



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Continuing the conversation from Locate19 in Melbourne and SEASC19 in Darwin, SSSI Queensland is hosting its annual Brisbane conference as a one-day celebration of all things surveying and spatial in Queensland.

The Queensland Surveying & Spatial Day will be based around digital futures and capacity for 21st Century growth and will focus on the community's growing reliance and adoption of digital technologies and processes. This growth in digital capability is driving new capacity and opportunity for the surveying and spatial science sector.

The conference will be followed by the Queensland Asia-Pacific Spatial Excellence Awards, which, in partnership with SIBA|GITA, recognises the outstanding achievements of Queensland's surveying and spatial organisations and individuals.

Register now to share in this opportunity for personal and professional growth, networking and celebration.

Thursday 17 October 2019

In the Footsteps of Gregory to Divett - celebrating surveying and mapping history 1859-1993

For those around the evening before the conference, please join us for a tour of the new Museum of Lands, Mapping and Surveying followed by pre-conference networking drinks.

Facilitated by the always engaging and incredibly knowledgeable Bill Kitson, walk in the footsteps of the pioneers of the surveying and mapping profession and land development in Queensland in this one hour guided tour. Witness the history of the profession in Queensland through interactive maps, and stories about remnants of our past told in only the way Bill Kitson can. Don't miss out on this unique chance to be a part of this unique collection told by the people who have curated the exhibition for more than 37 years.

Included in all Full Conference registrations, join us for a pre-conference evening of tales, tastes and tallies!

Museum Tour & Networking	
4.30pm	Registration Museum of Lands, Mapping and Surveying: Ground Level, 317 Edward St, Brisbane
4.45pm	Museum Tour Bill Kitson
6.00pm	Networking Drinks Grand Central Hotel: 270 Ann St, Brisbane



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Friday 18 October 2019

Opening Session

P1 & P2, Plaza Level, BCEC | Chair: Paul Reed

8.00am	Registration and Coffee		
8.45am	Welcome Paul Reed Chair, SSSI Queensland		
8.55am	President's Address Dr Zaffar Sadiq Mohamed-Ghouse FSSSI President, Surveying & Spatial Sciences Institute		
9.00am	Opening Address Michele Bauer Deputy Director-General, Manufacturing, Industry and Regions, Department of State Development, Manufacturing, Infrastructure and Planning		
9.10am	Innovations and challenges of surveying underground and inaccessible environments by unmanned vehicles Dr Farid Kendoul Co-founder and CTO, Emesent		
9.45am	GDA2020: In theory & in practice Dr Jane Cooke National Technical Support Manager, C.R. Kennedy		
10.20am	Spatially-enabled digital twins, the SEQ Digital Twin, and the levels of digital twin maturity Steven Jacoby Queensland Department of Natural Resources, Mines and Energy		
11.00am	MORNING TEA		
	Session A Chair: Robert McCabe Room: P1 & P2	Session B Chair: Angus Scown Room: P3	Session C Chair: Noel Davidson Room: P4
11.30am	Future Trends in Positioning Darren Burns Qld Dept of Natural Resources, Mines and Energy	Our journey adopting QGIS in a corporate environment Emma Hain SMEC	Overview of AS5488 2019.1 (Subsurface Utility Information) Ian Lambert Lambert Locations
11.50am	Cadastral Survey Requirements Russell Priebbenow Qld Dept of Natural Resources, Mines and Energy	Making Sense of the Range of Available 3D Spatial Data Rob Clout Aerometrex	A Low-Cost High-Precision Geo-Location Solution for UAV's Todd Morschel Monitum
12.10pm	Numeric Cadastre Adjustment Jaimie Dodd Qld Dept of Natural Resources, Mines and Energy	Application of GIS on Elderly Healthcare in Developing Countries Satya Singh University of the Sunshine Coast	Corporate Future Proofing of Mine Survey Departments Nigel Atkinson Rtd - Anglo American Coal
12.30pm	SBQ Update Peter Murphy Brazier Motti & Surveyors Board of Qld	Natural Disaster, Risk Mitigation & Recovery in the Nursery Garden Industry Peter James Cohga	Spatial Challenges for Cooperative Vehicles, the Queensland Experience Justin White Qld Department of Transport and Main Roads
1.00pm	LUNCH		



