basic" and does not provide the proper protection required for a survey firm. An example of this is that your survey equipment is insured on a standard "contractors equipment" form. This form typically has a waterborne exclusion… meaning that there is NO coverage for your equipment while it is on the water. So if your equipment is on a boat and it falls in the water, there is NO coverage for the loss of your equipment!

I have negotiated a specific insurance program with the same insurer as the Professional Liability Coverage (Novex Insurance – a subsidiary of Intact Insurance) that is tailored for the operations of a surveying firm. It has built-in insurance protection for your survey plans and field notes, computer equipment, and your surveying equipment… with the waterborne exclusion removed.

2) General Liability vs. Professional Liability - which insurer will cover you?

Having your general liability and professional liability policy insured with different insurers can create a situation where in the advent of a claim, both insurers begin pointing fingers at each other on who should cover the loss.

A general liability policy will cover the survey firm for damages negligently caused to a third party for bodily injury (damage to someone) and/or property damage (damage to something). This policy will typically have a professional liability exclusion that excludes coverage for "professional services" (that is why you need a professional liability policy).

A typical professional liability policy covers negligence caused by professional services of the insured however excludes any negligence that causes bodily injury or property damage. One of the many advantages of insuring through the AOLS Professional Liability program is that I have removed this exclusion from the AOLS insurance policy.

Consider the following loss example. A surveyor is about to begin surveying at the side of the road. The robotic total station is not set up properly and falls down onto the road. A car happens to be driving by at the exact same time and runs into the equipment and causes a car crash. Which insurance policy should respond to the loss?

Based on the above definitions, the general liability policy should respond as there was physical damage to the vehicle caused by the negligent act by the surveyor. However, the general liability insurer might deny the claim because in their view, the surveyor was conducting a professional service and as a result of the "professional service" exclusion on the policy, there would be no coverage.

The professional liability insurer might argue that the act of setting up the total station did not constitute a "professional service" and therefore the loss should be covered by the general liability policy.

This is a classic example of two insurers pointing their fingers at each other on who should defend the insured and pay the claim.

To avoid this potential issue, it is my recommendation that you have the general liability and professional liability policy insured with the same insurer.

3) Specialized Claims Service

One of the main advantages of having your business insured through the AOLS Business Insurance Program is that you will be dealing with people who through many years of experience know the surveying business.

I have arranged for Maltman Group International to be the claim adjuster for the business insurance (property and general liability) claims. Maltmans has been adjusting the professional liability claims for the AOLS for over 30 years. If you place your business insurance with the AOLS program, you will be dealing with the same knowledgeable firm.

We had a recent claim involving a firm insured on the program. The surveyor set up a total station in a parking lot. When he stepped away to set up a traverse point, there was a strong gust of wind and the equipment was blown over onto the asphalt. The repair cost was estimated at $9,000, however the manufacturer would not guarantee the accuracy of the measurement device upon repair (due to the extent of the damage). As a total station is required to measure accurately, the insurer agreed to replace the unit with a new total station for $16,000.

If this firm had been insured with a different insurer, it might have been difficult to convince them to replace the instrument completely. The advantage of insuring through the AOLS insurance program is that you have Maltmans, Novex Insurance, and me, who all know and understand the surveying profession. In this situation, we knew that if the total station was not calibrated properly, it could cause a measurement error and lead to a professional liability claim. Therefore, it was decided to replace the damaged total station with a new one.

4) Competitive Pricing

Another benefit of insuring your business insurance through the AOLS program is that I have negotiated very competitive pricing based on the fact that Novex already provides the professional liability coverage for the majority of survey firms in Ontario. In addition, I have arranged for an option to finance your premium over the year…. with NO financing fee.

5) Ease of Doing Business

There are countless times that I receive calls/emails from surveyors who are bidding on a new project and require the contract to be reviewed and/or have a certificate of insurance provided for their professional liability and the general liability coverage. It is much easier to send one request to your insurance representative, as opposed to multiple emails to different people who handle your insurance. For those firms that are insured on the AOLS Business Insurance program, we review the entire contact and then can issue one certificate of insurance that covers both the Professional Liability and General Liability requirements.

Hopefully this article has helped to summarize the benefits of insuring your business insurance with the same insurer as your professional liability coverage. I understand that some surveyors have chosen to buy their business insurance from someone in their local town/community. I completely respect that decision. However, please be aware of the limitations/disadvantages of this choice.

If you have any questions, or would like advice on your existing business insurance coverage, please contact me directly.

Mark Sampson, BBA, FCIP is the Senior Vice President of Arthur J. Gallagher Canada Limited. Mark can be reached by email at **mark_sampson@ajg.com** or by phone at **905-948-2631.**

Calendar of Events

October 18 to 21, 2016

Joint 3D Athens 2016
Athens, Greece
http://3dathens2016.gr

October 31 to November 2, 2016

Commercial UAV Expo 2016
Las Vegas, USA
www.expouav.com

October 31 to November 3, 2016

GIS-Pro 2016 – URISA's 54th Annual Conference
Toronto, Ontario
www.urisa.org

November 16, 2016

GIS Day
Discovering the World Through GIS
www.gisday.com

November 28 to December 2, 2016

GSDI 15 World Conference
Taipei, Taiwan
http://gsdi15.org.tw

March 1 to 3, 2017

125th AOLS Annual General Meeting
Ottawa, Ontario
www.aols.org

Rock Fragmentation Analysis using UAV Technology

By Thomas Bamford[1], Kamran Esmaeili[2] and Angela Schoellig[2],
[1]Lassonde Institute of Mining, [2]University of Toronto Institute for Aerospace Studies

In recent years, UAV (Unmanned Aerial Vehicle or "Drone") technology has been introduced into the mining environment to conduct terrain surveying, monitoring and volume calculation tasks. These tasks are essential for mining operations, but they do not leverage all of the benefits that UAVs can offer to the industry. In general, UAV technology can be used for acquisition of any kind of high-resolution (aerial) data, which can be beneficial in blast design, mill operations, and other mine-to-mill process optimization campaigns. Moreover, compared to traditional and typically manual measurement techniques, data acquisition with UAVs provides higher spatial- and temporal-resolution data, which improves the statistical reliability of measurements. One of the novel applications of UAVs in mining, being studied at the University of Toronto, is the real-time measurement of rock fragmentation.

Continuous measurement of rock fragmentation is essential for many mining operations. Production blasting in mining operations acts to reduce the size of rock blocks so that the rock can be transported from an in-situ location to downstream mining and comminution processes. The rock size distribution induced by blasting influences the efficiency of all downstream mining and comminution processes, including: loading, hauling, crushing, and grinding. It has been shown that rock fragmentation can influence the volumetric and packing properties of the rock (e.g., the fill factor and bulk volume) and, consequently, the efficiency of digging and hauling equipment. Similarly, it has been demonstrated that the rock size distribution fed into the crushing and grinding processes has a direct impact on energy consumption, throughput rates, and the productivity of these processes. Due to these impacts, the measurement of post-blast rock fragmentation is an important metric in the optimization of a mining operation. Furthermore, real-time measurement should be implemented to provide an immediate feedback to design engineers to improve blast design over time with the goal of producing an optimal rock size distribution for downstream processes.

