

Ontario Professional Surveyor



on the cover ...

**Niagara Falls, Ontario
Site of the 126th AOLS AGM**

also in this issue ...

**From Then until Now – 40 Years of GPS
Airborne LiDAR – More than an
Emerging Technology
Scan to BIM – Opportunities and
Pitfalls for Surveyors**

plus our regular features

**Educational Foundation
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ON THE COVER ...

The photo of Niagara Falls is credited to ©Ontario Tourism Marketing Partnership Corporation.

The City of Niagara Falls is the host city for our 126th AGM which runs from February 28 to March 2, 2018 at the Sheraton on the Falls Hotel. For a little bit of background on the city, read *A Little History of the Settlement of the City of Niagara Falls* in The Last Word on page 40.

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President's Page

By Russ Hogan, O.L.S.



As the end of my term as President approaches, I would like to highlight a few of the issues and initiatives that have been keeping our committees, Council and the AOLS staff busy.

The Professional Standards Committee (PSC) has spent considerable time reviewing the use - and misuse - of sketches and has now submitted their recommendations to Council for consideration. Their review included numerous examples of sketches produced by members as well as the responses to a member questionnaire on the use of sketches. The committee is recommending that the existing Guidelines for Sketches be updated, the expectations imposed by the Guidelines be communicated to our members and that sketches be subject to review by SRD. I commend the work done by the PSC and fully support their recommendations.

One of our strategic priorities is to review the legislation & regulations that affect the AOLS and identify any legislative amendments necessary to keep them current and effective. The Legislation/Regulation Task Force was formed to lead this initiative and has completed its own review, undertaken a jurisdictional scan and is in the process of gathering input from AOLS committees. When this work is complete recommendations for proposed changes will be presented to the membership for discussion.

Another key strategic priority is "Developing New Members" and there is an on-going effort through the work of PAC and GRLC to raise awareness of the surveying profession and its career opportunities with high school students. This is important and needs to continue. York University now has both a Geomatics Engineering program and a Geomatics Science program and the AOLS would like to work with the university to promote both programs to increase the number of students entering Geomatics.

We also need to attract the current Geomatics students into the surveying profession. There are many job opportunities for graduates and we need to ensure that they know about the surveying industry and its great career opportunities. Blain and I have met several times with representatives from York to identify opportunities to interact with students and to make our pitch for the profession.

A key factor for anyone trying to decide on a career path is good information about salary and long term earning potential. To ensure that we have accurate and up-to-date information about the remuneration that surveyors receive we are preparing to undertake another Salary Survey in early 2018. We are working with representatives from a number of our sister associations to

develop a survey that will be sent to professional surveyors across Canada. I encourage all members to take the time needed to respond and provide accurate information.

More details of these and other initiatives will be presented at our upcoming AGM in Niagara Falls. Blain and I have been working on the agenda with the goal of having a program that is not only interesting and informative but also designed to generate discussion about the Association's strategic priorities and to solicit ideas for Council to consider in the coming year.

Wednesday will consist of plenary sessions with presentations and our keynote address from Eric Termuende, a dynamic young speaker who will present his vision of the future of work, engagement in the workplace and creating a workplace culture that will help retain top talent. The presentations will include Commission Reports, updates from the Legislation/Regulation Task Force and the Province Wide Survey Records Index Task Force, a report back of the results of the member response to the Survey Records Search Fees questionnaire and a report from York University. The day will close with the first of two Open Forum sessions to provide members the opportunity to provide feedback.

Thursday will begin with plenary session presentations by the Beach Task Force (the evidence that should be considered when surveying beach properties) and by the Professional Standards Committee (their recommendations regarding sketches). The remainder of Thursday will consist of concurrent sessions that will feature interactive presentations to provide members with an opportunity to ask questions and provide feedback. Topics for these sessions will include: Digital Plans Submission – Service Ontario; Sketches – Professional Standards Committee; Council Q&A – Council members, and a Writing Workshop with Charles Wilkins.

Friday morning will be our regular business meeting and will end with a second Open Forum session to provide members with the opportunity to provide feedback. Of course there is a great social program to go along with the educational and business sessions.

Although some issues take longer than expected to resolve much has been accomplished over the course of the past year and I'd like to thank Council and all of the committees and task forces for their time and efforts to move our initiatives forward. Finally I would like to acknowledge and thank all of the AOLS staff for their hard work and commitment to the betterment of the Association. Without the efforts of every one of them we would not be able to meet the expectations of both the membership and the public. It has been a pleasure to serve as President and I thank everyone for the support you have provided throughout the year.



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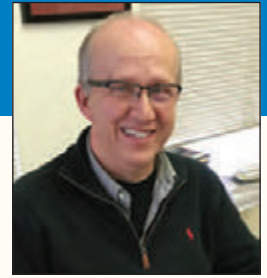


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Executive Director's Notes



By Blain Martin

In this column I would like to share my thoughts on how we are progressing with replenishing our membership with younger and vibrant members. Many of you know that I am approaching the 9th year in my position as Executive Director. One of the things that I have talked about over and over is the demographics of our membership. I clearly remember my first presentation concerning demographics at a South Central Regional Group (SCRG) meeting. At that time several SCRG members pointed out that my message seemed to be about “doom and gloom”!

That “doom and gloom” seemed warranted and we still find that 74% of our members are over 50 years old and 33% are over 60, with the total number of members decreasing each year. Although the chart is not clear, I sense we have turned the corner and our membership numbers are levelling out. That being said, there is still a lot of work to do to revitalize our profession.

One good thing about the chart is the number of articling and evaluated students in the system. They are increasing every year and I do not see those numbers lessening. There are a number of factors that have helped increase these numbers and these include an engaged membership, recruitment of foreign trained professionals and the work of various committees.

Two committees that are crucial to this increase are the Public Awareness Committee (PAC) and the Geomatics Recruitment and Liaison Committee (GRLC). PAC has reached out to all sectors of society to promote our profession. This includes writing articles for municipal and provincial organizations and attending various conferences and shows, such as the Ontario Good Roads Association Conference and Realtor Quest. Each of these endeavours gets our name in front of people and helps us to become better known.

GRLC is primarily focused on Secondary Schools and promoting surveying as a career to teachers, guidance counsellors and ultimately students. Of course our recently published book is a great marketing tool as the stories are engaging and make people want to learn more about our profession. When we solicited sponsorship for the book one of the goals was to print enough copies to be able to give one to every secondary school in Ontario.

Rather than going to individual schools we have been addressing School Boards. So far we have made presentations to Durham Region, York Region and Simcoe County School Boards. There are two directions that our interaction is taking with these school boards.

The first direction is to encourage more schools to participate in the Specialist High Skills Major (SHSM) Surveying Certification Program as was described in the Fall 2016 issue of

the Ontario Professional Surveyor. Part of our offering to teachers is a lesson plan that they can access in a secure section of our website. The Ministry of Education has shown interest in this initiative and GRLC is promoting this heavily.

The second direction involves working with Guidance Counsellors. In our visits to each of the three school boards mentioned above we met with the Guidance Counsellor Supervisor who in turn is sharing our information and books with his/her individual school Guidance Counsellors. This contact at each Board has allowed us to leverage the educational hierarchy and saves us from having to contact all the secondary schools in Ontario individually.

Developing a complete list of Secondary Schools and School Boards was one of the projects that our summer student worked on last summer. There 31 Public and 30 Catholic School Boards in Ontario.

Of course these school boards are spread across the province and we will need volunteers from each Regional Group to visit their local school boards. This commitment has led to the creation of a new task force specifically for this endeavour. If you would like to volunteer for this group, please send Joyce, at the AOLS office, a note. Rudy Mak has taken on the role as Chair of this task force under the guidance of the GRLC.

The potential for us to encourage secondary students to enter our profession is great. That being said, Maureen and I met with

Age	2010	2011	2012	2013	2014	2015	2016	2017
Evaluated Student	88	88	85	84	83	82	80	79
Articling Student	52	48	49	50	51	52	53	54
20-29	5	5	5	5	5	5	5	5
30-39	45	42	40	39	38	37	36	35
40-49	120	112	105	102	100	98	96	94
50-59	217	204	197	192	188	184	180	176
60-69	117	110	107	104	101	98	95	92
70-79	40	38	36	34	32	30	28	26
80+	5	5	5	5	5	5	5	5
Total	439	426	413	409	405	399	392	387
Membership %	8.6%	8.6%	7.9%	7.9%	7.8%	7.6%	7.5%	7.4%
Membership Growth	2.0%	2.0%	1.1%	0.2%	0.2%	0.1%	0.1%	0.1%
Membership Growth - Excluding Evaluated 2017	2.0%	2.0%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%
Membership Growth - Excluding Evaluated 2016	2.0%	2.0%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%



Left to right: Murray Purcell and Blain Martin present a copy of our book to Dale Orfanakos, Library Technician and Kristin Chaisson, Curriculum Consultant at the York Region District School Board office in Newmarket.

the SHSM Board Lead for the York Region District School Board and he told us that many other organizations are taking the same approach to revitalize their industry or profession. Fortunately we have our book with its incredible stories of surveyors and that really helps attract the right attention. And of course, we have an advantage as our profession is the most interesting.

Personally it is tremendously exciting to see these initiatives get underway as I believe it will encourage many students to consider land surveying as a career and of course it also has the intangible benefit of letting more people know about our profession.



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LOGAN WEALTH MANAGEMENT

A Land Surveyor's Duty of Care: What Duties are Owed to a Client's Neighbour?

By Izaak de Rijcke

In the last year there have been a number of opportunities for me to deliver Continuing Professional Development in person to an audience of land surveyors across Canada. The topic of this article and the question of professional responsibility for land surveyors as regulated professionals and as public officers, has been very popular. The notion of a public duty may not immediately come to mind for surveyors in private practice who are retained by a land owner or developer to produce a product that will relate to some private transaction. It is of course clear that the land surveyor must complete that work with the appropriate level of competency. This short article will also consider that a land surveyor, through special skill, contributes to and helps maintain the parcel fabric itself. It concludes by exploring what we may well want to remember: as land surveyors we hold a considerable degree of public trust.

In practising his or her profession, to whom does the land surveyor owe a duty of care and what does that duty entail? This is a particularly timely topic because this is an area that may be causing some uncertainty, and providing some background context may assist surveyors in being proactive in avoiding complaints and claims.

The question of the relationship of the land surveyor and any duty there might be to the non-client neighbour has been explored through several recent, but different court of appeal level decisions across Canada – and with seemingly different conclusions. What does this mean for land surveyors? Again – and to repeat - the questions at the heart of this query are: to whom does the land surveyor owe a duty and what does that duty entail? For practising surveyors, this becomes an urgent question, governing the nature of a land surveyor's interactions with the client and with an adjoining land owner. Let's begin by looking at how some courts in Canada have recently wrestled this topic to the ground.

MACKAY V. MACKENZIE, 2016 PECA 16

[11] A land surveyor is a public officer. In establishing a client's boundaries he does not represent a single client; instead he represents society at large. A surveyor must be fair and impartial to all parties; he cannot give undue consideration to his client's interests and disregard the interests of his client's neighbour and potential adversary. [...]

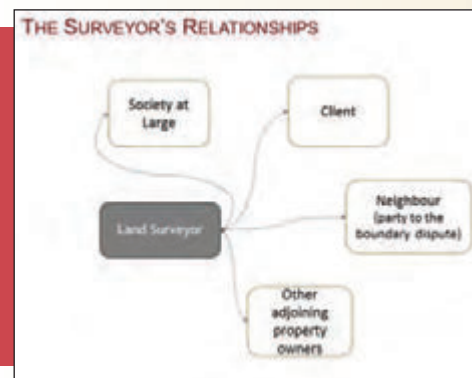
- *Burke v. Watson & Barnard (A Firm)*, 2016 BCCA 439

- *Black v. Norris and Registrar General of Land Titles*, 2012 NBQB 346

This quotation from the recent decision of the Prince Edward Island Court of Appeal in *MacKay v. MacKenzie* speaks to the role of the land surveyor as public officer and a need for fairness and impartiality.

But what does this mean in practice?

In a recent decision from the Court of Appeal for British Columbia, the result was a finding of no duty owed to the neighbour, but in the New Brunswick Court of Queen's Bench decision in *Black v. Norris* there had been an order made against the land surveyor related to his failure to properly consider the neighbour's interest – an order reversed at the Court of Appeal as the surveyor had been a non-party in the proceeding.



There is a multiplicity of relationships that exist between land surveyors and others...

This simple graphic allows us to consider the other parties, besides society at large, to whom the land surveyor owes a duty. What about a surveyor's oath, Code of Ethics, or Professional Standards? Can a duty be owed to the cadastre? There is the obvious duty owed to the client – as dictated by the terms of the professional services agreement, but also through the professional standards of practice. It is the client who hires a surveyor in the midst of a boundary dispute and will be relying on that surveyor's professional opinion and expertise. But what about the neighbour or other owners? Should we also consider adding "other members of the profession" as a further box as interactions between colleagues are also governed in part by codes of ethics and standards of practice?

While this topic of "duty" stems from the nature of land surveying as a regulated profession, we can appreciate that in each province, there is a separate governing legislative framework; the applicable legislation in Ontario is the *Surveyors Act* which provides the statutory authority for the self-regulation of the profession. More particularly, it establishes the Association, and empowers the regulator to pass by-

laws related to self-governance, discipline and professional standards.

This framework represents a codification of the minimum professional norms and competencies that are expected of practising land surveyors and, in turn, reflect a public trust. Within Ontario Regulation 1026 one will find the Code of Ethics and Standards of Practice as adopted and we can find further details of public duty therein. But how does the duty to maintain public trust interplay with the professional surveyor's duty to society? Understandably, this duty to society may not be something that comes immediately to mind when retained by an individual or corporate client for a particular project.

By "society" do we understand this to mean the adjoining owner? If so, what does the duty entail? Could it be enough to trigger a complaint to the regulator related to professional competence? Or even a tort claim in negligence by the neighbour? For answers we must turn to the case law for guidance.

The decision in *Black v Norris* is a lengthy one, covering a variety of relevant topics for the practising surveyor. The case involved a dispute over waterfront properties – the plaintiff and defendant being adjoining land owners. The defendant owner had hired a land surveyor to prepare a plan of subdivision. In preparing same the surveyor attempted to contact the adjoining owner but was unsuccessful because he spent much of his time out of the country. The surveyor prepared the plan, despite no contact having been made. This plan was registered, and then eventually disputed once the neighbour became aware of it as it appeared to include a swath of land to which he believed he was entitled.

At trial, the land surveyor was ordered to prepare and file a new plan at his own expense, although this order was struck down on appeal as the land surveyor was not a party to the litigation.

