

Geomatics – What is it? Where does land surveying fit in? Whose profession is it anyway?

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Geomatics – What is it?

Geomatics Professionals help ensure that every location-based system works. From the GPS ‘smart’ maps that guide our cars, to the satellite ‘apps’ that feed our phones or route our school buses, to the guidance systems that drop missiles down the bad guy’s chimney – there are geomatics specialists ‘inside’!

Geomatics is an unusual name for a profession and some even argue that we should change it. After all, other more conventional nomenclatures do exist like ‘Land Surveying’ and ‘Geospatial Engineering’. These names are fine but none of them encompasses everything that Geomatics Professionals do. These new professionals need a big name for a business that is basically the science of mapping, measuring and analysing the world and everything in it. This is a big job and it calls for a big name – a name with a shelf life – a name that encompasses all the known disciplines plus all of the emerging activities that we might need to name later.

Apparently, B. Dubuisson thought about that in 1969 when he combined the terms geodesy and geoinformatics and came up with ‘Geomatics’. The University of New Brunswick (UNB) has also thought about it. Their web site states that, “Geomatics is a term that has been adopted by governments and private industry across Canada and which is becoming accepted worldwide.” Since 1969 the term Geomatics has been adopted by the International Organization for Standardization, the Royal Institution of Chartered Surveyors, and many other international authorities. One exception is the United States - so far they prefer ‘geospatial technology’.

No matter what we call it the fact remains that if Geomatics Professionals are to help us meet the global challenges that we all share, then at some point all of the world’s information needs to be referenced and organized. In achieving this, Geomatics has a major role to play. To relate information we need both common and unique attributes. ‘Location’ has the potential to provide both. Everything is somewhere, and if that ‘somewhere’ is precise enough, it can be unique. If we think about the implications of that, we begin to see why Geomatics is a big job that calls for both the support of a strong professional organization and an appropriately big name.

Where does land surveying fit in?

The UNB ‘site’ explains that because the term “surveying” no longer accurately expresses all of the work they do and the knowledge they teach, they have updated their name to Geodesy and Geomatics Engineering.

In other words, professional land surveying, that business

that the American Congress on Surveying and Mapping (ACSM) defines as, “... the science and art of making all essential measurements to determine the relative position of points and/or physical and cultural details above, on, or beneath the surface of the Earth, and to depict them in a usable form, or to establish the position of points and/or details.”, remains a valid professional practice area; it just no longer accurately covers the whole range of knowledge areas and activities that a Geomatics Professional (or for that matter a Boundary (Cadastral) Professional) needs to deal with.

Boundary Professionals should be comfortable with this observation since they have always had knowledge areas, such as planning, municipal and boundary law, that fall outside the purview of the geospatial or ‘land surveying’ practice areas.

The Surveyors Act, R.S.O. 1990, Chapter S.29, seems to reflect the same perspective, defining the “practice of professional surveying” as “the determination or analysis of spatial attributes of natural and artificial features on, above or below the surface of the earth, whether or not the surface of the earth is situated below water, and the storage and representation of such features on a chart, map, plan or graphic representation, and includes the practice of cadastral surveying.”

It then goes on to define separately, the “practice of cadastral surveying” as activities that include “advising on, reporting on, conducting or supervising the conducting of surveys to establish, locate, define or describe lines, boundaries or corners of parcels of land or land covered with water.”

In fact this ‘land surveying + plus’ view of our rapidly evolving profession can be helpful as we grapple to understand this new broader profession that we call Geomatics. From a global perspective, land surveying is not really a profession but a set of core competencies that are shared by many practitioners including the cadastral and the geomatics professionals. The key question then is not what is professional land surveying but what additional competencies need to be added to land surveying knowledge areas, like the transformation of datums for example, in order for the practice area to be considered professional.

For the Geomatics Professionals most of these additional competencies are currently listed, or at least implied, in the syllabuses of the leading geomatics engineering programs. For cadastral surveyors they reside within their legislation, certification boards and the professional admission requirements of the various professional surveying organizations.

In Ontario this leads to the conclusion that although any qualified person can practice generic land surveying, only

registered or licensed AOLS members can hold themselves out as ‘professional’ surveyors and only licensed professional surveyors can provide cadastral (boundary) services.

Some members of the AOLS are registered as Geographic Information Managers (GIM) and there are also Geomatics Engineers registered with Professional Engineers Ontario (PEO) but so far, neither organization has designated any specific geomatics activities or practice areas that are restricted to professional surveyors or engineers. The Association of Professional Geoscientists of Ontario (APGO), however, has listed a significant number of restricted geospatial activities. Their act exempts all members of either PEO or the AOLS from those restrictions.