Measurement of Rock Fragmentation

Current Methods

Different methods have been developed for estimating rock size distributions. The most common methods are: visual observation, sieve analysis and image analysis. Visual observation involves inspecting the rock pile and subjectively assessing the quality of the blast. This subjective method can obviously lead to inaccurate and imprecise estimates of rock size distribution. Sieve analysis involves taking a sample of the rock pile being studied and passing it through a series of different sieve size trays. The rock size distribution is calculated by measuring the mass or volume of the rock material that remains on each tray. This method generates more consistent results; however, it is more expensive, time consuming and difficult to perform well as the sampled rock size distribution may often not be statistically representative of the whole rock pile. Image analysis methods have been developed with the rise of computer image processing and analysis tools. Conducting image analysis involves taking 2D photos, stereo images or 3D laser scans of the rock pile, and processing these images to determine particle sizes. Image analysis techniques enable practical, fast, and relatively accurate measurement of rock fragmentation. The most common image analysis technique applied in mines uses 2D fixed cameras located *(i)* at the base of a rock pile, *(ii)* on shovels and truck buckets, *(iii)* at crusher stations, or on conveyors in the processing plant to capture photos. However, the following limitations have been observed for these fixed, single-camera 2D image analysis techniques:

(i) Fixed single camera located at the base of a muck pile:
- Scale objects must be placed on the rock pile.
- Photos must be taken at a distance of less than 20 m from the rock pile. This can interrupt production and may place technicians at risk.
- The shape of the muck pile can influence the accuracy of the image analysis.
- Only a limited dataset can be collected from a fixed location.
- Dust, fog, rain, snow and particulates can obstruct the image.
- Lighting conditions can drastically impact the results of the image analysis.

(ii) Fixed single camera mounted on shovel booms or truck buckets:
- This requires installing a camera with a clear view of the shovel bucket.
- Equipment generates large amounts of vibration and shock during operation which can influence the

quality of images.
- Shielding is required to protect the camera from falling debris and direct sun light.
- Imaging the same material multiple times biases the results.

(iii) Fixed single camera installed in crusher stations:
- Detailed masking of images is required.
- Scale objects must be visible in image.
- Difficult to match material with source.
- Large amount of dust generation obstructs the image.

To overcome some of these limitations, 3D measurement techniques have been implemented that use LiDAR stations or stereo cameras to capture images. Using 3D measurements for rock fragmentation analysis eliminates the need for scale objects and reduces the error produced by the shape of the muck pile. However, the process of using LiDAR scans or stereo cameras for rock fragmentation measurement is still highly manual and the measurement results have low temporal and spatial resolution.

Measuring With UAVs

To overcome the limitations and to automate the data collection process, we use UAV technology to conduct a real-time rock fragmentation analysis. To demonstrate the feasibility and benefits of automated aerial rock fragmentation analysis, we designed a laboratory experiment, where we set up a muckpile with a known rock size distribution and conducted a UAV-based rock fragmentation analysis. The same muckpile was also photographed manually to compare both methods. The laboratory scale test was deemed to be necessary to optimize our UAV procedure before conducting any large-scale field experiments. Figure 1 illustrates the components and overall lab configuration used for the proposed automated rock fragmentation analysis. A detailed description of this setup is given in Bamford et al. (2016). Figure 2 is a photo taken of the UAV during flight with the raw and processed image for rock fragmentation measurement.

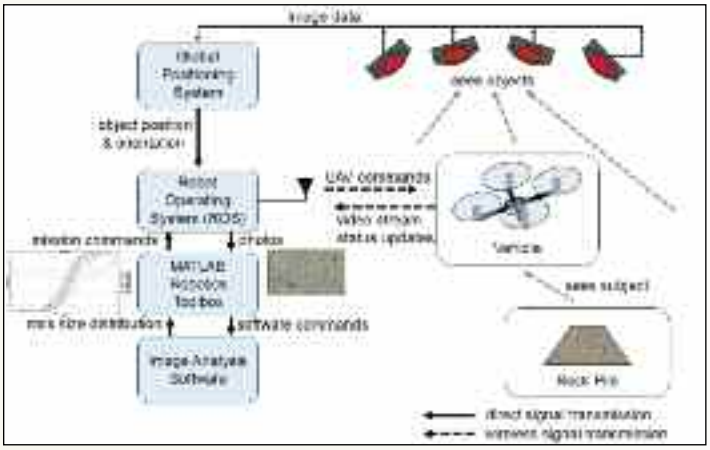

Figure 1: Block diagram of the lab configuration with arrows showing the typical information flow.

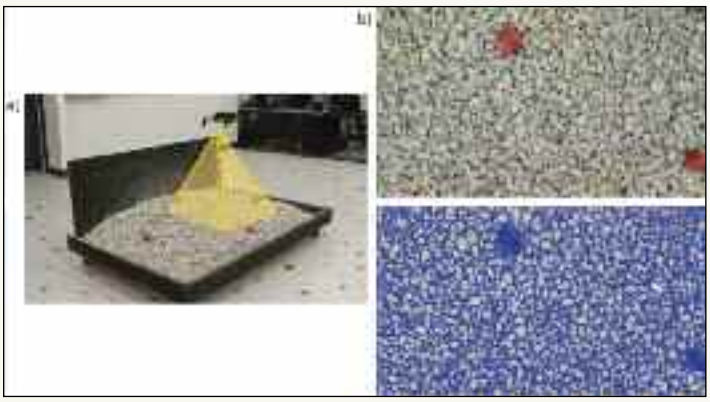

Figure 2: a) UAV (Parrot Bebop 2) in flight for automated image analysis. b) Raw and delineated photo captured by the UAV during automated image analysis.

Advantages of Rock Fragmentation Analysis Using UAVs

Throughout the development of the automated aerial fragmentation analysis system, we noticed a number of benefits. The main benefit is that the UAV system collects and analyzes images rapidly. This serves to reduce the cost to the operator and enables on-demand, real-time, high-resolution data collection. On top of this, the system provides results that are considerably more accurate. For these reasons, the UAV system is considered a valuable tool for real-time rock fragmentation measurement. Overall, the important benefits provided by the UAV system are:

- Collection of data does not interrupt the production process.
- UAV is capable of sampling regions of interest that are otherwise inaccessible by a human operator.
- Results are available in real-time allowing the real-time adjustment of the UAV's flight path to optimize the results of the fragmentation analysis.
- Real-time results also allow the immediate adjustment and optimization of blast designs.
- Surface sampling errors can be reduced with high-frequency measurements.
- Fragmentation analysis resolution can be easily adjusted to target different regions in the rock size distribution by flying closer or further away from the rock pile.
- Obstruction of the image by particulates can be controlled and avoided.
- Additional data collection, such as photogrammetry for volume calculations, can be performed simultaneously as part of the UAV mission.
- Sampling bias (resulting from taking the same image multiple times) can be controlled and extreme outliers can be filtered out in real-time.
- The system keeps operators out of harm's way in an active mining environment. A UAV is expendable; the human operator is not.

We compared the automated method of collecting rock size distribution information with conventional techniques using the designed lab configuration. In these experiments, UAV technology was shown to only take a fraction of the

cont'd on page 16

time (~20%) that a conventional method takes, to measure rock fragmentation within 6% of the conventional method's accuracy, where the conventional method deviates from the true distribution by up to 14% (Bamford et al., 2016). Figure 3 shows the two rock size distribution results that were measured using the conventional and automated methods for comparison.