Regarding the land surveyor's relationship with the non-client neighbour, the Court of Queen's Bench said this:

BLACK V. NORRIS AND REGISTRAR GENERAL OF LAND TITLES, 2012 NBQB 346

[554] The surveyor owes a duty of care not only to the person who contracted for the survey work to be done but also, based on the decision in *Hedley Byrne & Co. Ltd. v. Hillier & Partners Ltd.* (1964) A.C. 465, to anyone whom the surveyor should reasonably expect will be relying on the surveyor's special skills

Such a duty of care is a broad one indeed! First, one would expect that it might apply to the neighbour of one's own client. I will suggest to you that the duty to that neighbour is not less - but equal. Second, it does not stop here because when either owner sells their property, they, or their realtor, will happily assume that your survey or certificate is something that can also be sold to a buyer.

Now your duty arises with respect to future owners who

believe they have a trusted, reliable and correct certificate. *Burke v. Watson* involved a negligence claim brought against a land surveyor - not by the client, but by the opposite party in an underlying boundary dispute. A brief history: the underlying dispute boiled down to two neighbours disagreeing over the location of a fence – it made its way through the court system under the style of cause "*Phillips v Keefe*". A surveyor was hired for an opinion, a summary trial decision was in favour of the surveyor's clients, the court of appeal ordered a new trial, the judge at the second trial concluded that the survey was incorrect and awarded damages and costs in favour of the neighbours.

The second outcome was 180 degrees different. Many tens of thousands of dollars later, the successful neighbour sues the land surveyor, and a second appeal upholds the second trial decision and awards costs to the neighbour - but sets aside a damages award. The neighbour, while successful on the fence dispute, is now out of pocket considerable costs as the costs awarded by the court do not fully cover her out of pocket legal costs (they never do).

In order to recover legal expenses, the neighbour then brought a claim against the surveyor to recover both her out of pocket costs related to the court proceedings and "future expenses". An application was made to strike this in chambers on the grounds that *no duty of care is owed by the surveyor to someone other than his or her client and unrecovered legal costs cannot be considered "damages" in a negligence action*. This all seems reasonable since the neighbour has no relationship to the client... right? Well, no. The Chambers Justice said no, there are other cases out there (*Black v, Norris* was cited as an example), that seem to suggest some sort of duty owed to an adjoining property owner.

Moreover, all the codes of ethics that apply to land surveyors reference a duty broader than merely to one's own client. The Chambers Justice refuses to strike the pleading, ordering the matter be heard. So the matter remains before the courts and the surveyor's pain continues.

BURKE V. WATSON & BARNARD (A FIRM)

I do see the logic in distinguishing the work of a land surveyor, who is expressing an opinion not only about the boundary of his or her own client's lands, but also the boundary of the adjoining land from that of a solicitor who clearly has a duty of loyalty to act only in the interests of his or her client...

- BCCA appeal decision at para 14 citing Chambers decision at para 23

This can be a slippery slope and if one begins to bring in others, beyond the client, into the group to whom a duty is owed in an advisory context, the decision explicitly raises the issue and policy concern of the "spectre of indeterminate liability"

To whom - among those who might in one way or another

cont'd on page 8

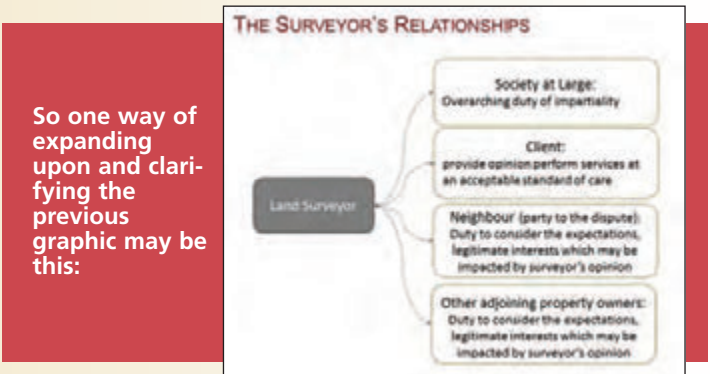
be impacted by the surveyor's opinion – is then a duty owed? The question now begins to centre on whether there was a case for a duty of care which, at common law, relates to a test for proximity. What is relational proximity? Proximity is the notion of a connection between the plaintiff's claim and the defendant's conduct and reflects the closeness of the relationship between the two – it is a way of containing the limit of the duty. Is the connection close enough or would it be unreasonable, unjust, or unfair to impose a duty of care?

This test, in the context of common law claims of negligence is articulated in the decision of *Hedley Byrne*. A key component of the test concerns the relationship between the parties – more particularly is that relationship of sufficient proximity – are they parties connected in a close enough way that it is fair to impose a duty of care? Where one seeks out the services of a professional and relies on that professional's opinion, clearly there is a duty. But might other parties be caught under the same net? What does this mean in practice?

Considering *Hedley Byrne*, the test for evaluating the closeness of the relationship between parties, one would need to examine the expectations of the parties, the representations made, and the nature of the reliance that one places on those representations among the other interests involved.

Is *Burke v Watson & Barnard* at odds with other decisions that describe a duty of care owed by the land surveyor? No. A surveyor has a duty of impartiality that is objective – think of standing 50% of the time on either side of the fence. There are limits to duty based on common law principles of reasonable foreseeability & proximity. These principles are not open ended to the world but there is a certain difficulty in placing clear borders around this duty.

Professional responsibility vs duty of care in the context of a claim for negligence raises the question of legal liability versus ethical responsibility. These are not the same, but a breach of ethics may make it easier for the plaintiff to succeed on a question with respect to liability. This exploration of the common law and overview of some of the relevant provisions of the Association's *Code of Ethics* and *Standards of Practice* can help us to expand upon and clarify the relationships set out in the graphic presented earlier.



This can lead to further proactive steps in how risks are managed:

PROACTIVELY AVOIDING RISK

- Understanding the Surveyor's relationships
- Applying the Code of Ethics and Standards of Practice
- Leave advocacy for the lawyers!
- Ensure that the client (and to the extent possible, the neighbour) understands the Surveyor's role

This topic continues to evolve as further court decisions will no doubt clarify and help in our understanding of what these duties entail.



Izaak de Rijcke is a licensed surveyor based in Guelph, Ontario. He is also a practising lawyer, focusing on boundary and title related issues. He has written numerous articles, co-authored books and taught seminars and courses for lawyers and land surveyors. Izaak teaches courses in boundary law at York University's Lassonde School of Engineering where he is an adjunct professor. He can be reached by email at: izaak@izaak.ca

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DISCIPLINE DECISION Mr. Rodney Reynolds

IN THE MATTER OF the Surveyors Act, R.S.O. 1990,
Chapter S.29, as amended

AND IN THE MATTER OF Rodney G. Reynolds, O.L.S.

AND IN THE MATTER OF a Disciplinary Hearing
of the Discipline Committee of the Association of
Ontario Land Surveyors held in accordance with
Sections 26 and 27 of the said Act

Order and Reasons

This Panel of the Discipline Committee convened on October 25, 2017. The Member was represented by Counsel, Tom Tsakopoulos; both the Member and his Counsel were present at the hearing. The Association was represented by Mr. Izaak de Rijcke, Counsel; both Mr. de Rijcke and the Association Registrar, Mr. Bill Buck, were also present. The Panel was assisted by Independent Legal Counsel, Carol Street.

On convening, the Panel was advised that the parties proposed to proceed by way of a guilty plea to all allegations by Mr. Reynolds, O.L.S., followed by a Joint Submission with respect to what the parties jointly proposed was an appropriate penalty for consideration by the Panel. A signed Agreed Statement of Facts setting out the facts in support of the guilty plea, and a signed Joint Submission setting out the proposed penalty were subsequently marked as Exhibits 6 and 7 respectively. Unsigned copies of both documents are appended to this Order as Appendix A and B respectively.

The Panel heard submissions from both Counsel and, after reviewing those submissions and the Agreed Statement of Facts was satisfied that the Member is guilty of the allegations against him as set out in Schedule A to the Notice of Hearing (Exhibit 1). Schedule A is appended to this Order as Appendix C.

The Panel then considered the proposed penalty as set out in the Joint Submission (Exhibit 7). After clarifying the Member's agreement to complete the Survey Law 1 and Survey Law 2 courses and what that entailed, the Panel was satisfied that the proposed penalty was appropriate, reasonable, and in the public interest.

Pursuant to paragraph 9 of the Joint Submission the Member was reprimanded by the Panel. Pursuant to paragraph 12, the allegations forming the charges, and this Order and Decision, including all Appendices, shall be published in the next issue of The Ontario Professional Surveyor magazine and on the public side of the Association website.

This Order may be signed electronically and in counterparts.

Robert Fligg, O.L.S.
Paul Miller, O.L.S.
Tom Kristjanson, O.L.S.
Richard Murray, O.L.S.
Patricia Meehan,
Lieutenant-Governor Appointee

Appendix A (Exhibit 6)

IN THE MATTER OF Section 26 of the *Surveyors Act*, R.S.O. 1990, c. S. 29

BETWEEN:

WILLIAM D. BUCK

Registrar of Association
of Ontario Land Surveyors

-and-

RODNEY REYNOLDS

Member

**IN THE MATTER OF a Disciplinary Hearing of the Discipline Committee of the Association of Ontario
Land Surveyors held in accordance with sections 26 and 27 of the said Act.**

AGREED STATEMENT OF FACTS

The Association of Ontario Land Surveyors and Mr. Rodney Reynolds, OLS agree that the following facts are true and correct and accurately set out the circumstances leading to the charges and allegations of professional misconduct as alleged by William D. Buck, Registrar, in this proceeding:

1. Mr. Reynolds is licensed as OLS number 1386, and practises cadastral surveying as a sole proprietor under a Certificate of Authorization issued under the *Surveyors Act* from one office at 998 Mosley St., Wasaga Beach, Ontario.
2. Mr. Reynolds has over 43 years of experience as an OLS and has no prior record of a conviction before the Discipline Committee under the *Surveyors Act*.
3. On or about April 14, 2015 the Registrar of the AOLS received a letter from Mr. P. Douglas Reitsma, O.L.S., a consultant to the AOLS Survey Review Department (SRD), reporting that five of Mr. Reynolds' plans that were being examined as part of the current Comprehensive Review of Mr. Reynolds' surveying practice had not been monumented until after they had been signed and certified by Mr. Reynolds as being complete and in compliance with the Acts and Regulations, and furthermore that one such plan that had been examined in the field by SRD had not been monumented, some four months after the date of completion certified on the plan by Mr. Reynolds.
4. On or about April 24, 2015 the Registrar sent a letter to Mr. Reynolds demanding that this practice cease immediately, pending the completion of the final report of the Comprehensive Review of his practice.
5. The Comprehensive Review report of Mr. Reynolds's practice indicated numerous instances of non-compliance with the standards, regulations and other applicable rules for surveys, such that the average number of demerit points per plan for the seven plans reviewed was 40.4, which exceeded the threshold of 25 points per plan, after which Survey Review Department policy requires that the member be referred to the Registrar.
6. The report of Mr. Reynolds's Comprehensive Review indicated many serious deficiencies, including the following:
 - i. In all of the seven files examined there was insufficient documentation to confirm that a thorough search of the records of other survey firms had been carried out for the subject and the adjacent properties, contrary to Section 8(a) of O. Reg. 216/10 of the *Surveyors Act*;
 - ii. The field notes for all of the seven files reviewed contained serious omissions of the information required to illustrate everything found, observed and done in the field, contrary to Section 15 of O. Reg. 216/10 of the *Surveyors Act*;
 - iii. In six of the seven files reviewed the field notes indicated that the survey monuments had not been planted as of the date of completion of the survey that was stated in the Surveyor's Certificate signed by Mr. Reynolds;
 - iv. In one of the seven files reviewed, the Survey Review Department field examination, which took place approximately four months after the date of completion of the survey certified by Mr. Reynolds on the plan, found no evidence that the monuments illustrated on the plan as having been planted by Mr. Reynolds had yet been planted.
 - v. Three of the seven files reviewed contained drawings that were entitled as Building Location Surveys, however, there are no provisions in Regulation for the use of this term and these plans should have been labeled as Plan of Survey or Surveyor's Real Property Report;
 - vi. None of the seven files reviewed contained sufficient documentation regarding the member's communication with his client, contrary to Sections 3 and 4 of O. Reg. 216/10 of the *Surveyors Act*;
 - vii. Four of the seven plans reviewed did not contain any field data or calculations to support the methodology for the integration of those surveys;
7. The Registrar considered that the deficiencies noted in Mr. Reynolds' Comprehensive Review Report were of such a serious nature that they warranted a referral to the Complaints Committee of the AOLS in accordance with Section 40(8) of Regulation 1026 of the *Surveyors Act*;
8. The Complaints Committee's Decision of April 27, 2016 required that Mr. Reynolds submit a Memorandum of Understanding stating that he would henceforth comply with the Code of Ethics and Standards of Practice of Professional Land Surveying, as well as requiring him to undergo another Comprehensive Review in approximately one year.
9. On May 17, 2016 Mr. Reynolds submitted such a Memorandum of Understanding and on June 24, 2016 he submitted additional information that had been omitted from his May 17, 2016 submission.
10. On or about February 2, 2017 the final report of the referral review of Mr. Reynolds' practice was provided to the Complaints Committee.
11. On March 13, 2017 the Complaints Committee issued a final decision, which referred Mr. Reynolds to Council;
12. The Reasons section of the Complaints Committee decision stated that Mr. Reynolds was still practicing to a standard below what is expected of a professional surveyor, noting that there had been no significant improvement in his field notes, minimal improvement in his reports to clients and poor field procedures, particularly in boundary retracement.
13. Mr. Reynolds failed to comply with the *Code of Ethics* of the AOLS in that he has repeatedly failed to abide by the standards of practice which is contrary to Section 33(2)(b) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
14. Mr. Reynolds failed to comply with the *Code of Ethics* of the AOLS in that he signed survey plans which did not comply with all relevant legislative requirements and all standards of the Association, which is contrary to Section 33(2)(f) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
15. Mr. Reynolds has committed acts of professional misconduct as defined by Sections 35(1), 35(2), 35(3) and 35(21) of Regulation 1026, R.R.O. 1990, as amended of the *Surveyors Act*.

Dated this 25th day of October, 2017.

cont'd on page 12

IN THE MATTER OF the *Surveyors Act*, R.S.O. 1990, Chapter S.29, as revised

AND IN THE MATTER OF Rodney G. Reynolds, O.L.S.