Land surveying remains a viable ‘stand alone’ professional practice area and a critical competency for both Cadastral and Geomatics Professionals. However, it represents only a portion of the dozen or so key disciplines that comprise a fully developed contemporary professional Geomatics practice. A practice that at this time remains largely unregulated and from the public’s perspective, uncontrolled.

Geomatics – Whose Profession is it Anyway?

Just a few decades ago, Geomatics was largely viewed as an emerging area of practice within land surveying. Today these new geospatial services have not only created new market opportunities but have also led to the emergence of a number of new professional specialties. These in turn have led to the development of a new expanded profession; a profession now known globally as Geomatics. According to the Schulich School of Engineering; “Geomatics is one of the fastest growing information sciences in Canada and throughout the World.” It seems that the profession is underway and its scope for the future is only limited by the vision, energy and creativity of its practitioners.

Over the past few decades, the growth of this new industry has caught the attention of professional bodies and fostered international societies, but so far, none has been prepared to step up and offer the geomatics practitioners or their public, a full ‘menu’ of professional support services. Some organizations help members network. Others may offer professional development and even make significant contributions towards global standards. But so far, no organization has provided all of the five essential services of member services (including outreach), professional development, standards, professional certification and peer review.

The lack of these services may be putting the public at some risk but they don’t seem to be a short term priority for the young Geomatics Professionals. Demand for their services is high; and even though they lack a globally recognised credential that fully reflects and promotes their capabilities, and a professional association that is prepared to stand behind them - the future looks bright. This is good news for the young professionals because if professional support was critical for their success, history wouldn’t hold out much promise.

In the past, despite risks to the public, new professional activities have often been left unattended and unregulated for

decades. For example the Association of Ontario Land Surveyors (AOLS) refused, in the 1920’s, to accommodate the Professional Engineers within their ranks. They concluded at that time that professional engineering did not belong within their mandate. Urban planning members received a similar response a few years later. Today PEO has one hundred times the membership of the AOLS and the planners have formed their own professional institute.

For the younger less patient Geomatics Professionals that insist on a more immediate global solution this latter ‘legislation free’ approach may be the option they are looking for. It worked for the international Project Management Institute (PMI). They responded to the question; “Whose Profession is this Anyway?” with the formation and promotion of their own organization. Their goal was not only to ensure that best practices were articulated, documented and followed but also that their credentials were valued and respected around the world. Members wanted both the project management community and their client organizations to not only recognise PMI credentials but also to attribute their success to them. In fact, over time, a version of that objective became more or less the PMI vision.

A few decades later, PMI is a successful global organization with hundreds of thousands of members. The organization issues numerous professional and paraprofessional credentials including the internationally acknowledged, Project Management Professional (PMP). In many sectors, industry and governments have begun to voluntarily endorse PMP credentials by calling for them whenever they issue projects or advertise for staff.

It remains to be seen what type of professional organization will emerge but it is clear that like Professional Project Managers in the 1980s, engineers in the 1920s and surveyors in the 1890s, these new Geomatics Professionals are ready.

What are the certification options now for new Geomatics Professionals?

In Ontario, there is currently no organization that offers a comprehensive certification process dedicated to the geomatics professionals. For graduates of recognised engineering schools PEO offers a Professional Engineering credential and does recognise Geomatics as a valid engineering area of practice. These graduates can apply for licensing or registration with the AOLS and/or PEO. Qualified Geomatics Professionals with more than 10 years of specialized experience working for a Professional Engineer may also apply for a limited PEO license. The scope of a limited licence does not include membership. To date the requirements for PEO membership do not accommodate graduates of geomatics science programs that are ‘unrecognised’ without a lot of extra study and effort. Similar issues arise with other organizations and boards like the Canadian Board of Examiners for Professional Surveyors (CBEPS).

Geomatics Professionals who join PEO or AOLS could benefit from some practice restrictions. The AOLS, for example, allows candidates to apply for a licensed or registered membership. As noted earlier, both types of memberships are ‘professional’ but only the licensed members, who practice boundary surveying, have exclusivity.

The Professional Engineers Act states that only those who are granted the “professional engineer” license have the right to practice professional engineering in Ontario. It is also worth noting that Geomatics Engineering is a designated area of practice and that the Act defines professional engineering activities very loosely and broadly. It is conceivable that PEO at some point could argue that certain types of mapping or data management present a public risk and therefore should only be delivered by Geomatics Engineers.