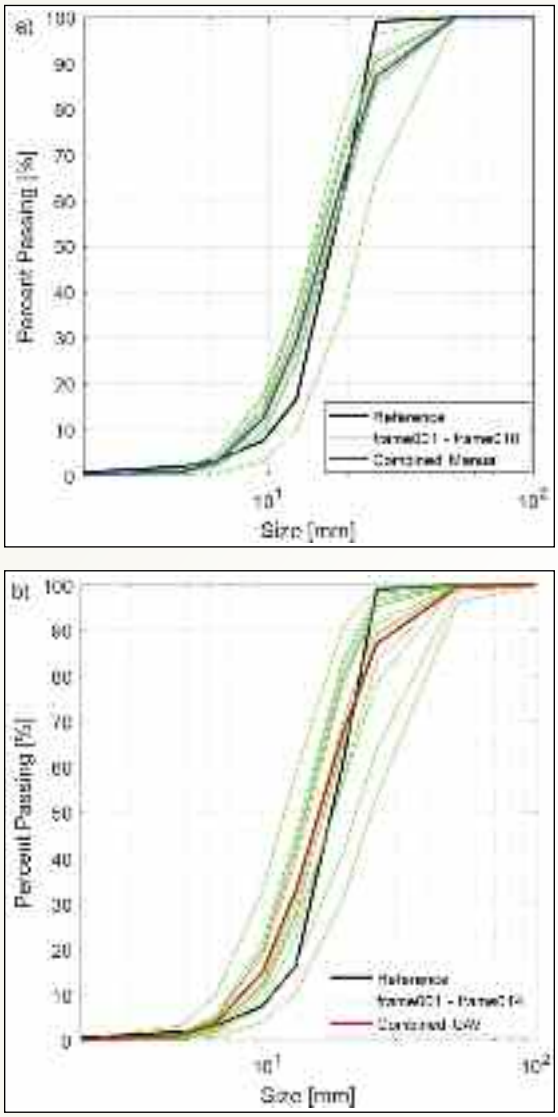

Figure 3: a) Manual, fixed-camera rock size distribution (blue),b) automated UAV rock size distribution (red) with the sieve analysis result in black as a reference. Results from the respective individual images are shown in green.

Future Development

Future work will focus on further optimizing the UAV capturing procedure and on implementing this system in an active mining environment to gain more insight into the system's prediction accuracy, the value added, and its ability to be incorporated into mine-to-mill process optimization. Ultimately, real-time acquisition of high temporal- and spatial-resolution data based on UAV technology will provide a broad range of opportunities for both improving blast design without interrupting the production process and reducing the cost of the human operator. The authors are also investigating other applications of UAV technology in mining such as automated rock discontinuity mapping for slope stability analysis, hyperspectral analysis of muck piles to control ore grade dilution, and real-time inspection and monitoring of surface excavations and earthworks. Interested industry representatives are encouraged to contact the authors for joint research opportunities.

Acknowledgment

The authors would like to thank Split-Engineering for their generous support of this project. Furthermore, the authors wish to thank the University of Toronto's Dean's Strategic Fund "Centre for Aerial Robotics Research and Education (CARRE)", for their financial support of this project.

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Bamford, T., Esmaeili, K., & Schoellig, A. P. (2016). A real-time analysis of rock fragmentation using UAV technology. *6th International Conference on Computer Applications in the Minerals Industry.* 5-7 October 2016, Istanbul, Turkey. Retrieved from http://arxiv.org/abs/1607.04243

Link to Youtube video:
https://www.youtube.com/watch?v=TmC7qovR3ps

Thomas Bamford earned his Bachelor of Applied Science with honours in Mineral Engineering from the University of Toronto. He is currently working towards his Master of Applied Science focused on applications of UAVs in mining within the Lassonde Institute of Mining and the University of Toronto Institute for Aerospace Studies. He can be reached at **thomas.bamford@robotics.utias.utoronto.ca**

Kamran Esmaeili is an Assistant Professor at the University of Toronto, Civil Engineering Department - Lassonde Institute of Mining. He is an expert in geomechanical mine design and mine to mill process optimization with more than 12 years of industrial work experience and academic research**.** A major area of his research interest is focused on the development of innovative methods for real-time collection of high resolution mining data, data integration, analytics and visualization. He can be reached at **kamran.esmaeili@utoronto.ca**

Angela Schoellig is an Assistant Professor at the University of Toronto Institute for Aerospace Studies (UTIAS) and Associate Director of the Center for Aerial Robotics Research and Education (CARRE). She is an expert in UAV technology with more than 8 years of experience in developing algorithms for autonomous UAV flight. She has won the ETH Medal and the 2013 Dimitris N. Chorafas Foundation Award (as one of 35 worldwide) for her research on multi-vehicle, high-performance flight control, which combines traditional control theory with ideas from machine learning. More details about her work can be found at: **www.schoellig.name**

Advertiser's News

Too *Dam* Dangerous?

When a conservation agency needed accurate data on a crumbling dam too treacherous for human access, they relied on an unmanned aerial system.

Submitted by microdrones

Just 20 minutes south of a bustling metropolis, along a broad canal, is a popular bike path that offers a peaceful refuge from city life. Here, locals and tourists enjoy a 19-kilometer stretch of quiet waters, green fields, and trembling aspens.

In addition to the functioning locks and the ruins of a pre-revolutionary fort, a popular stopping point along this path is a historic dam. Set in a particularly tranquil location, the shores near the dam provide the perfect spot for a rest or picnic – perfect except for the glaring danger signs.

Built in 1937, the retired dam is now in crumbling condition. As a result, the dilapidated dam causes a wide range of ecological, functional, and aesthetic problems, but the biggest concern is safety. While red and yellow signs posted all over the structure caution visitors to stay away, it is common to see people climbing and fishing on the dangerous dam.

When dilapidated structures are too dangerous for human access, UASs provide a safe, cost-effective way to complete surveys and inspections.

When an enormous slab of concrete broke from the dam and slid into the canal, an agency in charge of protecting these types of places and structures knew they had to take action to ensure the safety of visitors and avoid legal risk. They decided to begin the process of restoring and converting the dam into a safe, usable walkway.

The first step was to open up a request for proposals from engineering firms. But there was a problem. To solicit design ideas and cost estimates, they would need accurate measurements and a three-dimensional model of the dam. How could they achieve this, when the dam's life-threatening condition made access too risky for traditional survey methods?

By foot, by boat, or by traditional aircraft?

The dam was too old and fragile to inspect traditionally by walking on it, so the preservation team began considering other methods of inspection. One option was to use a small boat, but it was quickly determined this would not work, since measurements of the top of the structure were needed. A helicopter could provide the necessary aerial views, but the costs would be tremendous.

They decided to seek out estimates to collect the data and photos they needed via an unmanned aerial systems (UAS), or drone.

"When this client contacted us, we'd never surveyed a dam," explained Sebastien Long, Sales Manager for microdrones. "It was a huge job that would involve many challenges and flight hours, but we knew we had the technology to achieve their goals."

That technology was the microdrones™ md4-1000 aerial vehicle, a VTOL (Vertical Take Off and Landing) aircraft that supports up to a 1.2 kg payload. This UAS was equipped with a camera, sensors, and the Applanix APX-15, a component designed to drastically improve the efficiency of mapping missions. APX-15 accomplishes these goals by:

1. allowing data to be accurately collected without surveying an extensive number of ground control points (GCPs),
2. decreasing the amount of overlap that needs to be flown, saving flight time.

These advantages were especially important for this dam mission because GCPs could not be placed on the dam and long flights were required.

Why was the md4-1000 a perfect fit?

The md4-1000 solution from microdrones was uniquely qualified for this mission because of these key benefits:

Safety. Thanks to the APX-15, it was not necessary to place ground control points on the crumbling dam. This

cont'd on page 20

allowed the pilots to collect highly accurate data from a position of safety at all times.