AND IN THE MATTER OF a Disciplinary Hearing of the Discipline Committee of the Association of Ontario Land Surveyors held in accordance with sections 26 and 27 of the said *Act*.

**JOINT SUBMISSION TO DISCIPLINE COMMITTEE
ON CONSENT OF ALL PARTIES**

The Association of Ontario Land Surveyors (the “Association”) and the Member, Rodney Reynolds, O.L.S. (the “Member”), make joint submission to this panel of the Discipline Committee under the *Surveyors Act* in respect of this matter by asking the Discipline Committee to issue a consent Order on the following terms:

1. The Member pleads guilty to the charges and allegations of professional misconduct against the Member (the “Charges”) as alleged.
2. The Member’s Licence and Certificate of Authorization shall be suspended for a period of 18 months from October 25, 2017, such suspension to be deferred for a period of 18 months.
3. The Association will appoint a monitor, as a representative of the Registrar, who will meet with Mr. Reynolds as often as s/he considers necessary to effectively review and monitor the whole of Mr. Reynolds’ practice during the 18 months of deferred suspension;
4. Although the appointed monitor will be directed to monitor the whole of Mr. Reynolds’ practice, particular attention will be given by the monitor to the adequacy of research, field notes, reports to clients, field procedures and boundary retracement.
5. The appointed monitor will prepare and provide to the Registrar quarterly reports of his/her observations and conclusions regarding the manner in which Mr. Reynolds is conducting his practice with particular emphasis on the matters referred to in Paragraph 4 above.
6. The Registrar will in turn provide quarterly reports to Council of the Association as to whether all of the conditions set out in the Discipline Committee decision in this matter are being met, including the payment obligation set out in paragraph 10 below.
7. The Association will invoice Mr. Reynolds for the cost of the monitor and Mr. Reynolds will be responsible for payment of these costs within 30 days of being invoiced.
8. Mr. Reynolds will, at his expense, successfully complete the next available Survey Law 1 and Survey Law 2 courses, which are offered by distance learning through York University.
9. Mr. Reynolds shall be reprimanded and the reprimand will be recorded on the Register of the Association.
10. Mr. Reynolds will pay to the Association, for its costs, fixed in the sum of \$11,000.00, including HST, within 30 days of October 25, 2017.
11. Should Council conclude that there has been any failure on Mr. Reynolds’ part to comply with any of the terms of this Decision and Order during the 18 months deferred suspension, Council will in writing direct the Registrar to notify him that the deferral of his suspension is revoked; that the suspension will come into effect immediately; and that it will apply thereafter to the remainder of the original term of 18 months.
12. The allegations forming the Charges, as well as the Order or Decision of the Discipline Committee, shall be published in the next issue of The Ontario Professional Surveyor magazine and shall be posted on the public side of the Association website.
13. The terms of this Joint Submission are fair and reasonable and protect the public interest.
14. The Member acknowledges having been advised to obtain and has had the benefit of independent legal advice, or, has voluntarily declined to obtain same.
15. This Joint Submission and agreement thereto by the Member may be set up as a complete bar and answer by the Association to any appeal or judicial review of the Order or Decision of the Discipline Committee resulting therefrom.

DATED this 18th day of August, 2017.

**SCHEDULE “A”
ALLEGATIONS OF PROFESSIONAL MISCONDUCT**

CANADA)	IN THE MATTER OF the <i>Surveyors Act</i>
)	R.S.O. 1990, Chapter S.29, as revised.
)	
PROVINCE OF)	AND IN THE MATTER OF Rodney G. Reynolds, O.L.S.
)	
ONTARIO)	AND IN THE MATTER OF a Disciplinary Hearing of the
)	Discipline Committee of the Association of Ontario Land
)	Surveyors held in accordance with sections 26 and 27 of
)	the said Act.

I, WILLIAM D. BUCK, O.L.S., C.L.S., P. ENG., of the City of Markham, in the Region of York, am the Registrar of the Association of Ontario Land Surveyors.

1. The Council of the Association of Ontario Land Surveyors (AOLS) pursuant to Section 25(7)(a) of the *Surveyors Act*, by a Motion dated May 9, 2017, directed that Mr. Rodney G. Reynolds be referred to the Discipline Committee.
2. It is alleged that Rodney G. Reynolds, O.L.S. (herein referred to as “Mr. Reynolds”), in his personal capacity, and as the official representative for the firm Rodney G. Reynolds, Ontario Land Surveyor is guilty of professional misconduct within the meaning of Section 35 of Regulation 1026, R.R.O. 1990, as amended.
3. The particulars of the allegations in paragraph 2 above are as follows:
 - (a) On or about April 14, 2015 the Registrar of the AOLS received a letter from Mr. P. Douglas Reitsma, O.L.S., a consultant to the AOLS Survey Review Department (SRD), reporting that five of Mr. Reynolds’ plans that were being examined as part of the current Comprehensive Review of Mr. Reynolds’s surveying practice had not been monumented until after they had been signed and certified by Mr. Reynolds as being complete and in compliance with the Acts and Regulations, and furthermore that one such plan that had been examined in the field by SRD had not been monumented, some four months after the date of completion certified on the plan by Mr. Reynolds.
 - (b) On or about April 24, 2015 the Registrar sent a letter to Mr. Reynolds demanding that this practice cease immediately, pending the completion of the final report of the Comprehensive Review of his practice.
 - (c) The Comprehensive Review report of Mr. Reynolds’s practice indicated numerous instances of non-compliance with the standards, regulations and other applicable rules for surveys, such that the average number of demerit points per plan for the seven plans reviewed was 40.4, which exceeded the threshold of 25 points per plan, after which Survey Review Department policy requires that the member be referred to the Registrar.
 - (d) The report of Mr. Reynolds’s Comprehensive Review indicated many serious deficiencies, including the following:
 - (i) In all of the seven files examined there was insufficient documentation to confirm that a thorough search of the records of other survey firms had been carried out for the subject and the adjacent properties, contrary to Section 8(a) of O. Reg. 216/10 of the *Surveyors Act*;
 - (ii) The field notes for all of the seven files reviewed contained serious omissions of the information required to illustrate everything found, observed and done in the field, contrary to Section 15 of O. Reg. 216/10 of the *Surveyors Act*;
 - (iii) In six of the seven files reviewed the field notes indicated that the survey monuments had not been planted as of the date of completion of the survey that was stated in the Surveyor’s Certificate signed by Mr. Reynolds;
 - (iv) In one of the seven files reviewed, the Survey Review Department field examination, which took place approximately four months after the date of completion of the survey certified by Mr. Reynolds on the plan, found no evidence that the monuments illustrated on the plan as having been planted by Mr. Reynolds had yet been planted.
 - (v) Three of the seven files reviewed contained drawings that were entitled as Building Location Surveys, however, there are no provisions in Regulation for the use of this term and these plans should have been labeled as Plan of Survey or Surveyor’s Real Property Report;
 - (vi) None of the seven files reviewed contained sufficient documentation regarding the member’s communication with his client, contrary to Sections 3 and 4 of O. Reg. 216/10 of the *Surveyors Act*;
 - (vii) Four of the seven plans reviewed did not contain any field data or calculations to support the methodology for the integration of those surveys;
 - (e) The Registrar considered that the deficiencies noted in Mr. Reynolds’ Comprehensive Review Report were of such a serious

cont’d on page 14

nature that they warranted a referral to the Complaints Committee of the AOLS in accordance with Section 40(8) of Regulation 1026 of the Surveyors Act;

- (f) The Complaints Committee's Decision of April 27, 2016 required that Mr. Reynolds submit a Memorandum of Understanding stating that he would henceforth comply with the Code of Ethics and Standards of Practice of Professional Land Surveying, as well as requiring him to undergo another Comprehensive Review in approximately one year.
 - (g) On May 17, 2016 Mr. Reynolds submitted such a Memorandum of Understanding and on June 24, 2016 he submitted additional information that had been omitted from his May 17, 2016 submission.
 - (h) On or about February 2, 2017 the final report of the referral review of Mr. Reynolds' practice was provide to the Complaints Committee.
 - (i) On March 13, 2017 the Complaints Committee issued a final decision, which referred Mr. Reynolds to Council;
 - (j) The Reasons section of the Complaints Committee decision stated that Mr. Reynolds was still practicing to a standard below what is expected of a professional surveyor, noting that there had been no significant improvement in his field notes, minimal improvement in his reports to clients and poor field procedures, particularly in boundary retracement.
5. It is alleged that the member failed to comply with the *Code of Ethics* of the AOLS in that he has repeatedly failed to abide by the standards of practice which is contrary to Section 33(2)(b) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
 6. It is alleged that the member failed to comply with the *Code of Ethics* of the AOLS in that he signed survey plans which did not comply with all relevant legislative requirements and all standards of the Association, which is contrary to Section 33(2)(f) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
 7. It is alleged that the member has committed acts of professional misconduct as defined by Sections 35(1), 35(2), 35(3) and 35(21) of Regulation 1026, R.R.O. 1990, as amended of the *Surveyors Act*.

Dated at Toronto, Ontario, this 27th day of June, 2017.

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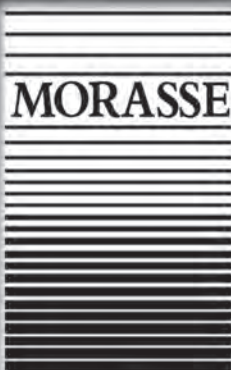
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"On behalf of Horizon Measurement Solutions, I would like to personally thank the AOLS and its members for the continued support over the years."

Mike McMillan
President - Horizon Measurement Solutions

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From Then until Now – 40 Years of GPS

By Pierre Heroux

Having been closely involved with the Global Positioning System (GPS) since its early years, it is hard to believe that the technology has now been around for four decades. I've had the privilege of following the evolution of GPS throughout my career so the occasion of my retirement from the Canadian Geodetic Survey was a good opportunity for me to reflect on the impact GPS has had on the practice of surveying and our lives in general. The following article highlights some key events that have shaped the evolution of GPS over the past 40 years. My review is divided into 5-year slices and gives particular attention to high-precision positioning, my area of expertise. While intended to be informative, this brief article is short on details and may neglect to mention some contributions or events that would have deserved more attention. Nevertheless, I hope readers will enjoy being reminded of the great technological advances that were made and the way GPS has gradually become an intrinsic part of our everyday activities.

1978-1985 Launching and Learning

February 1978 saw the United States Air Force launch the first GPS Block I satellite, one of eleven planned for deployment over a seven-year period. This period of system validation was an opportunity for both military and civilian users to experiment with GPS signal tracking and evaluate the overall performance of this new positioning, navigation and timing (PNT) system. Early on, single-channel slow-switching laboratory-type GPS receivers were used. Slaved to an atomic clock and interfaced to time interval counters, the Stanford Communications STI5010, which was the size of a small refrigerator, was used to obtain the first stand-alone GPS position solution by Sheltech Canada in 1980. Soon thereafter, more portable receivers such as the Macrometer and TI-4100 entered the market and served for early field-testing and surveys. As static mode GPS positioning could be performed with the limited satellite visibility offered by a partial GPS constellation, experts from the surveying community became early investigators of the potential offered by GPS for geodetic positioning. Despite

the 6-figure cost of first generation receivers, the anticipated accuracy and efficiency benefits of a space-based approach to extend control networks to remote areas justified this large initial investment.

1985-1990 Better and Faster

The first international GPS symposium hosted by the US National Geodetic Survey in 1985 set the tone for a number of developments that took place in the following years, in particular the use of carrier phase differencing for precise relative positioning. The implementation of differential methods in various software packages and investigations into fast integer ambiguity resolution became the object of many research and development efforts by academia and industry. The concept of active control systems (ACS) with continuously operating GPS reference stations (CORS) was also proposed at the time and the deployment of a global tracking network for precise orbit determination was envisioned. Experts already anticipated that precise GPS satellite orbit and clock products would enable direct access to the International Terrestrial Reference Frame (ITRF) and facilitate the maintenance and unification of continental coordinate systems such as the North American Datum of 1983 (NAD83). In terms of field operations, a number of GPS survey campaigns were conducted, although the incomplete constellation limited observation periods to a couple of daily sessions of a few hours in duration. Nevertheless, a national GPS campaign was initiated to



Figure 1: TI-4100 GPS Receiver - The portable Texas Instrument 4100 was the work horse of GPS field surveys in the early 1980's.

observe ellipsoidal heights at over 3,000 vertical benchmarks across Canada to validate geoid heights in preparation for a future transition to a gravity-based height system. Although the launch of Block II satellites was delayed following the Challenger space shuttle disaster in 1986, GPS receiver manufacturers continued to invest in the future by improving their equipment. In 1987, Ashtech introduced the first all-in-view multi-channel (12) GPS receiver into the user market.

1990-1995 Dithering and Spoofing

With the aggressive schedule to launch Block II satellites initiated in the early 1990's, all heads should have been turned towards the new possibilities GPS would offer under full operational capability in 1995. Unfortunately, civilian



Figure 2: IGS Logo- The International GPS Service was formed in 1993 and coordinated the development of open data standards and the establishment of a global network of continuously operating GPS tracking stations in support of geodesy and the geosciences.

users were distracted by the U.S. government decision to introduce Selective Availability (1990) and Anti-Spoofing (1993). These modifications to the broadcast GPS signals imposed by the military were expected to significantly degrade the precision of positioning solutions for civilian users. Selective Availability (SA), or the dithering of the GPS satellite clocks with random-like noise, effectively increased single-point positioning uncertainty from a few metres to about 30 metres. Anti-Spoofing (AS), or the encryption of the L2 P-code sequence, attempted to deny civilian access to the L2 signals. AS was largely defeated by innovative designs of codeless tracking methods by commercial manufacturers of high-end GPS receivers. SA could also be by-passed with differential GPS operations as satellite clock errors cancel out under common view tracking. This mode of operation was in fact rapidly gaining popularity at the time. In 1993, the International GPS Service (IGS), a worldwide collaboration among scientific agencies, coordinated the installation of a global network of GPS tracking stations. The Canadian Geodetic Survey contributed to IGS by installing a sparse network of GPS receiving stations across Canada and computing precise GPS products. IGS orbit and reference frame products soon became de-facto standards for scientific investigations in geodynamics and the geosciences. While these

advances were being made in the scientific community, U.S. military forces and their allies were also discovering the strategic advantages of GPS navigation and positioning to guide airstrikes and the movement of troops during the Gulf War. In fact, GPS was so popular with the troops that military units were supplemented with off-the-shelf commercial receivers and SA turned off temporarily during 1993.