In Ontario, the Geoscientists have taken a more focused and flexible approach. They define their practice area and then list activities within it that are restricted. These include a significant number of geomatics practices. However, explicit in their act is an exemption for all professional AOLS and PEO members. This illustrates one of the advantages of membership; even without exclusivity, wherein AOLS or PEO members may be protected from any new restrictions that might emerge from third parties such as other professional organizations, public agencies or government.

Despite these advantages, it is worth noting that none of the organizations is global and none has fully developed member services that include outreach, professional development, standards, professional certification and quality assurance through peer review. By those standards, none of the professional organizations fully measure up. Barring the emergence of a geomatics organization like PMI, the best a new Geomatics Professional can hope for is membership in an organization with potential for improvement.

What are the options for the professional organizations?

In general, legislated provincial professional organizations have two broad options; they can find ways to ‘license’ Geomatics Professionals or they can ‘register’ them and look for future opportunities to regulate specific activities and practice areas.

Even without exclusivity, registration can have value to members, if it offers them the same services, benefits, obligations and stature that licensed members enjoy. Examples of obvious benefits include networking and career opportunities, professional development, competency certification, peer review and advocacy. They may also be able to emulate the approach of the Geoscientists and work towards identifying and restricting specific geomatics activities to professional members.

Professional organizations that are ‘unregulated’ can consider emulating the PMI model and offer professional and paraprofessional certification, without the benefit of legislated exclusivity. To be successful, this type of credential must be promoted effectively to both the professional and the client community. The goal of this promotion would be to evoke a ‘client activated exclusivity’ based on the client organizations’ new found appreciation of the value of the credential to their businesses’ bottom line. This approach is aggressive, risky and openly competitive but as PMI has demonstrated when it works - it can go ‘global’ quickly and be very effective.

A few other advantages of this unregulated approach are that they can offer most of the same benefits as regulated organizations without the encumbrances of legislation. They

can also move quickly to issue new certificates of competency for emerging practice areas.

Disadvantages include the fact that without legislation they have no mandate to enforce exclusivity and that members also run a higher risk of being overlooked for ‘exceptions’ when governments or other ‘regulated’ organizations, like the Geoscientists for example, expand the number of activities or practice areas that they control.

What are some of the Risks and Benefits of Regulated vs. Unregulated Professional Associations?

Benefits and Risks to the Public

It is true that credentials don’t guarantee good business practice but they do offer the public and client organizations an easy way to ensure that at least a basic level of knowledge and competency is adhered to. It may be unrealistic to hope that a project can be protected by ensuring that all certified professionals are equally competent, but we can at least hedge our risks by ensuring that all retained professionals are equally certified. For complex or high risk activities, the fact that some professional organizations can monitor licensed practices and restrict practice to certified individuals can be a significant benefit to the general welfare and safety of the public. The peer review and quality assurance services, if they are rigorous, also provide real value and protection to the public. They can also represent a savings to the client organizations.

On the other hand those same traditional professional organizations that protect the public can also harm it by being too slow to adapt and develop new products. As a result they can inadvertently leave the public with ‘stale dated’ practices that are overpriced and under serviced. Their ‘regional’ practice restrictions can also lead to extra costs and delays for global projects that are trying to accommodate numerous jurisdictions simultaneously.

Benefits and Risks to the Members

Members of established regulated professional organizations are more likely to receive the benefits of legislation changes if any new activities are licensed and restricted. They are also more likely to be protected from changes in the mandates of other organizations.

On the other hand, members of new unregulated organizations are unencumbered by a legislated mandate. They are not only free to act but may act sooner because they have no sense of entitlement, no historical baggage and are focused on change and improvement. They are also able to network and partner with global organizations, develop new training for emerging professional activities and issue new certificates of competency at will. Since they have no statutory obligations to make protection of the public their primary objective, they can openly advocate for their members and more effectively respond to the changing business needs and interests of their members. On the other hand, as alluded to earlier, they have no monopoly or right to exclusivity and this makes them more vulnerable to vagaries in the marketplace, shifts in client perceptions and government intervention.

Summary

It is a given, that in the near future some professional

organization is going to certify and promote the Geomatics Profession. To achieve this, they will need to ensure that their members have proficiency in a number of related geospatial disciplines and these will probably continue to include land surveying. Whether Geomatics Professionals also need to be licensed boundary specialists or engineers is still an open question. Regardless of how many disciplines are required or which organizations prevail, it is a fair comment to state that in today's market the credential of Certified Geomatics Professional (CGP) is virtually 'up for grabs'.



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