Flight Time. This mission required the UAS to stay in the air for a very long time as it flew back and forth, surveying the dam in rough winds over the wide canal. With the longest flight times on the market, the md4-1000 was the perfect vehicle for this mission. Depending on load and weather, the md4-1000 can stay in the air for about 45 minutes to an hour and a half, depending on payload.

Durability. md4-1000's resilient carbon fiber housing made it an ideal choice for flying in the rough winds above the Chambly Canal. The UAS's structural and electronic components can stand up to high maximum temperatures of 130° C (266°F).

Stability. Another major advantage of the md4-1000 is its stability, which is due mostly to its large propellers. "Our propeller size allows our motors to fly at a lower RPM, averaging 2000 RPM as opposed to 8000 RPM," explained Long. "Plus, the large propellers impact the wind differently than smaller ones. This makes the vehicle much more stable in the air. It's also much quieter; other systems sound like swarms of mosquitoes. Our large propellers hardly make a sound."

Accuracy. The APX-15 allowed us to know exactly where the UAS was, within 2-3 centimeters, at any given time. This integration contributes heavily to the exceptional accuracy of the UAS.

Reliability. microdrones systems are made from German-engineered components and assembled in North America, so they offer superb reliability. "These aren't thrown together in the cheapest factories in the world, like so many UASs. And that's important. Things happen when you're flying – things fail! But you don't want them falling out of the sky when they're carrying a $50,000 payload. Customers certainly don't want their name associated with a failed mission," explained Long. "They can prevent that by choosing a well-made UAS they can trust."

The Results

The microdrones team spent one day setting up two ground control points on each side of the dam and were able to make the 1-2 hour flight the next day. Afterward, the microdrones team was able to create a complete mosaic image from which highly accurate measurements could be taken. From there, they were able to develop a 3-D model of the dam.

By choosing the microdrones md4-1000 over other UASs, the agency saved considerable time, money, and hassle.

Using highly accurate data collected using a microdrones UAS, a preservation agency was able to create a 3-dimensional model of the dam that engineers could use when drafting their restoration proposals.

They have since moved forward with the $7.4 million restoration of the dam.

But that's not the end of the story. The md4-1000 configuration worked so well for this type of project that microdrones has since configured the technology into its mdMapMaster package that is available for immediate order. "We made a few minor changes to the UAS package to make it more efficient and it's ready to go for those who need it to complete precision mapping missions," said Long.

The mdMapMaster package comes complete with the UAS, a Sony Cyber-shot RX1R II, the Applanix APX-15, and a powerful base station loaded with all the software you need to receive and process video and telemetric data on the ground. It is ideal for completing surveying applications in difficult environments.

For further information contact Sebastien Long, Sales Manager at **Sebastien.Long@microdrones.com** or Mike Hogan, Business Development Director at **Mike.Hogan@microdrones.com**


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Investing in the Future through Education

An Introduction to Surveying at Richmond Green Secondary School and Beyond

By Claudia Kwok

Ask a surveyor about the importance of their industry, and they will tell you it is critical to the success of our society, because, before any physical asset can be built and/or managed, a whole infrastructure system needs to be put in place to support it. In our increasingly crowded world, the ability to locate any coordinate on the globe has become a vital ingredient in the implementation of any business plan.

As of 2016, more than 75% of the professional surveyors in Ontario are over 50 years of age. With much of Canada's civil engineering infrastructure slated for renewal over the coming decades, coupled with rapid growth in urban areas and in resource exploitation, the need for new surveyors has never been greater. The parallel explosion of new technological opportunities built on a geomatics platform (from self-driving cars to Pokémon GO), has further fuelled the need.

AOLS Demographics							
Age	2010	2011	2012	2013	2014	2015	2016
20 - 29	9	6	3	3	6	8	9
30 - 39	40	32	26	31	31	36	38
40 - 49	189	162	143	130	111	99	84
50 - 59	237	244	242	243	238	220	211
60 - 69	117	128	137	139	136	139	133
70 - 79	46	46	48	41	38	59	30
80 +	5	8	6	9	8	9	9
Total	639	626	610	595	569	559	511
Over 50	53%	68%	72%	72%	74%	74%	75%

Learning how to use the optical plummet to set up over a point.

The Association of Ontario Land Surveyors (AOLS) has been working actively for some years now to bring new professionals into the sector through a variety of initiatives. The latest involves bringing introductory surveying curriculum to high school students across the province, to familiarize them with the field and its possibilities.

A pilot project grew out of a request for information from John Negru, a Technological Design teacher at Richmond Green Secondary School (RGSS) in the York Region District School Board. The school offers a Specialist High Skills Major (SHSM) in Construction, and Negru's senior courses focus on architectural design, urban planning, project management and sustainability. (SHSM is a program, funded by the Ontario Ministry of Education, which assists students in learning specific skills through advanced training, hands-on experience, and certifications, in various employment sectors.)

It did not take much investigation for Negru to recognize both the importance of, and opportunities in, surveying. Also clear was the major reason students weren't entering this career sector: they weren't even aware that such a thing existed, let alone the educational pathways that could lead them to a career within it.

He initially contacted Maureen Mountjoy at the AOLS office in September 2013 to discuss the feasibility of starting a geomatics program and to see if the Association could offer some resources to aid in educating the coming generation; this initial conversation began a series of meet-

Students completing their fieldwork in front of the school.

ings and a new partnership.

With extensive help from Maureen, the AOLS, and Joseph Young from J.D. Barnes Limited, whose financial support allowed Negru to purchase eight sets of levels, transits and related gear, RGSS launched Ontario's first Introduction to Land Surveying unit (three weeks long) as part of its senior architectural design courses in September 2014. The surveying training unit is now in its third year, and going strong. Between 44 and 66 students take the course each year. A significant number of graduates have gone on to further study in geomatics, civil engineering and related fields.

Amy Wong, a graduate of the introductory surveying course and currently beginning third year in the Honours Geomatics Co-op program at the University of Waterloo, notes, "There are a lot of co-op job opportunities for a Waterloo student in my program. Many Waterloo alumni are working for the government or private GIS companies. It is a small field but with the computer science and technology skills that come along with studying Geomatics at Waterloo, job opportunities become more and more available."

Nicholas Woo, another graduate of Negru's course and currently beginning second year in Engineering Science at the University of Toronto, says he benefited greatly from the training he received at RGSS. Woo says, "Using the surveying equipment, utilizing field notes, visualizing and drawing out the measurements – all these skills became very valuable in my studies."

RGSS also places students in co-op positions at local surveying companies each year.