1995-2000 Scientific Breakthroughs

As anticipated, GPS became fully operational in 1995. In addition to its positioning capabilities, this milestone now made continuous GPS navigation possible anywhere in the world and led to the development of a number of innovative applications. In science, the addition of GPS receivers to the payload of low-earth orbiters enabled atmospheric sensing and improved the quality of satellite altimetry. GPS controlled satellite gravimetry was also found to be an effective way of measuring, with unprecedented accuracy, monthly changes in the global gravity field. On the ground, targeted GPS networks in regions of seismic activity were also found to be a valuable asset to study regional geodynamics. In Canada, the Western Canada Deformation Array around Vancouver Island was instrumental in the discovery of silent slips, a significant breakthrough towards improved earthquake prediction. In the transportation sector, GPS Augmentation Systems to enhance the integrity and precision of stand-alone GPS were designed and developed for maritime and air navigation. In land surveys, road engineering and precision agriculture, network Real-Time Kinematic (RTK) systems were also developed in anticipation of affordable wireless communications over large areas of coverage.

2000-2005 Driving for Precision

The turn of the century was a time when GPS, digital mapping and Internet technologies reached a point of maturity and affordability that led to an explosion of consumer



Figure 3: Navigation System - The integration of GPS and digital mapping technologies led to in-car navigation systems entering the consumer market at the turn of the century. Shortly thereafter, open internet mapping services transformed GPS smartphones into personal navigation devices.

cont'd on page 18

products and applications. The spring of 2000 was also the time when a U.S. Presidential directive under the Clinton administration put an end to Selective Availability, giving back to civilians the metre-level positioning performance they had originally enjoyed. This precision level and the availability of GPS chipsets for a few dollars were catalysts for customized in-car navigation systems entering the consumer market. The open distribution of Google Maps over the Internet soon followed, transforming GPS-equipped mobile phones into personal navigation devices. For professional GPS users seeking the utmost precision, this period was also a time when public GPS Augmentation services started delivering corrections over-the-air. In North America, real-time GPS corrections were now being broadcast by Coast Guard beacons and communication satellites of the Federal Aviation Administration (FAA) Wide-Area Augmentation System (WAAS) and Canada-wide DGPS Service (CDGPS). For post-mission processing, a number of on-line applications were made available by several geodetic and scientific agencies. In Canada, the Online Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service became a popular tool for users to access the geodetic reference and control the quality of their surveys with centimetre accuracy. Such services greatly facilitated the integration of geospatial datasets into modern 3D reference frames, such as NAD83 (CSRS) and the ITRF.

2005-2010 More and More

While GPS remained the gold standard for global positioning at the dawn of the new millennium, Russia, China and the European Union (EU) continued pursuing their interests in also becoming providers of Global Navigation Satellite Systems (GNSS). The Russian GLONASS, an early competitor to GPS, struggled for nearly two decades with poor satellite performance and program funding difficulties after the collapse of the Soviet Union. It was only in 2003, with the introduction of the GLONASS M-series of satellites and a decision to bring the system into full operation within the next decade that their momentum turned. As the GLONASS constellation was being replenished, the Chinese and Europeans were also planning to deploy their own constellations. Starting in 2000, the Chinese launched a number of proof-of-concept geostationary satellites broadcasting GPS-like signals to enhance positioning capabilities in the Asian region. These experimental satellites of the Beidou constellation were followed in 2007 by launches of satellites into medium-earth orbits that will eventually form a constellation with global coverage. The European Galileo program was also delayed by political difficulties encountered in reaching a collaborative agreement among EU members. In-orbit validation satellites were launched in 2011 and 2012 and operational satellites followed in 2014. The Beidou and Galileo constellations are expected to be complete and fully operational by 2020, some 25 years after GPS reached that status.

While GNSS constellations emerged, more ground-based CORS were being deployed to support high-precision GNSS augmentation services. In North America, dense clusters of Real Time Kinematic (RTK) networks were established in urban areas and across some US States to serve the high precision needs of land surveys and road engineering. In rural and remote areas, a combination of network RTK and real-time PPP services were established to meet the needs of precise agriculture and resource management. Across the continent, large and at times dense scientific networks were also put in place to monitor crustal dynamics and investigate geophysical processes related to earthquakes and tsunamis. Overall, a tenfold increase in the number of CORS, from a few hundred to a few thousand, occurred in the later part of this century's first decade.

2010-2015 Integrating and Sustaining

By 2010, additional GNSS constellations and signals and a denser infrastructure of ground reference stations made centimetre positioning on a global scale a distinct possibility. To achieve this goal, some challenges remained such as: adopting open GNSS data standards, estimating inter-constellation biases and engaging with the international community to support a sustainable global geodetic reference frame (GGRF) with millimetre-level long term accuracy. The IGS Multi-GNSS Experiment (MGEX) created an open forum for exchange among international experts and is facilitating GNSS data and product integration in response to the first two challenges. To maintain the GGRF, a new level of collaboration is also required as global GNSS solutions are combined with those of Very Long Baseline Interferometry (VLBI) and Satellite Laser Ranging (SLR) to estimate all fundamental parameters that define the ITRF. To that end, the International Association of Geodesy (IAG) proposed the concept of a Global Geodetic Observing System (GGOS) based on a global network of multi-technique observatories. Ongoing formal support for GGOS could be provided by nation states following recommendations found in a United Nations agreement sanctioned by the General Assembly in 2015. MGEX and GGRF are still works in progress but remain a priority for several national geodetic agencies who recognize that coordinates can only be as good as the reference frames that sustain them.

2015-2020 Small and Ubiquitous

The latest developments and current trends indicate that GNSS receivers will likely continue to improve in performance and reliability. Already, GNSS software receivers are being embedded in small computing tablets, facilitating the development of custom applications. Recent results also indicate that carrier-phase measurements made by smartphones could soon provide centimetre positioning solutions to mobile users. While high-precision positioning has mainly been the business of



Figure 4: GNSS Constellations - By 2020, over 100 navigation satellites from 4 constellations will be orbiting the Earth broadcasting modernized signals, including modulations on a third frequency.

scientists and professionals to date, the general public may soon enjoy this capability.

The availability of robust GNSS solutions to monitor centimetre-level crustal motion or water level changes within seconds will also enhance the quality of early warning systems for earthquakes and tsunamis. GNSS time stamping and frequency monitoring capabilities are also being embedded in electronic trading systems, smart electrical grids and cellular networks to order financial transactions, distribute power and control digital traffic. These innovative uses of the technology, which were not originally anticipated but continue to expand, are rapidly moving GNSS into the ranks of an essential, if not critical, modern utility.

In Summary

Today, GNSS users can reliably position themselves and

navigate, anywhere in the world and at anytime, with metre to centimetre precision depending on their particular requirements, equipment and mode of operation. By 2020, it is expected that over one hundred navigation satellites from four GNSS constellations will be in orbit. Thousands of continuously operating GNSS tracking stations will also be operating worldwide in support of RTK and PPP augmentation services, and the networks they form continue to be extended and densified. At this time, billions of users are being served in a global market valued at several hundred billion dollars. Truly, the impact of GPS ‘From Then until Now’ has been beyond expectations ... and the revolution continues.



Pierre Heroux received a B.Sc. (Géodésie) from l’Université Laval and a M.Sc. (Surveying Engineering) from the University of New Brunswick. Upon graduation he was hired by Sheltech Canada and involved in GPS technology development. In 1984, he joined the Canadian Geodetic Survey to work on the implementation of systems that facilitate the use of GPS for precise positioning applications. During his career, he actively participated in the development of the Canadian Active Control System, the Canada-Wide DGPS service and the CSRS Precise Point Positioning application. Pierre retired from the Public Service in June of this year.

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DISCIPLINE DECISION Mr. Jansky Tak Choi Lau

IN THE MATTER OF the Surveyors Act, R.S.O. 1990,
Chapter S.29, as amended

AND IN THE MATTER OF Jansky Tak Choi Lau, O.L.S.

AND IN THE MATTER OF a Disciplinary Hearing
of the Discipline Committee of the Association of
Ontario Land Surveyors held in accordance with
Sections 26 and 27 of the said Act

Order and Reasons

This Panel of the Discipline Committee convened on September 12th, 2017. The Member was self-represented and was present at the hearing. The Association was represented by Mr. Izaak de Rijcke, Counsel; both Mr. de Rijcke and the Association Registrar, Mr. Bill Buck, were also present. The Panel was assisted by Independent Legal Counsel, Carol Street.

On convening, the Panel was advised that the parties proposed to proceed by way of a guilty plea to all allegations by Mr. Lau, O.L.S., followed by a Joint Submission with respect to what the parties jointly proposed was an appropriate penalty for consideration by the Panel. The Joint Submission was subsequently marked as Exhibit 9.

Some of the facts and the allegations against Mr. Lau were set out in Schedule A to the Notice of Hearing, marked as Exhibit 1 by the Panel. The Panel heard submissions from Mr. de Rijcke with respect to the facts and proposed penalty, and while the Member stated his agreement with those facts and proposed penalty, the Panel was not provided with an Agreed Statement of Facts signed by the Member.

The Panel recessed to consider whether it was prepared to accept Mr. Lau's plea of guilt to all of the allegations after which it reconvened and questioned the Member for further clarification of the facts.

The Panel gave due consideration to the facts as submitted and as clarified and advised the parties that it was prepared to accept the Member's guilty plea to paragraphs 4, 7 and 8 of the Allegations set out in Schedule A to the Notice of Hearing (Exhibit 1). On behalf of the Association, Mr. de Rijcke confirmed that it was prepared to withdraw the allegations set out in paragraphs 5 and 6 of Schedule A.

For clarity, the Panel therefore accepted the Member's plea of guilt and found him guilty of the following allegations:

4. The Member failed to comply with the *Code of Ethics* of the AOLS in that he was out of the country between May 2016 and September 2016 during which period he was not supervising the cadastral surveying services of Frontop Surveying Inc., contrary to Section 34(2)(a) of Regulation 1026 (the Standards of Practice) which is contrary to Section 33(2)(b) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended;
7. The member committed acts of professional misconduct in that he acted as an agent of a person who is not a professional member of the AOLS so as to enable him to offer professional surveying services to the public, contrary to Section 34(2)(e) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Standards of Practice* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended;
8. The member committed acts of professional misconduct in that he failed on several occasions to comply with written requests from both the AOLS Survey Review Department and the Registrar within the time specified in the requests, contrary to Section 34(2)(g) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Standards of Practice* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.

The Joint Submission (Exhibit 9) was amended to reflect the withdrawal of the allegations in paragraphs 5 and 6 of Schedule A, and to make it clear that the Member was pleading guilty to paragraphs 4, 7 and 8. The Panel considered the penalty jointly proposed by the parties and after a thorough discussion agreed that what was proposed was appropriate and in the public interest.

Pursuant to paragraph 4 of the Joint Submission the Member was reprimanded by the Panel, and pursuant to paragraph 7, the allegations set out in paragraphs 4, 7 and 8 of Schedule A as set out above, the contents of the Joint Submission as amended, and this Order and Decision shall be published in the next issue of The Ontario Professional Surveyor magazine and on the Association website. The amended Joint Submission is also attached hereto as Appendix A.

This Order may be signed in counterparts.

Terry Dietz, O.L.S.

Julia Meldrum Smith, O.L.S.

Rick Miller, O.L.S.

Douglas Hunt, O.L.S.

Patricia Meehan,

Lieutenant-Governor Appointee

cont'd on page 22

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APPENDIX ‘A’

IN THE MATTER OF the Surveyors Act, R.S.O, 1990
Chapter S.29

AND IN THE MATTER OF Jansky Tak Choi Lau, O.L.S.,

AND IN THE MATTER OF a Disciplinary Hearing of
The Discipline Committee of the Association
of Ontario Land Surveyors held in accordance
With sections 26 and 27 of the said Act

JOINT SUBMISSION TO DISCIPLINE PANEL
ON CONSENT OF ALL PARTIES

WHEREAS the Association of Ontario Land Surveyors (“AOLS”) has commenced proceedings under the *Surveyors Act* against one of its members, namely, Jansky Tak Choi Lau, OLS, for professional misconduct;

AND WHEREAS AOLS has specified and made allegations in respect of the member which have been acknowledged and admitted by the member for purposes of making a finding of guilt on the part of the Discipline Committee.

AND WHEREAS AOLS and the member are now desirous of making a Joint Submission as to penalty and disposition by the Discipline Committee pursuant to the *Surveyors Act*;

THE PARTIES, on a consent basis, hereby agree to dispose of this matter before a panel of the Discipline Committee by way of a joint resolution on the following terms:

1. The Member represents to the Association of Ontario Land Surveyors and the Discipline Panel that, before entering into this agreement, he has been advised to obtain independent legal advice as to the consequences of signing same, that the Member has either obtained independent legal advice or he has voluntarily waived his right to obtain independent legal advice knowing the consequences of signing same and that the Member is doing so voluntarily and without undue influence or pressure from anyone.
2. The Member pleads guilty to the charges and allegations of professional misconduct against the Member (the “Charges”) as alleged, as set out in paragraphs 4, 7, 8 of Sch. A to Exhibit 1.
3. The Member’s Licence shall be suspended for a period of one year from September 12, 2017, such suspension to be deferred for a period of one year.
4. The Member shall be reprimanded and the reprimand will be recorded on the Register of the Association.
5. The Member engage in the practice of professional surveying only under the personal supervision and direction of another member.
6. The member will not be the managing Ontario Land Surveyor for any Certificate of Authorization company or a branch office of any Certificate of Authorization company for a period of three years.
7. The publication of the summary of allegations leading to this proceeding, as well as the contents of the Joint Submission, shall be published in the Ontario Professional Surveyor Magazine and posted on the Association website.
8. The Member shall pay to the Association the sum of \$10,000.00 for costs. This amount may be paid in installments but in any case will be fully due and payable no later than one year from the date of this agreement. Should the member’s licence be terminated for any reason full payment of these costs will be required as a condition of the reinstatement of the member’s licence. Should full payment not be received within the above period the member’s licence will be cancelled.
9. The Member and the Association acknowledge and agree that this Joint Submission document has been prepared by both parties and reflects a fair disposition of this matter, under all of the circumstances. In the event the Discipline Panel does not adopt this Joint Submission document as a basis for making its determination, finding, and disposition, the parties agree that this matter will then continue on the basis of a full hearing before a Discipline Panel on a date to be fixed by the Discipline Committee and that same shall proceed on the basis of all of the allegations set out in the Notice dated 6 July 2017.

