

WILL WE BECOME THE NEW ROMANS?

THE ROMANS CREATED STANDARDS – AND THE FUTURE OF THE SURVEYING PROFESSION MAY BE TO BECOME THE 'PRAGMATIC GUARDIANS OF SENSIBLE GEOGRAPHICAL DATA STANDARDS', SAYS **DAVID MARTIN**

What do Roman ruts have to do with Wi-Fi, shoe sizes and surveying?

In a word – standards! Standards have existed for thousands of years. The first long-distance roads in Europe were built by Imperial Rome for the benefit of its legions. The ruts created by the Roman chariots were then used by all other wagons. These ruts later became a gauge for laying the first railway lines.

Modern standards started with the obvious things such as weights and measures. However, they have since evolved to permeate virtually all aspects of our lives. Today there are standards that cover



everything from shoe sizes and screw threads to the Wi-Fi networks that connect us to each other. These international standards ensure that customers and consumers can be confident that the products and services they use are safe, reliable and of good quality.

This confidence creates indisputable

economic benefits. These include streamlining internal company operations, innovating and scaling up operations, and creating or entering new markets.

Organisations and businesses exist to fulfil a need. They are successful when they satisfy the requirements and expectations of their stakeholders. Stakeholders are the people and groups that have a special interest in what the business does, and include governments, suppliers, society, employees and customers. The customer is a special stakeholder who receives a product or service, and generally pays for it. Only the customer can decide if products or services are satisfactory. Customers need quality products and services. They need products that are delivered on time, at a price that provides value for money, and are reliable, functional, durable, secure, available and traceable. Quality services reflect competence, responsiveness, integrity, reliability and credibility. Standards help to ensure quality products and services.

Is quality important in surveying? Obviously, yes it is, and by extension, standards are essential to surveying. Although many surveyors may not realise it, standards already pervade virtually everything that we do.

Much of what surveyors do is concerned with mapping, analysing and interpreting spatial data and information about the land, sea and buildings. More



STANDARDS HELP TO ENSURE QUALITY PRODUCTS AND SERVICES

We have already observed that a lot of what surveyors do centres on measurement. There are standards that help us to understand the quality of our measurements. For example, the Guide to Uncertainty in Measurement (GUM) provides a set of rules to establish uncertainty and 'traceability' – a way by which the measurement can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty.

Why is traceability important? All measurements can have errors and a degree of uncertainty. There are several sources of uncertainty in a given measurement, including the instrument itself, the item being measured, the environment and the operator. A measurement is only complete if it is accompanied by a statement of this uncertainty. The GUM provides a set of rules to establish a statement of uncertainty by using statistical analysis of the measurements themselves combined with additional information about the measurement process.

Finally, there are standards that influence the surveying profession indirectly. One example is ISO/TC 307 Blockchain and distributed ledger technologies. The standards created by ISO/TC307 could have a far-reaching impact on the surveying profession. A blockchain is a growing list of records (blocks) that are linked using



often than not, this means working with measurements, measurements that can be reduced, in one way or another, to angles and distances. Whether we express distance in metres or feet, angles in grads, degrees or radians, we all agree that a metre is a metre and a foot is a foot and that one inch is exactly 0.0254m. If we didn't, nothing would work or make any sense.

Real-world problems

Most standards strive to address real world problems with pragmatic industry standard solutions. Today, two major International Standardisation Organisation (ISO) technical committees (TCs) cover a large number of real-world problems and standards of direct interest to the surveying community.

The first, ISO/TC211 covers standardisation of digital geographic information. This work aims to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth. ISO/TC211 has 81 published standards and 25 others currently under development. Examples include: ISO 19111:2019 (geographic information – referencing by coordinates), which describes the data elements, relationships and associated metadata required for spatial referencing by coordinate; and ISO 19152:2012 (geographic information — land administration domain model), which is a conceptual model that provides a formal language for describing these models, so that similarities and differences between different systems can be better understood.

The second, ISO/TC 172 SC6 Survey Instrument Standards, provides a comprehensive coverage of standards related to surveying instruments and their

accessories including: handheld laser distance meters, levels, theodolites, EDM measurements to reflectors, total stations, GNSS field measurement systems in real-time kinematic, terrestrial laser scanners and more

There are also non-ISO standards related to surveying, including the International Property Measurement Standards Coalition, the International Land Measurement Standard and the International Construction Measurement Standards. These standards provide sets of expert framework and rules applicable to their domains of expertise.





What will the role of surveyors be in this brave new geospatial world? It is unlikely we will become specialists in quantum computing or artificial intelligence, but we can certainly help to ensure that the data generated by these technologies is at least coherent geographical data. Because these technologies are in disparate fields, the only way we can sensibly talk to each other is through standards.

Today, surveyors as professionals must fulfil certain legal, regulatory and/or accuracy requirements for their clients. Typically, they will strive to do this in an optimal cost-effective way and with the most appropriate equipment for the job at hand. Clients and customers expect best value for money. Legislative authorities as well as private and public companies require confidence that the services rendered are in conformity with globally accepted best practice rules. Using internationally and industry recognised standards is a widely accepted way of fulfilling these requirements.

The truth of this is obvious today. A potential wild west of geographical information will need pragmatic guardians of sensible geographical data standards. Surveyors have the necessary professional background, experience and native proximity on how geographical data is collected and generated. Will our future role be to create standards that ensure coherent and safe geospatial information?

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A POTENTIAL WILD WEST OF GEOGRAPHICAL INFORMATION WILL NEED PRAGMATIC GUARDIANS OF SENSIBLE GEOGRAPHICAL DATA STANDARDS

cryptography. Blockchains are inherently resistant to modifications. Consider for example, the implications of blockchain and land registration and ownership.

and effect on the surveying profession of OpenStreetMap becoming a de-facto authoritative source of geospatial data.

Future trends

Blockchain technologies are certainly the tip of the iceberg if we are to believe the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)'s yet to be published third edition of Future Trends in Geospatial Information Management: The Five to Ten Year Vision. The surveying profession is about to be confronted with truly paradigm-shifting technologies. Even if a small number of these future technologies become widely used in geospatial management – and many of them are already in use today – the surveying profession will become unrecognisable. Artificial intelligence, Digital Twins, Big Data and data analytics and edge computing will completely alter the skills base of traditional surveyors.

In a world where “everything happens somewhere” and in the absence of authoritative data and despite the limitations of user-generated data, crowdsourcing platforms such as OpenStreetMap or CrisisMappers provide the functions that support data aggregation, data curation and data management. Imagine the implications





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