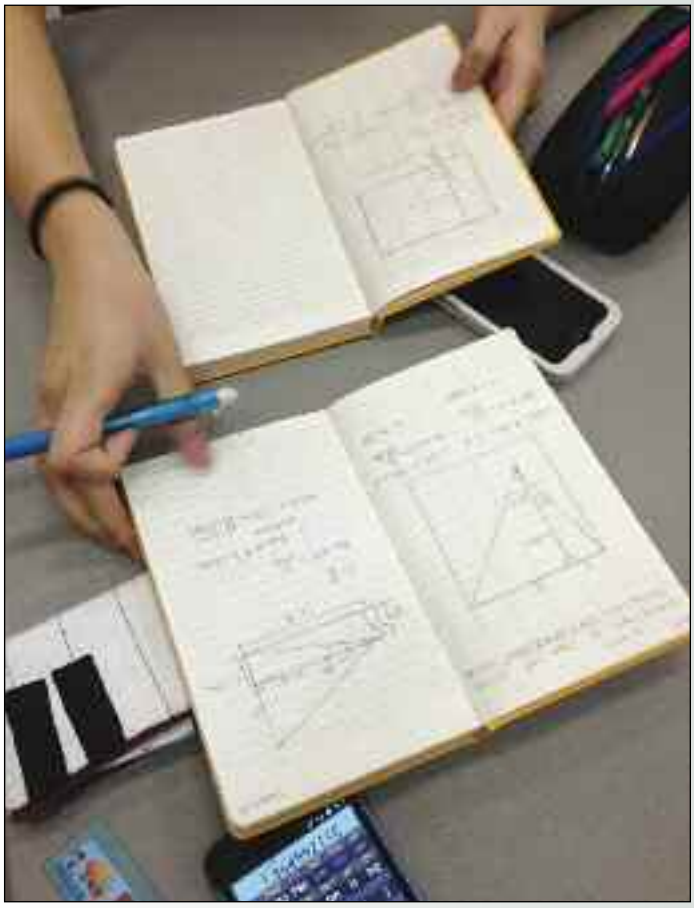
The reasoning behind these efforts is that targeting senior high school students in construction and technological education courses as prime candidates for information about, and experiences with, the surveying industry, represents the best opportunity to reach them as they commit to post-secondary education pathways. It's the nexus of best audience and best timing.

Building on his success at RGSS, Negru approached the Ministry of Education to approve "Introduction to Land Surveying" as a SHSM certification across the province. Once that approval was received in 2015, he began creating the curriculum any Ontario high school construction or technological design teacher could use, with a student's successful completion of the workshop being certified by AOLS. That curriculum will be going live on a secure section of the AOLS website in September 2016, structured as either a one-day conceptual introduction, or a two-day introduction that includes hands-on fieldwork with equipment. The certification will be available to students as an in-school field trip.

The Introduction to Surveying curriculum package contains relevant Ministry of Education expectations geared to senior construction and technological design courses in Ontario, unit and lesson plans, assessment tools, and an array of resources that would enable any technological studies teacher to deliver it in its concentrated format, or as the basis for a more extensive exploration.

To begin the steps to promote the course province-wide, the availability of the curriculum package will be first announced to the York Region District School Board (YRDSB). In November, Maureen will be presenting an overview of the material at a meeting of the Technological Studies Subject Heads group, which represents all of the 32 schools in the YRDSB. The next step in 2017 will be to speak to Technological Leads from other school boards, science teachers and other relevant groups.

Negru believes that the success of the program in other



Students checking their calculations in their field books.

schools will largely be dependent on surveyors around the province offering their knowledge and technical expertise both in the classroom and during field exercises, just as he experienced. The AOLS is committed to promoting the course and will be encouraging its members to volunteer once programs in their local areas are identified.

Claudia Kwok is a graduate of Richmond Green Secondary School. She is currently enrolled in the Publishing Program in the School of Communications, Media, Arts and Design at Centennial College.

NEWS FROM 1043

Changes to the Register

Members Deceased

Thomas Wilson	780	Oct. 31, 2015
Paul Jayson	1121	Feb. 6, 2016
Edward C. Tacium	1032	June 14, 2016
Timothy A. Young	1505	Sept. 1, 2016
Robert G. Waterman	1204	Sept. 12, 2016

Retirements/Resignations

Desmond A. Christopher	CR160	Jan. 1, 2016
Stewart D. McKechnie	1508	July 31, 2016
Ronald H. Smith	1296	Aug. 1, 2016
Robert F. Sevigny	CR189	Aug. 1, 2016

Reinstatement

Craig Leslie	1694	Aug. 15, 2016
Adam King	1972	Aug. 26, 2016
Richard R. Gauthier	1762	Sept. 7, 2016

Suspension Removed

Frank Delph	1306	Aug. 18, 2016

CofA's Cancelled

RS Geoinformatics
Toronto, Ontario, September 1, 2016

CofA's Revised

Was: Benedict Raithby Inc.
Is: Benedict Raithby Inc. (a division of NA Geomatics Inc.)
Woodstock, Ontario, July 1, 2016

CofA's Relinquished

Story Geomatics Inc.
Haileybury, Ontario, July 8, 2016

Ronald H. Smith Ltd.
Gananoque, Ontario, August 1, 2016

Surveyors in Transit

Francis Lau is now with **Ivan B. Wallace Ontario Land Surveyor Ltd.** in Belleville, ON.

John C.G. Keat is now the managing OLS at **Coe, Fisher, Cameron Surveying (a division of J.D. Barnes Limited)** in Lindsay, ON.

Nancy Grozelle has relocated to the **Ministry of Government and Consumer Services** office at 300 Water St., 1st Floor, North Tower, Peterborough, ON, K9J 3C7, Phone: 705-755-5143.

William E. Parsons is no longer with **J.D. Barnes Limited** in Thunder Bay.

Stantec Geomatics Ltd. has a new branch office located at 600-171 Queens Avenue, London, ON, N6A 5J7. **Jeremy Matthews** is the managing OLS.

McIntosh Perry Surveying Inc. has a new consultation office located at 1-1329 Gardiners Road, Kingston, ON, K7P 0L8. Phone: 613-267-6524. Hours are by appointment only.

Ryan W. Seguin is now with **Surveyors On Site Inc.** located at 569 Helmer Pedersen Drive, P.O. Box 3095, New Liskeard, ON, P0J 1P0.

Bruce Brouwers is no longer with the **City of Toronto Engineering & Construction Services Land and Property Surveys.**

Mansour Ghofrani is now with **Krcmar Surveyors Ltd.** in Thornhill, ON.

Jason Chun-Ho Mo is no longer with **Krcmar Surveyors Ltd.**

Hugh S. Coutts is no longer with **RS Geoinformatics.**

William Akehurst is now with **WJSurveys Ltd.** located at 711 – 35A Street NW, Calgary, AB, T2N 3A3. Phone: 587-586-3855.

Richard Gauthier is now with **Annis O'Sullivan Vollebekk Ltd.** in Nepean, ON.

Jeff Talbot is now the managing OLS at **Stewart McKechnie Surveying Limited** in Waterloo, ON.

THE AOLS IS PLEASED TO ANNOUNCE THAT THE FOLLOWING ONTARIO LAND SURVEYORS WERE SWORN IN:

Luke G. Wilcox	1996	July 26, 2016	Rob C. Leiper	1997	July 26, 2016

Survey Review Department Forum

By Tim Hartley, O.L.S., Survey Review Department Manager

This is a new feature in the Ontario Professional Surveyor where we at the Survey Review Department (SRD) will attempt to one, answer your questions and two, relay our views on the surveys that you have submitted and the process of reviewing them.

The Survey Review Department consists of five members; Administrative Officer Sheila Lavina; Assistant Field Examiner Herman Bernardo, part time OLS Field Examiner Alan Worobec; two OLS Comprehensive Review Consultants Doug Reitsma and Drew Annable; and me as the Manager. The department is totally funded from the revenue raised from the plan sticker sales. Below are two of the questions that we have been frequently asked, our answers, and some of our thoughts and ideas.

Are all of the surveys that we are asked to submit for a Comprehensive Review field examined?

We request a minimum of four plans from a firm and the number after that is dependent on the number of surveyors in the firm. For a one-OLS firm we will do a field examination on one or maybe two plans depending on the circumstances. If there is more than one OLS in the firm, we will attempt to field examine a plan of each surveyor. New construction surveys are not normally field examined as these sites are usually dynamic and many changes have probably occurred since the survey was completed. The usual explanation given at the office visit about field examinations is that we do not pull a transit out, we concentrate on checking for evidence, features and monumentation. We are not resurveying the property.