Dated this 12th day of September, 2017

**SCHEDULE “A”
ALLEGATIONS OF PROFESSIONAL MISCONDUCT**

CANADA) **IN THE MATTER OF the *Surveyors Act***
) **R.S.O. 1990, Chapter S.29, as revised.**
)
PROVINCE OF) **AND IN THE MATTER OF Jansky Tak Choi Lau, O.L.S.**
ONTARIO)
) **AND IN THE MATTER OF a Disciplinary Hearing**
) **of the Discipline Committee of the Association of Ontario**
) **Land Surveyors held in accordance with sections 26 and 27**
) **of the said Act.**

I, WILLIAM D. BUCK, O.L.S., C.L.S., P. ENG., of the City of Markham, in the Region of York, am the Registrar of the Association of Ontario Land Surveyors.

The Council of the Association of Ontario Land Surveyors (AOLS) pursuant to Section 25(7)(a) of the *Surveyors Act*, by a Motion dated May 9, 2017, directed that Mr. Jansky Tak Choi Lau be referred to the Discipline Committee.

It is alleged that Jansky Tak Choi Lau, O.L.S. (herein referred to as “Mr. Lau”), in his personal capacity, and as the official representative for the firm Frontop Surveying Inc., Ontario Land Surveyors (Frontop) is guilty of professional misconduct within the meaning of Section 35 of Regulation 1026, R.R.O. 1990, as amended.

The particulars of the allegations in paragraph 2 above are as follows:

- (a) On March 29, 2016 the AOLS Survey Review Department (SRD) sent Mr. Lau a letter requesting Frontop’s Plan Log, which is the first step in the Comprehensive Review process. This log was due on April 12, 2016 however Mr. Lau requested and was granted an extension to May 24, 2016. He was subsequently granted another extension to May 31, 2016, however no plan log was received by the SRD. On or about June 27, 2016 Mr. Frank Feng, P. Eng., an employee of Frontop Engineering and a Director of Frontop Surveying Inc. advised the SRD that Mr. Lau had gone to Hong Kong regarding a family issue. On June 28, 2016 Frontop placed an order for 30 Plan Submission Forms, and on September 15, 2016 Frontop placed another order, at which time SRD advised the Registrar about the situation, noting that a recent email to Mr. Lau had been re-routed from the Frontop address to his personal email address and that the Frontop Plan Log was still outstanding.
- (b) On or about September 15, 2016 the Registrar emailed Mr. Lau expressing his concern that Mr. Lau had not been properly supervising Frontop’s cadastral surveys and asking him to respond to these concerns by September 19, 2016. Mr. Lau responded to the Registrar by email on September 19, 2016, stating that he would “... try to arrange to be back this week.” On or about October 6, 2016, having heard nothing from Mr. Lau the Registrar emailed him again, stating that he was going to suspend the Frontop Certificate of Authorization (C of A). Mr. Lau responded by email that day, stating that he was back in the country and hadn’t made it into the office due to a serious family issue, but that he would be in the office next week. On October 25, 2016 SRD advised the Registrar that they had still not received anything from Mr. Lau. On October 28, 2016 the Registrar emailed and mailed a letter to Mr. Lau notifying him that the Certificate of Authorization for Frontop Surveying Inc. was suspended effective immediately.
- (c) On or about January 26, 2017 the Registrar received a call from Ms. Ashley McPherson, a member of the public who was concerned about a Surveyor’s Real Property Report (SRPR) that had been prepared for her by Frontop. She related that she had tried to speak with Mr. Lau to ask him to stake out her property line but that she had been unable to reach him. After she pressed the issue with Frontop they gave her Mr. Lau’s cell phone number. When she reached him on the phone he admitted that he was out of the country and would be back “next week.” This directly contradicted Mr. Lau’s emails to the Registrar on January 20 and 26, 2017 in which he implied that he was in the country but that he couldn’t schedule a time to deliver his SRD information to the AOLS office.
- (d) Based on Ms. McPherson’s information and the events of the previous few months the Registrar instituted a Registrar’s Investigation of Mr. Lau, and on February 9, 2017 hand delivered a letter to both Mr. Lau and Mr. Feng advising them that he was commencing an investigation under Section 30 of the *Surveyors Act*.
- (e) On December 1, 2016 the Registrar received a letter from Mr. Feng informing him that Frontop had hired Mr. Djordje Petrovic, O.L.S. to be their managing OLS. On that basis, and after speaking with Mr. Petrovic, the Registrar reinstated the Frontop C of A. Less than two weeks later, on December 12, 2016 Mr. Petrovic visited the Registrar’s office and informed him that his employment with Frontop had been terminated without notice that morning. As Frontop no longer appeared to have a managing OLS the Registrar advised Frontop on December 12, 2016 that their C of A was cancelled immediately.

cont’d on page 24

- (f) On or about February 9, 2017 the Registrar and Mr. Herman Bernardo, an employee of the AOLS Survey Review Department, visited the offices of Frontop Surveying Inc. and met with Mr. Lau in his office. During this meeting Mr. Lau admitted that he had been out of the country from May 2016 to September 2016 and that during this period he had only been checking plans that were sent to him electronically. He also admitted that the signatures on his plans had been added electronically. He stated that he had no knowledge of Ms. McPherson's SRPR, and that he had no first-hand knowledge of why Mr. Petrovic's employment had been terminated. Mr. Bernardo and the Registrar left Mr. Lau's office with several cadastral job files, however these were incomplete, containing no field notes or correspondence. In spite of repeated emailed requests to Mr. Lau (February 16, 2017, March 13, 2017, March 23, 2017, April 12, 2017) he did not submit the missing materials. Mr. Feng did send a few pages of field notes on April 18, 2017 but maintained that there was no correspondence. The Registrar received no response from Mr. Lau.
- (g) The Registrar has examined 15 SRPR's issued by Frontop during the period between July 12, 2016 and September 15, 2016 that appear to have been signed by Mr. Lau and the signatures on these plans are all identical and appear to have been added electronically and do not appear to be original signatures.
4. It is alleged that the member failed to comply with the *Code of Ethics* of the AOLS in that he was out of the country between May 2016 and September 2016 during which period he was not supervising the cadastral surveying services of Frontop Surveying Inc., contrary to Section 34(2)(a) of Regulation 1026 (the Standards of Practice) which is contrary to Section 33(2)(b) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
 5. It is alleged that the member has committed acts of professional misconduct in that he signed projects that were not prepared under his supervision, contrary to Section 35.6 of Regulation 1026.
 6. It is alleged that the member failed to comply with the *Code of Ethics* of the AOLS in that he signed survey plans which did not comply with all relevant legislative requirements and all standards of the Association, which is contrary to Section 33(2)(f) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Code of Ethics* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
 7. It is alleged that the member has committed acts of professional misconduct in that he acted as an agent of a person who is not a professional member of the AOLS so as to enable him to offer professional surveying services to the public, contrary to Section 34(2)(e) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Standards of Practice* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.
 8. It is alleged that the member has committed acts of professional misconduct in that he failed on several occasions to comply with written requests from both the AOLS Survey Review Department and the Registrar within the time specified in the requests, contrary to Section 34(2)(g) of Regulation 1026, R.R.O. 1990, as amended. Failure to comply with the *Standards of Practice* constitutes Professional Misconduct within the meaning of Section 35(3) of Regulation 1026, R.R.O. 1990, as amended.

Dated at Toronto, Ontario, this 6th day of July, 2017.

Calendar of Events

February 7 to 9, 2018

Damage Prevention Symposium 2018

Collingwood, Ontario

www.orcga.com

February 28 to March 2, 2018

126th AOLS Annual General Meeting

Niagara Falls, Ontario

www.aols.org

March 17 to 19, 2018

GISTAM 2018

Madeira, Portugal

www.gistam.org

March 25 to 29, 2018

2018 Joint Canadian Hydrographic and National Surveyors' Conference

Victoria, British Columbia

<https://www.eiseverywhere.com/ehome/chc-nsc2018/home>

May 6 to 11, 2018

FIG Congress 2018

Istanbul, Turkey

<http://fig.net/fig2018>

June 19 to 21, 2018

39th Canadian Symposium on Remote Sensing

Saskatoon, Saskatchewan

<https://crss-sct.ca/conferences/csrs-2018>



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Scan to BIM - Opportunities and Pitfalls for Surveyors

By Roland Mangold

Remote sensing technologies include mapping, surveying and recording virtually every inch of the Earth from satellites, planes, automobiles and UAVs. We live in a 3D world and it is just a matter of time before it is recorded digitally in 3D. The demand for fast 3D professional documentation and capturing reality continues to rise.

The advent of Building Information Modeling (BIM) to simulate planning, design, construction, and operation of a facility helps reduce costs, save time, improve processes and safety for various end users such as construction managers, general contractors, architects, owners, and engineers who require accurate, high definition as-built, “as-is” digital data to populate their BIM.

Growth and awareness of 3D technologies such as laser scanning, reality capture and scan-to-BIM are about to accelerate with the adoption of BIM. Laser scanning and photogrammetry to BIM are recognized as the most efficient and accurate method to obtain this information, however indoor mapping has been the elusive “holy grail” due to the lack of a GPS signal or “Localization” element which is unattainable indoors.

Indoor Location and Positioning will be huge because we spend most of our time indoors, working, shopping, eating, at the mall, at the office, or on campus, etc. Google already has Indoor Maps for many airports and shopping malls.

Recently, there has been considerable excitement about the use of technology from the robotics and autonomous vehicle industries for indoor mapping where GPS or GNSS are not available. This technology is called SLAM ... it stands for Simultaneous Localization and Mapping.

SLAM technology was born in the robotics industry and is used by autonomous vehicles to concurrently map and navigate through an unknown environment. To do this, SLAM algorithms utilize information from sensors (often LiDAR or imagery) to compute a best estimate of the device’s location and a map of the environment around it.

SLAM Mobile Mapping

To enable fast and accurate indoor mapping and mapping

in challenging surroundings, Viametris, which is located in Laval France, developed the first mobile 3D measurement system for building interiors in 2011. The iMS3D is a cart mounted system with sensors that acquire 3D point clouds and 360 degree images, with centimeter accuracy, simultaneously at walking speed. The iMS3D captures up to 500,000 sq. ft. per day and calibrates imagery with point cloud data even in GNSS-denied areas using SLAM technology. In 2015 Viametris released the second version of the iMS3D as well as the iMS2D, a portable handheld 2D interior scanner.

SLAM by itself does not produce a point cloud ... for the iMS3D, it initially calculates a 2D trajectory issued from two-dimensional measurements. Additional algorithms then generate a 3D trajectory from the coupling of additional embedded sensors. To enable fast and accurate indoor mapping and mapping in challenging surroundings, Viametris implemented SLAM to develop mobile 3D measurement systems for building interiors. The entire process chain allows the technology to accurately map the environment in 3D, even on irregular terrain, and the resultant point clouds can be

exported in standard formats and exploitable in CAD, GIS and BIM software. The iMS3D can also incorporate survey or other scan/measurement data to further increase the accuracy of the SLAM and 3D point cloud data.

Advent of the Drones ... Who Do You Want to Do Your Mapping?

2018 will be the harbinger of great things to come for the LiDAR, Laser Scanning and Reality Capture industries. This could well be the breakout year with the advent of drones making new markets and applications practically and economically feasible.

The primary benefit of drones is that they can go places where humans, or manned vehicles, cannot or should not go, such as oil refineries to inspect flare stacks or buildings, towns or neighborhoods that have been hit by storms, flooding and fires. The bottom line is that drones are ideal for tasks that are too difficult or dangerous for



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humans, or can be done more cheaply and accurately by a robotic vehicle.

Many in the geospatial mapping field believe that drones will be a panacea ... allowing anyone who has a flying machine with a camera and some photogrammetric software to perform mapping and surveying services.

The democratization of surveying and mapping being made possible by the proliferation of drones and mobile mapping systems opens the door for anyone to start offering surveying, mapping, or photogrammetry services. It is now more important than ever to promote the professionalism of your profession. You must ask yourself ... or ask your clients and potential customers, if some “millennial type kid with baggy jeans hanging precariously from his hips, a backwards ball cap on his head, skate board in one hand and quad copter in the other” ...is really who you want to do your mapping and surveying?

The critical element of the proliferation of drones in the geospatial field is that it opens the door to neophytes and newcomers to the surveying and mapping disciplines. This should be a major concern for those who are surveying, mapping and photogrammetric professionals.

Now, more than ever surveyors must impress upon their customers what bad data costs them. When it comes to mapping and surveying, it is as critical as building a solid, true foundation ... faults in the foundation will jeopardize the building, the entire project. As the old saying goes, “it is cheaper to do it right the first time than to have to do it over!”

Brand as a Warranty

In today's business environment, it is no longer enough to create superior technologies or solutions. People buy from organizations with which they are familiar, companies they like and give them a feeling of confidence. Professionalism is critical to achieving a “Brand as Warranty!” This is creating a brand that is equivalent, indeed better, than a warranty because a warranty never compensates a client for a failed product or service. Therefore, you want customers to believe that they are dealing with a company that will live up to its name and perform as expected. The customer cares about only one thing ... the customer! And, that they will get exactly what they contracted for, on time, on budget and on specification ... that's all the customer expects!

No question, we have a lot of catching up to do to update and improve our infrastructure, but driving across the country one can't help but be impressed with all of the construction taking place. The newly finished highways are certainly enjoyable to drive on and provide invaluable benefits to society. And, the costs to society by outdated and crumbling roads, highways, rails, buildings and facilities are immeasurable. I have seen construction sites on lonely stretches of highways, in cities and suburbs and I can't help wondering if there are enough workers to address the need when infrastructure investment actually comes about.

The construction industry has the slowest adoption of digital technology of virtually any industrial sector and could



iMS3D: Jerome Ninot, president and founder of VIAMETRIS, demonstrating the iMS3D collecting 3D point clouds and 360° images with centimetre accuracy at walking speed. The iMS3D captures up to 500,000 sq. ft. per day and calibrates imagery with point cloud data even in GNSS-denied areas using SLAM technology.

benefit the most from the adoption of new technologies. The actual unemployment rate in commercial/industrial construction is 1-2% and the need to develop compensatory strategies is necessary. The implementation of Virtual Design and Construction (VDC), BIM and new 3D data collection devices will lead to greater prefabrication—and that is economically only possible by moving to 3D technology.

Construction must adopt new 3D technologies to address the needs of society and it is up to the surveyors with their expertise in positioning and measurement and their knowledge and skills in LiDAR, laser scanning, reality capture, surveying and mapping to educate the construction industry to the benefits of 3D technology.



Roland Mangold has 25 years of experience in marketing, communications and evangelization of remote sensing technologies starting as founder and publisher of Earth Observation Magazine in 1992. He was one of the original organizers of ILMF, the International LiDAR Mapping Forum and most recently managing editor of LiDAR Magazine. He can be reached at roland@bim-ray.com for further information.

