RWANDA YOUNG SURVEYORS NETWORK

Newsletter

This newsletter is aimed to keep members of Rwanda Young Surveyors Network (RYSN) up to date on state of the art of surveying and its development.

Rwanda Young Surveyors Network (RYSN) was formed in November 2017, under the International Federation of Surveyors (FIG) Young Surveyors Network (YSN). Our main purposes are to make the young surveyors network an active research ingredient for the sustainable development of Rwanda and the world in general through research and innovation, ensure the future of the surveying profession, promote the work of FIG and the 10 FIG Commissions, organize events around the world within our regional networks and to collaborate with other likeminded industries and professions.

July, 2020

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THE FUTURE OF SURVEYING TECHNOLOGY: How will the Surveyor's role look in future?

Things will never be the same again with technology. Can we go back to the beginning? I think no. Surveying is science and at the same time art of determination of relative positions of points on, above or beneath the surface of the earth. It uses direct or indirect measurements of distance, direction and elevation.

Brief on the history of surveying

Surveying is believed to be the third oldest profession in the world. To a surveyor, the link chain symbolizes a rugged era, in terms of the evolution of surveying technology and equipment.

Around 1400 B.C., the Egyptians first used the predecessors of modern surveying instruments to divide the land into plots for taxation accurately and to engineer many feats, from canals to pyramids. We have come a long way, but land surveying technology is still evolving.

Then what happened?

Looking back at the whole history of land surveying, we can say that it has travelled miles and improved a lot. As time went by, the importance becomes higher. Moreover, as technology progresses, various developments have come out, making the process easier and a lot more helpful.

From simple equipment to UAVs, the surveying field will surely travel further and play more important roles in people lives.

The three basic requirements

With the advent of the electronic distance measurement, GPS, GIS, and computer-controlled Land Surveying, the profession of surveyors has turned from a labor-intensive type into a more sedate one.

For each surveying activity, we want it to be: **Fast**, **Cheap** and **Accurate**. But how? It is challenging to get all 3.

How to make the decision?

Fast: How fast do we need to roll out or update? Can we fix it at a later stage? *Cheap*: How much is the project worth? Accurate: What is the accuracy in the context of the purpose?

Answers to these questions will help surveyor to decide for Fast, Cheap and Accurate requirements.

What is going on?

Is the world changing?…isn't it?

- Fast technological development,
- Automation of most of the surveying tasks is inevitable,

- Typical work of the surveyors is being replaced by surveying robots,
- Surveyors need to change the business model (turning into managers, leaders and advisors for surveying projects),
- Temporal aspect (4D)
- Sensors everywhere– BIG DATA,
- Crowdsourcing – we all can provide data as well,

Global trends

New development

New and better sensors, new platforms- UAV, mobile mapping and Small satellites, constellations, data continuity, space video.

Sensor and data fusion - Images + point clouds + text. Multi-temporal data analysis - Change detection, update and - Process monitoring.

Real-time applications - Traffic, environment, security etc. - Robotics for mapping/mapping for robotics.

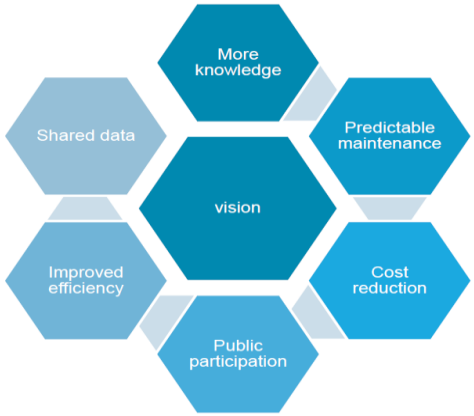
Big Data:

- Machine learning / deep learning

- Data mining

- Automation

What is expected in the future?



Today we will be going over what the future of land surveying technology looks like and what some of the top land surveying trends are shaping up to be.

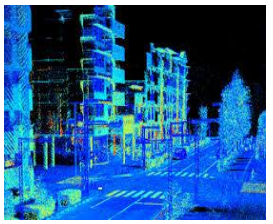
Unmanned aerial vehicles (UAVs)

UAVs have become more and more accessible and affordable, making them great additions to a surveyor's arsenal.

UAVs cover large surface areas in a short amount of time; Cross difficult terrain; Take detailed images of hard-to-reach landscapes; Accomplish land surveys, photogrammetry, 3D mapping, topographic surveying and more.

Mobile 3d mapping

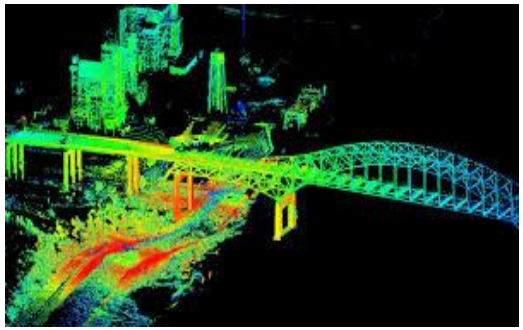
Mobile mapping systems can provide extremely detailed images in a short time. They are flexible and allow the creation of 3D models from a wide variety of environments. Indoor, outdoor and underground areas can all be extensively detailed with mapping technology.



Data accessibility

Another growing piece of technology is LiDAR, a form of 3D laser scanning. LiDAR stands for Light Detection and

Ranging and uses a pulsed laser in ultraviolet, visible or near-infrared light to measure variable distances to the ground or nearby objects.



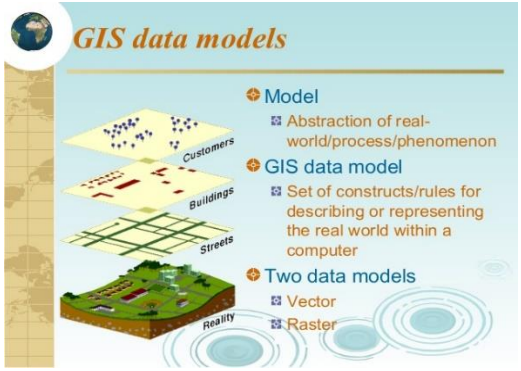
Cloud storage of data

As scanning technologies have become more complicated and advanced, they have started to create more data.

All of that data takes up valuable space and can quickly become a burden on the IT capabilities of land surveying organizations. Many of them do not have the storage infrastructure to support such a growing amount of information in a physical, on-site data centre. To remedy this, many companies are turning to cloud storage, in which data is kept off-site, in a secure location and managed by a third-party company.

Work with data modeling experts

For your data modeling needs, Take-Off Professionals has been creating accurate 3D models for over 20 years. Whether you are a contractor or surveyor, we can provide fast and accurate quotes for 3D machine control models.



What surveyors have to do?

Demand will increase for surveyors' expertise in the time-based analysis of changing site conditions, such as monitoring installations for volume-changing and deformation analysis. Surveyors and mappers should also take heed of capital flows into the autonomous vehicle revolution.

Big data and real-time data an abundant resource for spatial information, yet also challenge surveyors to process it into something relevant to their applications.

Surveyors will be needed to ensure data accurately represents the physical world. The increasing the demand for surveyors who are bound to provide data accuracy and quality.

Cutting-edge surveyors will have invested in proven technologies to provide quicker and safer means for data capture, with scanning top of mind. Those who learn to master the robust software programs used to extract data and automate processes will be most competitive.

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