Some of the common errors that we find during a field examination are for example, overhead utilities that have been missed and eaves on buildings that are close to the property line but not shown on the plan. But more importantly, we find that if field notes are not prepared in the traditional manner but instead consist of only data collector-coded points then we frequently find that features along the boundary, such as fences and hedges, are shown in the wrong position with respect to the property line.

Why can't the requests for Comprehensive Review files all be made during the winter when survey offices are traditionally slow?

I thought this was a no brainer too but as it turns out there is currently not enough time in the winter to request everything. During the months of January and February the entire AOLS office is almost totally consumed by the work required to prepare for the Annual General Meeting. It is therefore not until March that the requests for the plan sticker logs go out. As well, in the early part of the year we are still receiving copies of some of last years' deposited plans from various registry offices. We are now attempting to have each registry office send us the copies on a monthly basis. Also, if plan sticker logs, plans and supporting documents are not received in a timely manner or field note copies are not legible then it bogs down the works, resulting in everything taking a longer period of time. However, that is not to say that we are not working on the matter; our aim is that eventually all of the Comprehensive Review submissions will be requested during the slower times of the year.

I hope that this column has been of some help and if you have any questions feel free to call the office at **416-491-9020 ext. 34** and leave a message with Herman or call me directly at **647-529-9020.**

Advertiser's News

Cansel celebrates its 50th anniversary

Cansel, a provider of integrated software, hardware, training and professional services, is celebrating its 50th anniversary this year. Since its founding on March 15, 1966, Cansel has strived to provide exceptional customer service with minimum downtime and high quality products. As the business has expanded over the years, the focus has been on achieving two primary objectives: doing more for its existing clients in terms of delivering value, products and services and focusing on growth in Canada.

"As we celebrate 50 years in business, we are grateful to our employees and our loyal customers," said Lovett Lewis, Cansel's President. "The longevity and success of our company can be attributed to our customers who have allowed us to become their trusted partner and supplier and who continue to support us as we expand our products and services. Their challenges and feedback have pushed us to become a better company. Equally important, our employees' hard work, dedication and enthusiasm is one of the main reasons why we are recognized as a leader in the industry."

Since 2008 the company has been largely expanding its product portfolio, allowing customers to improve their field to finish productivity, which remains Cansel's primary motto and mission. Such expansions include becoming an Autodesk Platinum Partner, introducing a comprehensive variety of Wide Format products, and more recent acquisitions of Ernest Green and Dowco Technology Services.

Cansel takes great pride in being a Canadian owned and operated company for 50 years. Currently, Cansel is defined by 5 business units operating from 23 locations across Canada with over 400 employees. The company's commitment and focus on the Canadian market remains strong and forward-looking.

For 50 years Cansel has helped organizations in the engineering, surveying, construction, mining, architecture, manufacturing, utilities, forestry, and government sectors measure, analyze, design, and build more efficiently and profitably. Cansel's national team of professionals combine software, hardware and services to provide tailored solutions to improve your workflow, from field to finish.

Pat Hills, who is "Proud to be a part of this wholly Canadian company on this special anniversary!" joined Cansel 5 years ago. He is the Segment Manager for the Survey and Scanning business. Pat has also been an active supporter of the AOLS for over 20 years.

To retire or not to retire? When is the question...

By Graham Bowden, O.L.S. (Ret.)

Fellow land surveyors, are you planning to retire? Still making your retirement plans? Have a date in mind? Well here is some unsolicited advice on how to, or more correctly, how not to select a retirement date.

There is the "years from now" retirement date plan, as in, "I am going to retire in 1, 2, or 5 years." Well, a number like that just never arrives; it just keeps going and going. I suggest you Google a calendar and pick out a date in 1, 2 or 5 years hence. Write the date down. Pin the note to the wall. If you say it out loud on every significant family occasion, I promise you the date will arrive.

Or maybe you are more of a "big money" date planner. "I will retire when I win the lottery." So far I don't know of any OLS who has won big on the lottery. But keep planning, as your dream funds our health care system. Alternately, if you have lived longer than your parents, consider you have already won the lottery.

And there is the "event date" plan. "I will retire when I have my first heart attack." Well surprise, it may be next Tuesday when you get that twinge in the arm while cutting the lawn. Somehow I doubt your first thought will be, "yes, now I can retire".

Don't wait for your life partner to say "Come join me in retirement". You won't hear it, as they are too busy playing while your pay cheque is paying. Why not surprise them on their next birthday, or anniversary with the gift of your retirement. But don't be surprised if they say, "When?" not, "When!"

Don't wait for your work partners to suggest you retire. By the time they get around to it you will be well past your "best before" date.

How about the, "I will retire when someone buys my business" retirement plan. Good idea, but is there a "For Sale" area on the AOLS website? No? In that case your retirement is not likely to happen any time soon.

Finally there is the "I will retire when I have enough money" plan. Revenue Canada is also looking forward to you retiring so they can collect at least 40 cents of every dollar you saved. Retire sooner and give the CRA less money.

I bet you have parked in the same space at the office for 10, 20 or maybe 30 years. I did. Tomorrow, park in another space and see the looks you get from staff. You will hear their questions, "Is he/she okay?" Enjoy your private joke, as the real test is when you leave work and you can't find your car. Then it is definitely time to retire.

Need another reason to retire? Perhaps you have a part-time employed 30 year-old living in your basement who should move out. Retire and take up projects that require the use of power tools at 6 a.m. Or invite yourself to play video games with him. Call it "buddy time". It won't be long before you have a spare room to rent to supplement your pension income.

In the five years that I have been retired I haven't met anyone who said they retired too soon. Come to think of it I haven't met anyone who said they retired too late either, probably because they are in the cemetery.

Just like graduating from university, completing articles, or becoming a manager, a retirement takes commitment and effort. Make the commitment, make the effort and make a date.

Back to the original question, when should you retire? Here is a simple measure; retire when you still have some tread on your tires.

For questions or enquiries on retirement or stone sculptures, Graham can be reached at **gwbowden22@gmail.com**

In his "retirement" Graham Bowden keeps busy creating sculptures in an artist's studio at Williams Mill in Glen Williams, Ontario http://bowdenstonesculptures.com

Surveying the 49th Parallel: The Plains Metis and the British North American Boundary Commission

By Michel Hogue

Twenty years after the British North American Boundary Commission had completed its survey of the forty-ninth parallel across the Great Plains, some of its members worried that the commission's work had already been overshadowed or forgotten. At least, that's what it must have seemed like to L.F. Hewgill, a member of the joint British-Canadian commission between 1872 and 1874. Hewgill was motivated to put pen to paper and to record his experiences on the boundary survey after reading an account published in the *Regina Leader* that celebrated the accomplishments of the North-West Mounted Police and that credited the Mounties with having been the first to trek across the Plains in 1874. Hewgill was determined to set the record straight and to re-claim that "first" for the Boundary Commission. "It is needless to say we had no guide," he asserted, "but like a ship at sea, travelled by observation and established our line as we went along."

Hewgill's efforts to write back against the fading public memory of the boundary survey betrayed his own tendency to forget. By representing the Plains as both empty and unknown, Hewgill completely effaced the pivotal roles that Metis played in the operations of the Boundary Commission. While it might be tempting to dismiss his account as an act of pioneer one-upmanship, it is nonetheless suggestive of a collective forgetting about the Metis role and of the Metis presence in the borderlands of the Canadian-U.S. West more generally. While the members of the Boundary Commission surveyed and marked the forty-ninth parallel, they were surprisingly dependent on Metis individuals and communities for the diplomatic work that ensured that the survey proceeded largely without incident. Moreover, Metis labour and expertise sustained the commission's work in vital ways.