Airborne LiDAR – More than an Emerging Technology

By Susan Muleme Kasumba

On September 19, 2017, URISA Ontario gathered almost 70 industry professionals at Queen's University's Donald Gordon Conference Centre in Kingston, to teach and learn about LiDAR. Staff from the Ministry of Transportation attended along with folks from the Ministry of Natural Resources and Forestry, several lower and upper tier municipalities, conservation authorities, private companies and university students.

There were four main topics;

- **Airborne LiDAR**, which was presented by Airborne Imaging's Martin Maric and Susan Muleme Kasumba (who also happens to be URISA Ontario's Eastern Section Director),
- **Mobile LiDAR**, which was presented by Scott Paterson from Tulloch Mapping,
- **Bathymetric LiDAR** was presented by Wayne Szameitat from Teledyne Optech, and
- **Point clouds created by UAV** was presented by Trevis Giglioti from Principle Point Geomatics

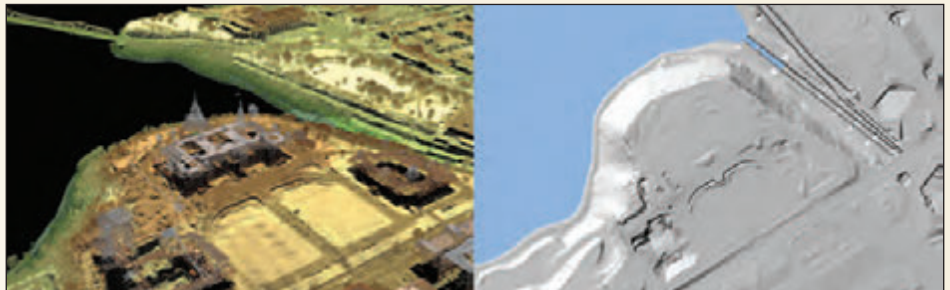
The sold out event, which included lunch and snack breaks from the conference facility, was a great success. As a result of the feedback that participants would like to learn even more about LiDAR, URISA Ontario will add a full day LiDAR Workshop at the 2018 BeSpatial Conference. The LiDAR Day presentations will be more focused on how LiDAR is being used by public and private sector organizations and less about the technical aspects of LiDAR acquisition.

At the presentation in Kingston, our discussion included:

- ⇒ The types of sensors on the market
- ⇒ The principles behind LiDAR
- ⇒ LiDAR Accuracy
- ⇒ LiDAR point density
- ⇒ How to request a quote
- ⇒ Published LiDAR specifications
- ⇒ Uses of LiDAR

Types of Sensors

The airborne LiDAR industry in Canada has exploded from only four providers in 2000 to almost twenty in 2017. The main sensor manufacturers are Reigl, Teledyne Optech and Leica and there about 33 of these various units span-



Courtesy of the City of Ottawa; Parliament Buildings- full feature point cloud coloured by elevation and bare earth model of Parliament Hill

ning the country. It is important to note that the age of the scanner can have an impact on its ability to generate high density point clouds (older sensors pulse at lower frequency). Typically higher density surveys are desired in urban centers or regions with denser vegetation.

Principles behind LiDAR

Airborne LiDAR (Light Detection and Ranging), is a technology in which laser pulses are emitted from a laser scanner towards the ground. These pulses number in the many hundreds of thousands (even millions) per second. These are not visible to the eye. They strike everything they come in contact with (ground, trees, power lines, cars, buildings) and reflect from these objects. This reflected pulse returns to the scanner (at the speed of light). By combining the pulse scan angle with information from an onboard GPS and inertial measurement unit, we are able to generate an X,Y,Z,I; horizontal position (X,Y) and vertical position, (Z), and the intensity or strength of each return (I). A group of these points (typically numbering in the millions or billions) is called a point cloud.

The newest sensors typically will allow for multiple returns per pulse allowing a single pulse to collect upwards of 4 discrete measurements. With the advent of waveform sensors, this has allowed for even more discrete measurements to be extracted from the same pulse. The end result is that LiDAR sensors are able to record viable and dense measurements from the ground as well as details of the features above the



Riegl and Leica Sensors installed in fixed wing aircraft

ground, such as trees and buildings, very accurately. If all returns except for the ground are removed from the point cloud, we are left with a bare earth model – an extremely accurate depiction of topography. The cool thing about LiDAR: it can also be flown at night!

LiDAR Accuracy

The question was asked; has airborne LiDAR accuracy improved. The short answer is yes. However, not as much from technology as by survey techniques. The sensors themselves still use similar inertial sensors today as they did 10 years ago. The scanner accuracies have not changed in a decade. Airborne GPS has also not changed in that period of time. However, good providers now understand the importance of:

- Calibrating their system after every installation
- Flying pre and post-mission calibration flights at staging airports
- Using GPS base stations at tighter intervals to minimize baseline distances

And, there have been improvements in the post processing and classification techniques. Having more satellites in the sky has also made a big difference.

The biggest change in the sensors themselves has been the advent of multiple pulses in the air (upward of 8 as opposed to having to wait for one pulse to return to the scanner before firing the next pulse) and eliminating range gate (the distance between the scanner and the ground) limitations of the sensors. These have not improved the accuracy of the pulses themselves, but have allowed for huge increases in density of pulses in a single pass. This is especially important in heavy vegetation or in mountainous terrain or both.



The highest accuracy that can be achieved consistently with an Airborne LiDAR scanner is approximately 5cm fundamental vertical accuracy (95% confidence interval on hard flat surfaces), and this is a very expensive approach and reserved for very small sites and big budgets. Typically the tightest specification from the United States Geological Survey (USGS) and other agencies, for mapping initiatives, is a more cost effective and realistic 10cm fundamental vertical accuracy. Regardless, to achieve higher accuracy, one must fly lower, and insure good GPS base station distances (typically 30km or less).

For horizontal accuracy the biggest factor is flying height, however slope will make a difference too. The LiDAR pulse

cont'd on page 30

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is not a point of light. It is, in fact a laser footprint. The higher the flying height, the larger the footprint, which results in less accuracy in a horizontal plane. Similarly, the greater the slope the more elongated the pulse, which causes a less accurate reading of the pulse in the horizontal plane. Due to these characteristics of the beam, the horizontal accuracy is always worse than the vertical accuracy. A good generic rule of thumb; the horizontal accuracy is approximately 1.5 times to 2 times that of the vertical. So for a project that is collected to meet 10cm fundamental vertical accuracy (FVA), one can expect the horizontal accuracy to be approximately 15-20cm. This means if a client submits a Request for Proposal (RFP) that asks for the same vertical and horizontal accuracy of 15cm, in essence the LiDAR provider will need to plan to meet 15cm horizontal and in reality 10cm vertically. If the true intent of the client is to achieve 15cm FVA, then they should expect the horizontal accuracy to be closer to 25-30cm and that is how the RFP should be written.

LiDAR Point Density

Ten years ago, for a LiDAR operator to meet 20 returns per square metre the only approach was to use a helicopter or small slow single engine plane. Today, with the new sensors, flying in larger, twin engine fixed-wing aircraft allows for providers to collect 30 returns in a single pass. This allows for collection of power lines and high density urban projects with a multitude of aircraft and sensors. If nothing else, this gives the clients a lot more options for collecting their project sites.

Writing a Request for a Proposal

At the session we also discussed the importance of a well written Request for Proposal. It is essential to make sure that all vendors supplying prices for a project have the same Shape File or KMZ for flight planning. Consultants should be told:

- ✓ The required accuracy
- ✓ The required point density
- ✓ The level of point cloud classification, and
- ✓ What products are required (classified point cloud, DEM, DSM, Bare Earth/Full Feature hillshades, contours, etc.)

Published LiDAR Specifications

It is challenging for someone who has never ordered LiDAR to know what should be requested. There are publications available to help guide the creation of your RFP

specifications. We recommend one of the following;

- 1- USGS Base LiDAR Specifications
- 2- Ontario Specifications for LiDAR Acquisition
- 3- Federal Airborne LiDAR Data Acquisition Guideline

These publications include everything from levels of accuracy and flight parameters, to different point cloud classifications and other LiDAR products. Reading through and using specifications from any of these publications will ensure that your RFP makes sense, and that your consultant understands what you require. It will also help to make sure that when you are evaluating proposals, you are able to compare apples to apples.

This also comes with a caution. Although these specifications are important for creating a good RFP, it is important to know what is needed and what is not for the successful fulfillment of your project. For example, items such as hydro-flattening, or ground truthing of classification techniques or vegetated areas, can add a lot of cost to a project. Similarly, the American Society for Photogrammetry and Remote Sensing (ASPRS) has defined classes for classification of the point cloud. However, if you only require a bare earth model, then asking for the classification of bridge decks, building and power lines may be unnecessary and terribly expensive, in many cases more expensive than the collection of the project. Therefore, defining your need is very important. For example, asking vendors for ground (1) and non-ground (2) classes for the point cloud may be all you need. This allows for creation of a bare earth terrain model and contours and this may suffice. If you are unsure, then at least asking for a base classification level, with options for higher classification, hydro-flattening, vegetation checkpoints, etc., will allow you to pick and choose what your budget will allow.

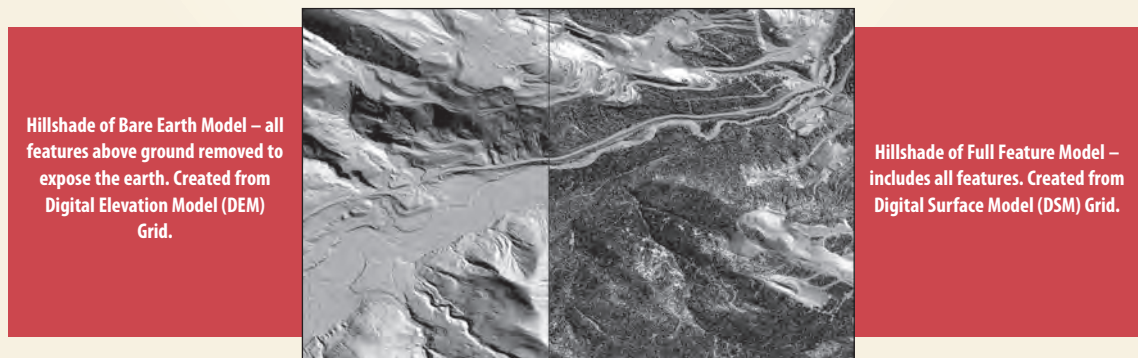
Uses of LiDAR

Our attendees gave us the feedback that what they really want to know is “how do we use this data”?

We presented some brief examples from the Cities of Ottawa and Toronto, the Toronto and Region Conservation Authority (TRCA) and Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

Some of the uses of LiDAR data include;

- Flood plain mapping, flood risk management and hydraulic modelling



- Visualization of terrain beneath forest cover
- Land management, land development and infrastructure management
- Impervious surfaces uses intensity models
- Slope mapping for both terrain and roof slopes
- Change detection
- Forest resource management
- Hazard mapping

We also spoke about various industries that use LiDAR routinely, and how they use it for;

- Engineering
- Virtual Scouting
- Hydrography
- Forestry Applications
- Exploration and Mining

Because this part of the presentation was brief, URISA Ontario has decided to plan our LiDAR day with a focus on applications. We will expand on this portion of the LiDAR 101 presentation. If you are interested in learning more about this emerging technology, sign-up for the URISA Ontario LiDAR Day at the 2018 BeSpatial Conference in May. You will leave the day with a complete picture of how LiDAR is acquired, and how it can be used. URISA Ontario's website www.urisaontario.ca will open registration for BeSpatial in spring 2018.



Susan Muleme Kasumba is the Business Development Manager at Airborne Imaging. She is a graduate of Sir Sanford Fleming's GIS/Cartography program and attended the University of Guelph. She joined Airborne Imaging in 2011 and has over 19 years of experience in the mapping industry. Susan manages Airborne Imaging's Office in Ottawa. She looks after clients and projects in British Columbia, Ontario and the eastern provinces. She can be reached at susank@airborneimaginginc.com for further information.

Airborne Imaging is a Canadian based, full service mapping company. We use the latest, leading edge technology and have operated throughout North America since 2004. We collect, on average over 100,000 square km of high density LiDAR, annually for various clients in all levels of government, engineering, forestry, mining, land development, hydro, and exploration. Airborne currently operates six aerial LiDAR systems: two Leica-ALS70-HP (MPIA), two Riegl LMS Q-1560 and two Riegl VQ1560i. All represent the highest levels of accuracy and productivity in commercial LiDAR acquisition systems. www.airborneimaginginc.com

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Joseph Fortune, Surveyor of Richmond Town and Park Lots, Carleton Co., District of Bathurst

By George A. Neville

The following article was prepared for the Goulbourn Township Historical Society (GTHS) and is reprinted with permission.

Richmond, the 2nd Rideau Military Settlement

Joseph Fortune's Plan of survey for the layout of a new Rideau Military Settlement near the rapids of the Good Wood River was finalized and executed as a town map in 1818¹ swiftly following on Conger's survey delineation of Goulbourn Twp.² An advance party of 20-30 military men headed by George T. Burke³ departed in late July 1818 from the 'Flats' of the Ottawa River below the Chaudière Falls into the bush in a south-westerly direction to locate a suitable site for a new settlement along the banks of the river that came to be known as 'The Jock'. Presumably, Joseph Fortune was a participant of this advance party, for it was the Deputy Quarter-Master General of British Forces in Canada at the time, Lt.-Col. Francis Cockburn's intention that the survey be conducted during the 'dry season'⁴ [pre-winter] under conditions more favourable for surveying dense bushland. Much of the surveying must have been done and completed before the end of December 1818. Since the general location along the Good Wood River for the new settlement had been specified, the area must have been explored at an earlier time by one or more military scouts, possibly even by Joseph Fortune. Unfortunately, no Richmond survey notes or related information were found among the fragile, torn, and fire-singed, sparse papers of the Library Archives Canada (LAC) Joseph Fortune Collection⁵.