A closer look at the records generated by the Boundary Commission reveals the essential roles that Metis individuals and communities played in executing or enabling the boundary survey. Lawrence Barkwell and Larry Haag have documented, for example, how the thirty Metis guides and scouts—the 49th Rangers—were chosen because of their knowledge of the Plains landscapes, their experience interacting with other Plains peoples, and their demonstrated abilities as hunters. These men, along with their leader, William Hallett (who had been a chief of the famous Red River buffalo hunting brigades), had spent much of their lives on the Plains. One Manitoba newspaper confidently asserted that they therefore knew "every inch of the ground" that the surveyors would cover. Their close connections with different Plains First Nations, meanwhile, meant that they could "converse with the Indians in their native tongue, and [were] thoroughly conversant with their habits. Men like these... will do more towards carrying such an expedition safely through, than all the troops that will accompany it."

Sappers of the North American Boundary Commission building a boundary mound [August-September 1873], *Library and Archives Canada, C-073304.*

The newspaper's editors captured an important truth: In the volatile and unpredictable world of the northern Plains in the 1870s, Metis played critical roles in the political and diplomatic negotiations that surrounded the survey. In 1872, the year before the surveyors set out west from their base in Dufferin, Manitoba, the U.S. army escort which was sent to guard the surveyors working on the line of the Northern Pacific Railroad through the Yellowstone Valley had clashed with Lakota, Cheyenne, and Arapaho warriors who objected to the railroad's construction through lands they considered their own. As he prepared to lead the British-Canadian commission later that summer, Captain David Cameron

relayed menacing reports passed to him from Metis traders and hunters who told of plans by the Lakotas to stop the railroad construction in the summer 1873. Such reports confirmed widespread concerns that conflict surrounding the railroad survey would not only interrupt the American commission's efforts to survey the international boundary, but might also derail the Canadian-British efforts as well. For this reason, Canadian officials tapped Pascal Breland, a prominent member of the Red River Metis community and former Plains trader, to act as one of the emissaries who travelled across the Plains to investigate reports of unrest along the border. Other Metis emissaries also went west to alert Plains peoples of the plan to initiate the boundary survey later that season. Together, the emissaries' knowledge of Indigenous diplomatic and cultural protocols and their existing connections to key Indigenous leaders were indispensable in conveying the official news about the planned survey and in allowing officials to learn about events on the ground. These Metis connections helped officials make sense of the complicated human landscape of the Plains.

Metis Traders, ca 1872-75, *Library and Archives Canada, C-004164.*

The work of Metis emissaries like Breland was largely hidden from view and therefore easy for many members of the Boundary Commission to overlook. Yet, even the many quotidian interactions between Plains Metis and surveyors have faded from memory. For instance, the commission's commissary, veterinary surgeon, and the geologist all relied on the creaky Red River carts that Metis hunters, traders, and freighters had long used to haul their supplies across the Plains. The carts as well as the jackets, trousers, and mitts the men wore while journeying west were secured for the members of the commission at Red River and were likely produced by Metis men and women who routinely outfitted travellers with such necessities.

That those Red River carts travelled along some of the trails that Metis trading and hunting parties blazed in previous years offers another physical reminder of the pre-existing Metis presence in the borderlands of the Canadian-American West and of their contributions to the survey. These trails connected the settlements in Red River with the buffalo fields to the west and Metis wintering settlements at places like Wood Mountain, where the commission established its terminal depot in 1874. The casual exchanges that occurred at Wood Mountain and along these trails between commission members and Metis travelers and traders offered key opportunities for commission members to secure information about the route ahead, and even to hire translators as they moved west. Some of this information gleaned from these interactions found its way into the voluminous reports published by George Dawson, the geologist and naturalist who conducted his own investigations alongside the work of the survey. Dawson's private journal gives hints as to how some of the information that he secured from his face-to-face conversations with Metis and others made its way into his published observations about the geology and resources of the northern Plains. Thus, a more fine-grained account of the depth and nature of the interactions between Metis and the members of the Boundary Commission allows us to see the surprising dependence of Canadian and British officials on the labour, expertise, and goodwill of Plains Indigenous peoples as they planned and executed the survey and how Metis intelligence

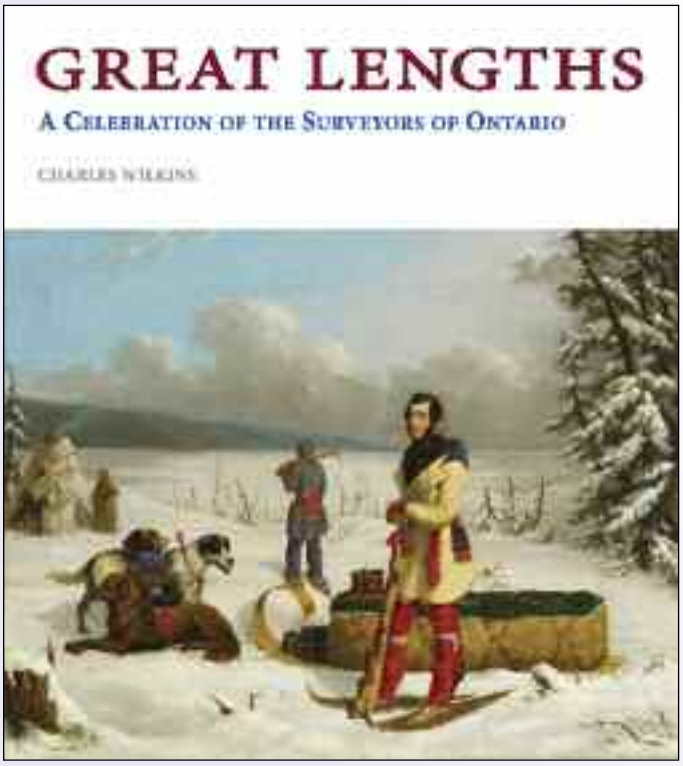
View of Metis camp [Milk River Lake, July-August 1874], *Library and Archives Canada, C-081785.*

cont'd on page 32

about the lands and peoples of the Plains shaped official views of this region.

The formal survey of the forty-ninth parallel marked an important turning point for the Metis communities who inhabited this portion of the Plains. The physical marking of the border and the drafting of the first detailed maps of the region began to exert their own power on the Metis and on other borderland inhabitants. In the years following the survey's conclusion, officials in both Canada and the U.S. eyed the large Metis presence along the border. By decade's end, the close connections between Metis and other Indigenous peoples like the Dakotas and Lakotas that had served the commission well and that had allowed Metis emissaries to secure valuable intelligence, generated intense concern among U.S. officials. Convinced that the Metis traders who frequented Lakota camps were the source of the arms and ammunition that the Lakotas and others used to resist American expansion, the army cracked down on this illicit traffic. These cross-border trade networks became a focal point for the army's efforts to disrupt the flow of these weapons south. By the late 1870s, Metis and other Indigenous buffalo hunters also experienced the effects of the growing militarization of the forty-ninth parallel as the U.S. Army sought to keep those hunters north of the forty-ninth parallel. Concerns about illicit cross-border trade and the influx of "foreign" hunters onto American soil invested the border with meaning and brought to life the stakes associated with enforcing the border as a meaningful divide between the two countries. For Metis, the border that they had helped to survey became a powerful new symbol of the desire among U.S. and Canadian officials to divide and absorb the the North American West.

Michel Hogue is the author of *Metis and the Medicine Line: Creating a Border and Dividing a People*. He teaches classes in Indigenous, Canadian, and U.S. history at Carleton University in Ottawa. Michel's book can be found in the Book Reviews on page 35.



Charles Wilkins has been a fulltime writer for more than 30 years. He is the author of 15 books, including, most recently, *In the Land of Long Fingernails* (a memoir about a summer spent working in a large Toronto cemetery) and *Little Ship of Fools* (about his 2011 row across the Atlantic Ocean). His journalism has earned five National Magazine Awards, and he has been a finalist for half a dozen national literary awards. Four of his books have been named to the *Globe and Mail's* annual Top 100 Books. Charles is writing *Great Lengths – A Celebration of the Surveyors of Ontario* for the 125th Anniversary of the Association of Ontario Land Surveyors which will be celebrated in March 2017 in Ottawa. To aid in the book's preparation, several sponsorship opportunities have been made available. Please see above.

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EDUCATIONAL FOUNDATION NEWS

Congratulations to a few more of our Educational Foundation Award Winners

2015 University of Waterloo Awards – Paul Donchenko and Mark Ong, both 3rd year students in the Honours Geomatics Cooperative Program received **Geomatics Awards** as the top two students in the Geomatics program who have completed the course GEOG 310 (Geodesy and Surveying). **Academic Excellence in Geomatics Awards** were presented to the top students in the Geomatics program. **Daniel Markhevka**, a 2nd year student in the Honours Geomatics Cooperative Program received his award in the winter term. **Brian Wan,** a 3rd year student in the Geomatics program received his award this spring.

York University - Anna Tsvetanova and **Saied Sedaghatjahromi** received awards for achieving the highest grades in **LE/ESSE 4670 Survey Law** and demonstrating a strong interest in cadastral surveys during the course.

Richmond Green Secondary School - Derek Lin received an **Award of Excellence in Technological Design and Geomatics** as the top grade 12 student in the **Introduction to Surveying** class taught by John Negru.

November 1st –Time to join or renew your membership!

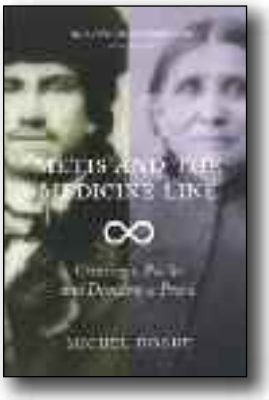
In 1975 the first Educational Foundation awards were presented to **Paul Miller, OLS** and **Jim Statham, OLS (Ret)** for their academic excellence in the Survey Science Program at Erindale College. Since that time, more than $390,000 has been awarded to over 370 students in various university, college and now high school, Geomatics programs. Currently 20 of our 80 Articling Students are Educational Foundation award winners; that is 25%. Please support the Educational Foundation and "Invest in the Future" of our association by making a donation or becoming a member. Please contact the AOLS office or make a donation online at www.aols.org/resources/donate

The Educational Foundation would like to recognize with thanks another donation made in the memory of Jim Nicholson.

BOOK REVIEWS

Metis and the Medicine Line
Creating a Border and Dividing a People

By Michel Hogue



Published by University of Regina Press

ISBN 978-0-889773806

Metis and the Medicine Line tells the remarkable story of the Plains Metis and their role in creating the Canada-U.S. border, brought vividly to life by history writing at its best. Author Michel Hogue shows how the mobility of the Metis and Indigenous peoples who mixed freely across both sides of the border presented challenge to 19th-century bureaucrats, who were ordered by their eastern counterparts to "restrain their 'Indians'". The bureaucrats then used "either-or" categories of race to assign people legal identities and ultimately, unlock access to Indigenous lands.

Grounded in extensive research, *Metis and the Medicine Line* also illuminates a hidden history of violence that created the "world's longest undefended border," and challenges Canada's peaceful settlement story of the West.

Information taken from the publisher.

Reclaiming the Don
An Environmental History of Toronto's Don River Valley

By Jennifer L. Bonnell

Published by University of Toronto Press

ISBN 978-1-4426-1225-9

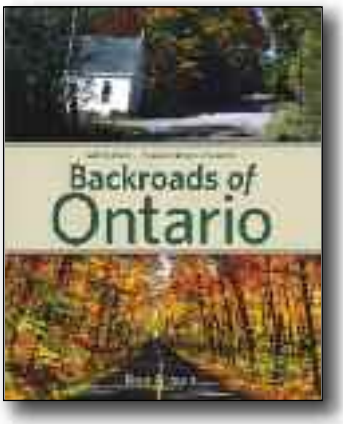
Reclaiming the Don explores the historic relationship between the Don River and the city through which it runs. An environmental history, Bonnell's book examines the river's place in the public imagination from the establishment of the town of York in the 1790s to the construction of the Don Valley Parkway in the 1960s, and beyond.

Bonnell explains how for more than two centuries the Don has served as a source of raw materials, a sink for wastes, and a place of refuge for people pushed to the edges of society, as well as the site of numerous improvement schemes that have attempted to harness the river and its valley to build a prosperous metropolis. Combining extensive research with in-depth analysis, *Reclaiming the Don* will be a must-read for anyone interested in the history of Toronto's development.

Information taken from the publisher.

Backroads of Ontario, 4th Edition

By Ron Brown



Published by Firefly Books Ltd.

ISBN 978-1-77085-707-0

Backroads of Ontario invites travelers to leave the hustle of the city and take a journey through Ontario's countryside. Author Ron Brown maps out the most interesting, seldom-travelled roads and knits vivid descriptions into foolproof directions that anyone with a map or GPS can follow. Each path is illustrated with photographs, a map and is accompanied by information about the history of each route including the road's origins as well as how each road has helped shape the surrounding towns, villages and Ontario as a whole.

Travelers will discover fascinating vantage points and places of historical interest along the way including: long-abandoned ghost towns; charming villages; century-old mills and farmhouses; dramatic cliffs; picturesque picnic spots; stunning architecture; and so much more. This updated and revised fourth edition also includes new attractions; additional photographs and the most updated directions.

Information taken from the publisher.

The Last Word

URISA to celebrate its 50th Anniversary in Toronto, Ontario

The Urban and Regional Information Systems Association (URISA) is an independent, not-for-profit organization which was officially established in the United States in 1966. It emanated from a conference held to "trade information on developments in regional information systems" at the University of Southern California on August 28, 1963. This first conference was organized by Edgar Horwood, a professor of civil engineering and urban planning at the University in Washington. Horwood became the founder of URISA and was its first president in 1966.

With the evolution of global technology and advancements in Geographic Information Systems (GIS), URISA has become "a multi-disciplinary geospatial organization that provides professional education and training, a vibrant and connected community, advocacy for geospatial challenges and issues, and essential resources". The AOLS is a member and industry partner of URISA Ontario, whose member volunteers work hard to bring together professionals involved in the application of information technology and integration of land-related data in the fields of GIS, planning, conservation, engineering and surveying in the private, public and education sectors.

URISA will mark its 50th anniversary at the GIS-Pro 2016 conference, which is being hosted by the Alberta, British Columbia and Ontario chapters of URISA, at the Westin Harbour Castle in Toronto from October 31 to November 3, 2016. Of note during the conference, longtime supporter of the surveying profession, Alex Miller, President of Esri Canada will be inducted into URISA's GIS Hall of Fame for his significant and original contributions to the GIS profession.

Visit http://www.urisa.org/education-events/gis-pro-2016-urisa-s-54th-annual-conference for more information on URISA and the GIS-Pro 2016 conference.

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