Origin of the Fortune Family Surveyors

Not much has been found and written about the Father-Son Fortune surveyors. Joseph's father, "Colonel" William Fortune "reached Canada from South Carolina soon after the close of the American Revolution, and on his arrival, applied to Lord Dorchester, the Governor-General, for a Commission to practise in Canada. He stated in his application that he had been an inhabitant of South Carolina for several years antecedent to the late war, and had acquired considerable property there, being a Planter and Land Surveyor in that Province. He had been granted a Commission to practise as a Land Surveyor there by Sir Egerton Leigh, Surveyor General

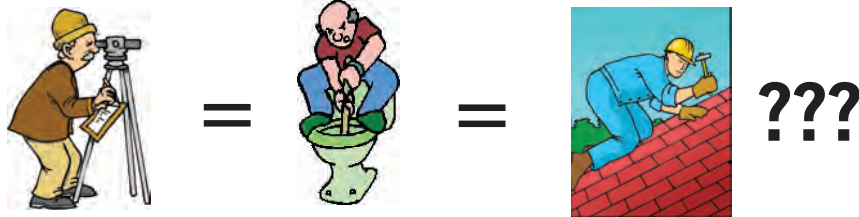
of His Majesty's Province of South Carolina, this Commission being dated 5th day of May, 1773. Mr. Fortune further stated in his application, that on the outbreak of hostilities he had been declared to be a 'Public Enemy' on account of his allegiance to the British cause, and had to abscond from his property and family, and for three years lived chiefly in woods and morasses. Upon arrival of British troops, he was employed by them under Earl Cornwallis, had fought bravely in the action of 25th April 1781, had been appointed Colonel of Militia on 8th September 1781, and at the close of the war had made his way to Canada"⁶.

Wm. Fortune's application was favourably received by Lord Dorchester, and a Commission to practise surveying in



Digital copy of the 1818 Fortune Map, Archives Ontario Plan 288 H20 showing the following inscription at the bottom centre: Plan of the VILLAGE of RICHMOND situate in the Township of Goulbourn district of Johnstown province of Upper Canada. Surveyed under Instructions of Thomas Ridout Esquire Surveyor General of said province in the year of our Lord 1818
Scale of 4 chains to an Inch. [Signed] J. Fortune Dy Pc Surveyor [Deputy Provincial Surveyor]

cont'd on page 34



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[the Province of] Quebec was issued 4th July, 1788⁶.

Walker states that “we have no definite information as to the age and place of birth of Col. [Wm.] Fortune, but it is probable that at this time he was a man of over 50 years of age, and born in Ireland”⁶. More recently Edward Wilson of Almonte, ON, a descendant of Fortune, has found that William (Col.) Fortune was born 30th December 1748 in Ireland and died c1822 in Rigaud, Quebec. “He received from Lord Dorchester in addition to his Commission, a grant of land, for his services in the Army, of 1,000 acres, and this was located for him by Deputy Surveyor General Collins, at the North-East Corner of the Township of East Hawkesbury, close to where the present Village of Point Fortune is built. Col. Fortune settled here with his wife and six children about 1790, and claims he was the first settler on the Ottawa River. The size of his lot is given as 152 perches along the [south side] Ottawa River (then known as the Grand), and 1,060 perches deep. The country at this time was absolutely in a state of nature, and the Colonel and his family passed through the usual severe trials of an early settler’s life. Soon after his arrival he suffered a serious loss, in the death of his eldest son (who had studied surveying in South Carolina), and also his eldest daughter”⁷. According to Wilson⁸, William Fortune Jr., b. c 1769 in Camden District, South Carolina, U.S.A., died in March 1794 at Montreal, Quebec; for Fortune senior’s eldest daughter, Jane Elizabeth (Jane) Fortune, b. c1777, no death date is known at this time.

Joseph Fortune

Of Joseph’s early life, Walker says little is known, but he was probably born in South Carolina and escaped to Canada with his father and mother when a boy at the time of the American Revolution. Wilson has found the young lad’s full name to be Cornwallis Joseph (Joseph) Fortune, born c1770 in Camden District, South Carolina, U.S.A.⁸. His father was granted Lots 1 & 2 of East Hawkesbury fronting on the Ottawa River that just earlier had been surveyed along a stretch of the north and south Fronts of the Grand River by Patrick McNiff in 1788⁹. Here in this area that came to be known as Point Fortune, “Joseph grew up to manhood, and learned Surveying from his father, who had qualified as a Deputy Surveyor on his arrival in Canada. Joseph was granted a Commission to practise as a Surveyor of Lands by Lord Dorchester on 4th May, 1796. This Commission evidently covered both Upper and Lower Canada, although Upper Canada had been separated from Lower Canada in 1792. Joseph assisted his father in surveys of the outlines of the Townships of Woford, Kitley, Bastard, Burgess, Elmsley and Montague in 1794, and in surveys of the Townships of East and West Hawkesbury and parts of Alfred and Plantagenet in 1797-8”¹⁰.

From the meagre Joseph Fortune papers⁵, there is a one-sheet account of William Fortune, Deputy Surveyor, for work in Upper Canada from 18th Dec. 1793 to 8th Feb. 1794 and from 15th April 1794 to 10th October following, 52 days, etc. [info on reverse side of very messy 8½” x 11”

sheet] with the front side listing Chain persons: Joel Achley, Joseph Fortune, William Grant, George Brown, Hamilton Rankin; Ax-Men Ennias, Peter, Harrena, Joseph & Peter. In the same file box, there is a small booklet (3” x 5”) of many pages entitled, Diary of the Survey of the Twp. Hawkesbury March 18th 1798.

“On 29th August, 1800, Joseph Fortune was appointed a Magistrate for the district and afterwards built a mill on the River Petite Nation, on a 400 acre plot of land granted to his father for his military services. In 1803 he made a survey of part of the Township of Cornwall, and in 1808 made surveys of the Seigniori of L’Original and Township of Caledonia”¹⁰.

“On 10th April, 1792, the Province of Upper Canada had been formed from part of the old Province of Quebec, and all the above work was done under authority of the Surveyor-General of Upper Canada at York, now Toronto. During the war with United States in 1812, we find Joseph Fortune’s name given on the Militia list as Lieut.-Colonel of the Prescott County Militia, and no doubt he took an active part in repelling the invaders at that time, although the County of Prescott was not actually detached from Glengarry until 1816”¹⁰.

“We have no record of any Government surveying done by [Lt.-Col. Joseph Fortune] during these unsettled years, but in 1816 he surveyed the Gore of Hawkesbury, which lies between the Township of Hawkesbury and the Province line of Ontario and Quebec, which had by this time been run out and established”¹¹.

“After the Counties of Prescott and Russell were established in 1816, Joseph was appointed a Notary Public, and Returning officer of that riding. In 1820 he opened a ‘Land Office’, but in 1821 got into difficulties apparently owing to his extreme loyalty” [see the remainder of Walker’s compilation¹¹ for details and Joseph Fortune’s refuge at St. Andrews [East], Quebec, on the north shore of the Ottawa River]. It is surprising during this last interval between 1816 and 1820, that O.L.S. Walker appears to have no knowledge of Joseph Fortune’s awareness of the first Rideau Military Settlement established at Perth, Upper Canada (1815-16), and his active involvement and laying out of the second Rideau Military Settlement of Richmond near the Good Wood River before the end of December 1818. The only archival evidence for the latter is the Joseph Fortune survey Plan of the Village of Richmond, 1818¹.

Fortune’s Role as a Land Broker in later Years

With Joseph Fortune being appointed a Notary Public after 1816 and opening a Land Office in 1820, it is now understandable why he would be prevailed upon by Grantees of Crown Lands to liaise and facilitate their sale and transfer. Sir John Johnson had been accorded Lot No. 8 of East Hawkesbury Twp.⁹ in 1788 as a later Grant in addition to his many earlier land Grants along the St. Lawrence River for his Loyalty and pivotal role in support of the monarchy of King George III during and after the American Revolution. In the

Joseph Fortune Collection⁵, there is a small hand-written note addressed to Col. Fortune, Point Fortune, from Sir John Johnson, Bart, 21st May 1821, requesting disposal of some of his Lots in Hawkesbury, Marlborough, or his Lot in Nepean purchased from a U.E. Loyalist. From the same sparse collection⁵ there is this jewel of insight in a 2½-page letter addressed to Col. Fortune, Maner House, S[t]. Andrews [Quebec] from Col. G.T. Burke (Richmond) 15th Oct 1824 (Parliament to meet soon) asking Fortune to convert his grain & hay into cash as soon as possible – his Brewery & distillerys are in operation, but cash will be wanted.

As a Surveyor, Notary, and Land Broker, Joseph Fortune would come to know many many people and be sought out to liaise between parties. A serendipitous rich example of this was also found in the Fortune Collection as a separate file (John Forrest file)¹² in a 2-page finely written letter from John Breckenridge to Mr. John Forrest transmitting a copy of letter of William Davie's father, just as he received it from Dalbeth, Nov. 25th 1821 with [N.B.] PS[bottom of 2nd page] dated Brockville 4th December 1821 – visiting daughters Tess (in Ogdensburgh opposite Prescott) and Betsay – please direct on to the care of E.C. Malloch, Perth, Upper Canada.

Walker was unable to ascertain what became of Joseph Fortune after his unfortunate episode caught between powerful political foes. He concludes by writing that [Joseph Fortune} “seems to have disappeared from sight and a

careful search has failed to reveal his movements. He may have practised in Lower Canada, but the only Government record [found] there is of a survey he made of the Village of St. Eustache in 1828. Wilson has recorded Joseph Fortune's death occurring in May 1836 at Rigaud, Quebec.



References

- ¹ George Neville, Town of RICHMOND & Park Lots in the Township of Goulbourn, The Ottawa Genealogist, Vol. 50, No. 3, July-September 2017, pp. 73-88.
- ² Wilson Conger, Goulbourn Twp. Survey 1818, Dept. Lands, Forests & Mines Diaries of Public Land Surveyors, Ontario Bureau of Archives Reports (1905), 3rd Report, p. xiii.
- ³ Andrew Haydon, Pioneer Sketches in the District of Bathurst, 1925, Ryerson Press, Toronto, p. 63.
- ⁴ Ibid., p. 59.
- ⁵ Joseph Fortune Collection (one box), LAC, MG 24 I 157. [Very fragile papers with no distinguishing numbers applied to pages by LAC curators]
- ⁶ “William Fortune”, Annual Report of the Association of Ontario Land Surveyors, 1932, p. 89-91.
- ⁷ Ibid. p. 90.
- ⁸ Personal communication (3rd Sept. 2017), Edward Wilson, 238 Greystone Cres., RR4, Almonte, ON, K0A 1A0.
- ⁹ George Neville, Loyalist Land Grants along the Ottawa (Grand) River in 1788, Bytown Pamphlet #103, January 2018, published by The Historical Society of Ottawa.
- ¹⁰ “Joseph Fortune”, Annual Report of the Association of Ontario Land Surveyors, 1934, pp. 128- 30.
- ¹¹ Ibid., p. 129.
- ¹² Joseph Fortune Collection (same box but separate John Forrest file), LAC, MG 24 I 158.

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“Land Settlement” Exhibit at the Museum in Wilno was Well Received

By Shirley Mask Connolly

This article is a follow up from “Early Land Settlement – Making Canada Home” which was published in the Summer 2017 issue of the Ontario Professional Surveyor.

The Special 150th Anniversary “Land Settlement” exhibit this past summer at the Polish Kashub Heritage Museum in Wilno was well received and visitors left many favourable comments in the guest book. Undoubtedly the story of how and when this land was settled has broad appeal and visitors appreciated the opportunity to



learn more as well as to study the old maps on display. It also was of particular interest to the descendants of the original settlers who still live in the area.

The overwhelming attraction of Canada to the Kashubs, most of whom were landless farm labourers from Pomeranian West Prussia, was the promise of free land. One of the main stories told at the Polish Kashub Heritage Museum in Wilno is the story of the struggle to survive on the land – “we worked the land, both in the field and in the forest, to survive”. While the Polish Kashub Heritage Museum emphasizes some of the issues that made this Canadian cultural group’s story unique, this is a story that is relevant to all immigrant groups who arrived in this particular area of Canada over a century and a half ago. It is a story of the hard work and determination of the first settlers who managed to overcome some very difficult conditions and make Canada home.

Just as the story of who and what Canada is has evolved over time, so has the story of the relationship to the land – what the land means to us today as compared to what it meant to our ancestors. Land ownership was very important to the Polish Kashub immigrants who wanted land to farm. The land they were offered here in Canada was free, but in reality they had to pay a high price for that ownership —

backbreaking labour clearing the trees and stones to create fields to cultivate and then accepting and adapting to the fact that the land was ill-suited for agricultural purposes. Somehow during the process of trying to make a living on their hard-won homesteads, the land/landscape acquired a sort of sacredness. A strong bond was created – and the idea of being rooted here kept families on the land long past the days when it was used for farming. Many descendants still live on or near the original land holdings of their ancestors, however, the old farms could no longer be described as farms if we use the usual definition as an area of land and its buildings used for growing crops and rearing animals.

The 2017 special 150th Anniversary “Land Settlement” exhibit at the Polish Kashub Heritage Museum in Wilno focused on the efforts at land ownership of the first Polish Kashub immigrants, using maps, deeds, and copies of archival records such as government reports, inspection reports, field notes, official letters, diaries etc. made by the people who helped/facilitated their earliest land ownership in Canada— in particular, the German Emigration Agent and translator, William Sinn; surveyor, William Bell; Crown land agent on the Opeongo Line, Thomas Patrick/T.P. French, and



local authority, John J. Watson, who helped the immigrants with their applications for their free grant deeds.

The map titled “A Part of the Township of Sherwood Radcliffe Hagarty Brudenell– Ottawa and Opeongo Road” and dated February 2, 1864, registered in Pembroke by Provincial Land Surveyor, William Bell, was the main focus of the display. This map along with Bell’s accompanying Field Notes of the Survey of the Ottawa and Opeongo Road



Free Grant Lots is from the Ministry of Natural Resources and Forestry. The field notes have drawings made by Bell of the various lots along the Opeongo Road and include information about the terrain, the type/quality of the land/soil on each lot, as well as the type of trees growing there. Of particular interest is that Bell also writes the names of the settlers on many of these lots along with the indication of their clearings and placement of shanties (dwellings), barns, stables and sheds.

Also on display is a replica 66 foot Gunter's Chain on loan from the Association of Ontario Land Surveyors.



Shirley Mask Connolly is the Curator of the Polish Kashub Heritage Museum in Wilno, which is a seasonal museum open daily in July and August. The "Early Land Settlement" exhibit at the Museum will continue next summer. Look for the sign CROWN LAND OFFICE and the special display in the Timber Frame Shed, Building #5. Contact Shirley Connolly Mask at maskconn@magma.ca or the museum at 613-756-6937.

NEWS FROM 1043

Changes to the Register

MEMBERS DECEASED

Kenneth Bunton	1640	Dec. 11, 2015
Donald D. McGeorge	985	Aug. 30, 2017
Henriette Verhoef	1817	Oct. 9, 2017
Henry J. Gerrits	1450	Oct. 22, 2017
William D. Ratz	726	Nov. 5, 2017
William Arthur Brewer	1172	Nov. 14, 2017
Andrew M. MacKenzie	1112	Nov. 23, 2017
Jack K. Young	1446	Dec. 2, 2017

RETIREMENTS/RESIGNATIONS

Michael Macek	1605	Dec. 31, 2017
Bruce S. Baker	1551	Dec. 31, 2017
Amy Li	CR205	Dec. 31, 2017

REINSTATEMENTS

Andrew Cameron	1314	Jan. 1, 2018
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COFA REVISED

Was: Holstead & Redmond Limited
Now: MTE Ontario Land Surveyors Limited
London, Ontario, October 31, 2017

COFA REINSTATED

WDB Consulting
New Hamburg, ON
September 2017

Surveyors in Transit

Trevor McNeil is now the managing OLS at the new office of **MTE Ontario Land Surveyors Limited** located at 520 Bingemans Centre Drive, Kitchener, ON, N2B 3X9. Phone: 519-743-6500.

Patrick Levac is now the managing OLS at **MTE Ontario Land Surveyors Limited** located in London.

Blake van der Veen is now with **MTE Ontario Land Surveyors Ltd.** located in London.

Gavin Seaman is now the managing OLS at **MTE Ontario Land Surveyors Limited** located in Stratford.

MGF Surveying Services has moved their office to 169 Dufferin Street South, Unit 20, Alliston, ON, L9R 1E6.

The postal address for **Richard W. Murray, O.L.S.** has changed to 13009 County Road #11, Essex, ON, N0R 1J0.

Douglas Scott McMorran is now with **Fairhall Moffatt & Woodland Limited** in Kanata.

Juzer Noman is now the managing OLS of **Rugged Geomatics Inc.** in Timmins.

Michael Haines is now with **Rugged Geomatics Inc.** in Timmins.

Steve Gossling is now with the **Ministry of Transportation** in the North Bay office.

C. T. Strongman Surveying Limited (a division of Dearden and Stanton Limited) has moved their office to 86 Coldwater St. East, Orillia, ON, L3V 1W7. Phone: 705-329-0765. Fax: 705-329-0764.

Jansky Lau is now with **Ertl Surveyors**.

Jason Chun-Ho Mo is now with **Pearson & Pearson Surveying Limited**.

Total Tech Surveying Inc. has moved their office to 341 Talbot St. N., Unit 2 & 3, Essex, ON, N8M 2W3. Phone: 519-776-9887.

Patrick Woolley is now with **WSP Geomatics (Ontario) Limited** located in Oakville.

Farzad Salehi is now with **exp Geomatics Inc.** located in Markham.

Athiththan Kanaganayagam is no longer with **J.D. Barnes Limited**.

Jason Wilband is now the managing OLS of **Archibald Gray & McKay Ltd.** in London.

Shawn Hodgson is now with **J.D. Barnes Limited** in Markham.

Jamie Leslie is now with **Farley, Smith & Denis Surveying Ltd.** in Ottawa.

Tulloch Geomatics Inc. has moved their office in Elliot Lake to 10-12 Brunswick Walk, Elliot Lake, ON, P5A 2A8.

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EDUCATIONAL FOUNDATION NEWS

Congratulations to our Fall Award Winners

Ryerson University - On November 9, 2017 during the Civil Engineering Awards Ceremony, awards were presented to: the following third year students demonstrating overall academic achievement and in CVL 323 - Fundamentals of Surveying and showing an interest in pursuing a career in Geomatics Engineering: **Stanley Zeng, Michael Muliana, Moathe El-Rabbany** and **Mohab Ali**; the following fourth year students demonstrating overall academic achievement in CVL 323 - Fundamentals of Surveying and showing an interest in pursuing a career in Geomatics Engineering: **Venetia Stephen, Holly Hudyma** and **Karuna Sookoo**; and to the following third or fourth year students demonstrating academic achievement in CVL 323 - Fundamentals of Surveying and/or CVL 352 - Geomatics Measurement Techniques and showing an interest in pursuing a career in Geomatics Engineering: **Mohamed Maslati, Amir Khoshnood** and **Adam Banaszek**. Each student was required to submit a letter outlining their interest in pursuing a career in Geomatics Engineering.

Lassonde School of Engineering: Geomatics Entrance Awards were presented to **Celina Landolfi** and **Daniela Krcmar** who entered the

Geomatics program with the highest high school average mark. **Celina Landolfi** and **Daniela Krcmar** were also the recipients of the **Women in Engineering Entrance Awards** for their demonstration of high academic achievement and leadership qualities.

The AOLS Educational Foundation Henriette Verhoef Award

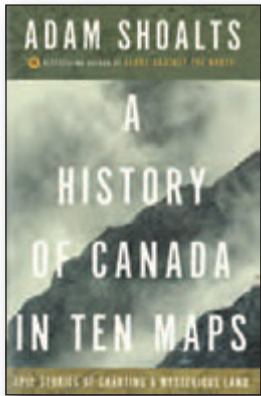
The Board of Directors of the Educational Foundation has endorsed a proposal from the North Western Regional Group to create an award in the memory of Henriette Verhoef to encourage women to become land surveyors. The Henriette Verhoef Award will be presented to a female student who is enrolled in either the Geomatics Engineering or Geomatics Science program at York University. She must demonstrate good academic standing, show a commitment to helping her fellow students and be recognized for the supportive and community nature that Henriette shared so much with her surveying family.

Mark Your Calendars

The Educational Foundation Annual Meeting of Members will be held on March 1, 2018 from 7:30 a.m. to 8:30 a.m. at the Sheraton on the Falls Hotel in Niagara Falls.

The Educational Foundation would like to recognize with thanks donations made in the memory of Henriette Verhoef, Bill Ratz, Doug McMaster, Jim Nicholson, Jack Milne, Alex Wilson and Jack Young.

BOOK REVIEWS



Published by Allen Lane, a division of Penguin Random House Canada Limited
ISBN 978-0-670-06946-0

A History of Canada in Ten Maps Epic Stories of Charting a Mysterious Land

By Adam Shoalts

Every map tells a story. And every map has a purpose – it invites us to go somewhere we’ve never been. It’s an account of what we know, but also a trace of what we long for.

A History of Canada in Ten Maps conjures the world as it appeared to those who were called upon to map it. What would the new world look like to wandering Vikings, who thought they had drifted into a land of mythical creatures? Or to Samuel de

Champlain, who had no idea of the vastness of the landmass just beyond the treeline?

It’s a story that will surprise readers, and reveal the Canada we never knew was hidden. It brings to life the characters and the bloody disputes that forged our history, by showing us what the world looked like before it entered the history books.

Information taken from inside the front cover.

The First Mapping of America The General Survey of British North America

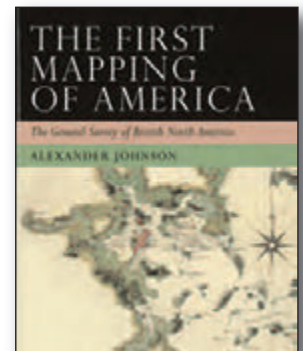
By Alexander Johnson

Victory in the Seven Years War dramatically enlarged Britain’s North American empire. Eager to know more about its new territories, the government in London commissioned a spectacularly ambitious survey to provide an accurate map of the entirety of Britain’s North American empire. Known as the General Survey of British North America, it ranks as one of the most impressive technical achievements of the period, transforming Great Britain into the undisputed global leader in cartography by the late eighteenth century. It revolutionized the geographic conception of vast and diverse sections of North America, and provided decision makers with vital intelligence for

economic and military purposes.

Alexander Johnson tells the story of the General Survey. At its heart lie the remarkable maps and the men who made them – the commanding and highly professional Samuel Holland and the brilliant but mercurial William Gerard De Brahm. Both sought to establish their place in the firmament of the British hierarchy; yet both were subject to constraints from afar, by Crown administrators in London and in the colonies by wealthy speculators, whose approval or opposition could make or break the best laid plans as they sought to use the Survey for their own ends.

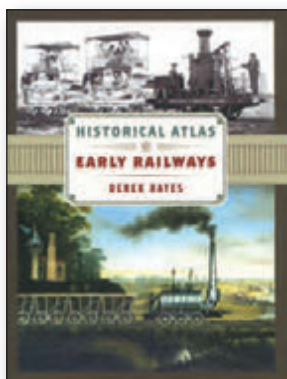
Information taken from inside the front cover.



Published by I.B. Tauris & Co. Ltd
ISBN 978-1-78076-442-9

Historical Atlas of Early Railways

By Derek Hayes



Published Douglas & McIntyre
ISBN 978-1-77162-175-5

The coming of the railway changed the world. Yet railways did not begin with the opening of the Liverpool & Manchester Railway in 1830 as so many texts proclaim, but much earlier. Wagons were being put on rails as early as the fifteenth century, and in the fifty years prior to 1830 there were hundreds of railways created, with wooden rails, with cast iron and wrought iron, creating a set of available trackwork that could be used by a new invention – the steam locomotive.

Historical Atlas of Early Railways tracks the emergence of the modern railway in a unique, essentially geographical way, providing contempo-

rary maps – many never before published – showing the locations and routes of the early railways. In addition to Britain, where much of the early railway system originated, the book also covers the earliest railways in France, Germany, the United States and Canada, among other countries, and includes the fascinating histories of monorails and atmospheric, electric, underground and mountain (rack) railways. This newest addition to the popular Historical Atlas Series is richly illustrated with over 300 maps, and 450 photos and other illustrations.

Information taken from inside the front cover.

The Last Word

A Little History of the Settlement of the City of Niagara Falls

Settlement in the Niagara area began in earnest after the American Revolutionary War (1775 -1783) when an urgent need to provide land for United Empire Loyalists, disbanded soldiers and former members of Butler's Rangers, named for Lieutenant-Colonel John Butler, Commandant of the Corps of Rangers, changed the landscape to what we see today. An area of almost three million acres, which extended to the Thames River, was purchased from the First Nations Mississauga in 1784 for settlement. It was this year that Phillip Rockwell Frey was appointed as Deputy Surveyor. Frey's father had been a surveyor and it is thought that Phillip might have surveyed while he was a Butler's Ranger. His major surveying operations in Niagara did not begin until June 1787. His first task was to re-survey Township No. 1 (Niagara) possibly as surveyed by Lieutenant William Tingling in 1784.

Later surveys in 1787 included Township



The Map of the Township of Stamford is taken from the Illustrated Historical Atlas of the Counties of Lincoln and Welland, Ont. H. R. Page & Co., 1876. Copyright © McGill University, 2001. It can be found online at <https://digital.library.mcgill.ca/countyatlas>

No. 2 (Stamford) which is the township where we find Niagara Falls. Assisting Frey was Augustus Jones who is a well-known name in our surveying community. The method of survey was the front and rear system. There were only 13 townships surveyed under this system and they are all in the Niagara Peninsula. Due to the tremendous amount of surveying involved, this system was very costly and was not continued.

As you can see on the Township of Stamford map (pictured left), the major populated areas were the Town of Clifton which was incorporated in 1856 and changed to Niagara Falls in 1881, and the community of Drummondville (near the present-day corner of Lundy's Lane and Main Street) which was incorporated as the village of Niagara Falls in 1881. The village was referred to as Niagara Falls South to differentiate it from the town. In 1904, the town and village amalgamated to form the new City of Niagara Falls.



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Phone: 416-491-9020 FAX: 416-491-2576
admin@aols.org * www.aols.org

Editor & Publication Manager:

Maureen Mountjoy, O.L.S., O.L.I.P.

Production Manager:

Lori Veljkovic

Advertising Manager:

Maureen Mountjoy, O.L.S., O.L.I.P.

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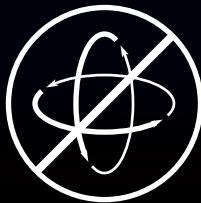
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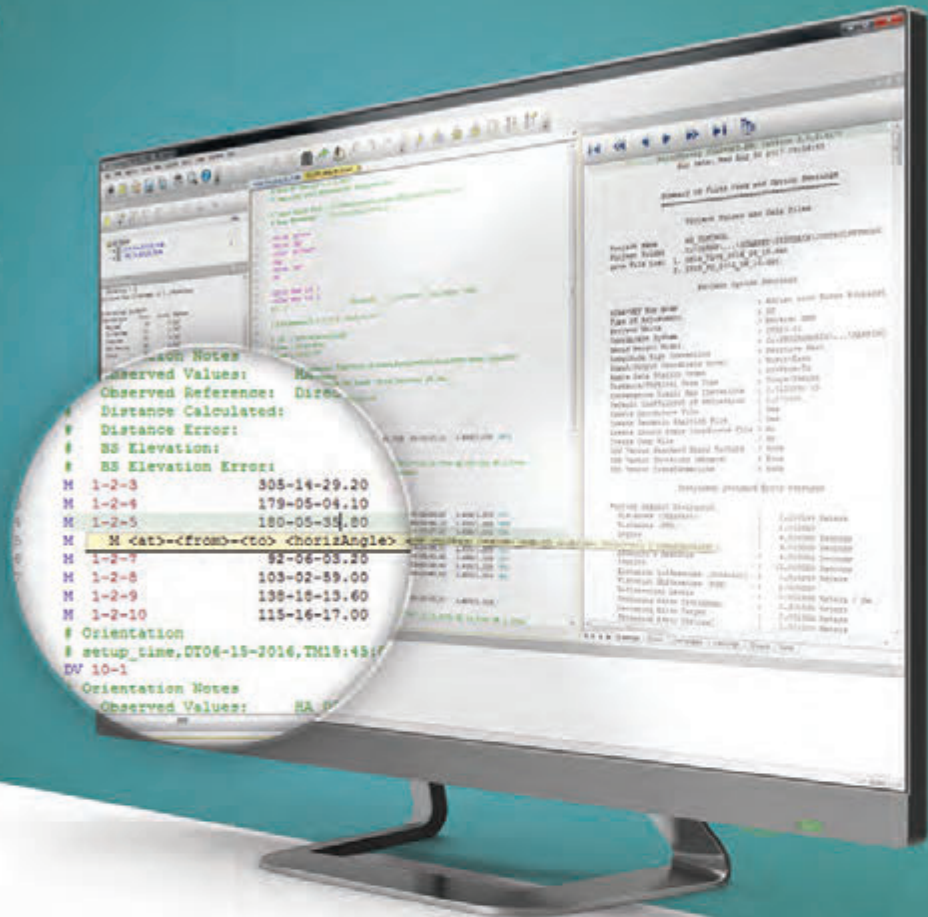
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