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE



	Session D Chair: Jemma Picco Room: P1 & P2	Session E Chair: John Broadbent Room: P3	Session F Chair: Peter Kinne Room: P4
1.45pm	Sugarcane Yield Estimation by UAV Photogrammetry Survey Clancy Sharp <i>University of Southern Queensland</i>	Tides 102: Port Datum, Chart Datum, AUSHydroid, Australian Height Datum and AUSGeoids John Broadbent <i>Coastal Impacts Unit, Qld Department of Environment and Science</i>	Aquawatch Australia Mission: decision-ready information for Australian and Global freshwater and coastal ecosystems Stuart Phinn <i>The University of Queensland</i>
2.05pm	Considerations in Monitoring Projects Brent Dawson <i>Ultimate Positioning Group</i>	Providing a Baseline for Future Change along Australia's Coastline Mick Hawkins <i>Fugro</i>	Driving towards our Digital Future – a practical Deep Learning Framework for Geospatial Applications Dipak Paudyal <i>Esri Australia</i>
2.25pm	Terrestrial laser scanning best practices and examples of efficient data processing Jennifer Ludwig <i>C.R. Kennedy</i>	Satellite-derived bathymetry: Global state-of-the art, local examples Magnus Wettle <i>EOMAP</i>	Logan City: Street level imagery for road asset management and broader community Edoardo Neerhut <i>Mapillary</i>
2.45pm	Native Title and the role of the Cadastral Surveyor Dale Atkinson <i>Atkinson Surveys</i>	RC boats, Single beam, Multi beam, colourised point clouds and Slam based solutions Mark Hickey <i>C.R. Kennedy</i>	Sundale Project – Bridging the Gap between Remote Sensing & Surveying Liam Thierens <i>Bennett + Bennett</i>
3.15pm	AFTERNOON TEA		
	Closing Session P1 & P2, Plaza Level, BCEC Chair: Mark Hickey		
3.45pm	Cross River Rail's Digital Network Approach – our approach to the digital enablement of infrastructure in Queensland Peter Quick <i>Director, Program Control and Communications - Cross River Rail Delivery Authority</i> and Russell Vine <i>Executive Director, Marketing & Communications - Cross River Rail Delivery Authority</i>		
4.15pm	Challenges & Opportunities: Young Professionals in the Geospatial Industry Michael Topp <i>Surveyor, Veris & Co-Chair, Qld Young Professionals</i> Panel Discussion: John Tasker <i>Royal Geographical Society of Qld and DNRME</i> Lee Hellen <i>Land Solution Australia</i> Nelson Kuna <i>Maritime Safety Queensland</i> Paul Reed <i>East Coast Surveys</i>		
5.00pm	Closing Remarks Mark Hickey, Conference Chair		
5.15pm	Conference concludes		
6.00pm	Asia-Pacific Spatial Excellence Awards - Queensland <i>Skyroom, Brisbane Convention & Exhibition Centre</i>		

Special thank you to our valued Sponsors:



Please note, this program is a draft and subject to change.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Opening Session

Innovations and challenges of surveying underground and inaccessible environments by unmanned vehicles

Dr Farid Kendoul *Co-founder and CTO, Emesent*

While surveying above ground and accessible environments is a mature and a well-established discipline, mapping harsh and inaccessible areas is still an unsolved problem. Some groups and companies such as Emesent are developing the next-generation technologies that will allow the automation of data collection in those challenging environments through the use of new mapping systems and autonomous vehicles. Some of the key challenges and innovations related to the surveying of inaccessible underground environments will be discussed in this presentation. We will also report on some of Emesent's achievements in this area including the results from deploying these technologies in the latest DARPA Subterranean Challenge.

GDA2020: In theory & in practice

Dr Jane Cooke *National Technical Support Manager, C.R. Kennedy*

GDA2020 is being rolled out across Australia. Many states are already using it and some, such as Queensland are yet to officially start. This presentation presents an opportunity to look into how GDA2020 is being adopted across Australia and for Queensland to hopefully learn from any misperceptions.

We will look into what GDA2020 is and why we need to adopt the new datum and then examine the procedures that surveyors follow to start working in GDA2020 with Ausgeoid2020. The focus will be on the practical implementation of GDA2020 in both the field and the office with everything from drones, total stations, Network RTK and post processed GNSS.

Spatially-enabled digital twins, the SEQ Digital Twin, and the levels of digital twin maturity

Steven Jacoby *Queensland Department of Natural Resources, Mines and Energy*

The Department of Natural Resources, Mines and Energy (DNRME) is leading an opportunity to develop a digital twin for Southeast Queensland under the recently released SEQ City Deal. Steve Jacoby – Executive Director, Land and Spatial Information will explain why precise positioning and a modern cadastre is fundamental to the development of a spatially enabled digital twin in SEQ and how the spatial and surveying industry can help shape its design and implementation.

[Back to program](#)



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session A

Future Trends in Positioning

Darren Burns *Qld Dept of Natural Resources, Mines and Energy*

- Basics of GNSS positioning
- GNSS System developments
- System provided precise point positioning
- Mass market positioning
- Influence of automated vehicles
- Direct georeferencing
- Vulnerabilities

Cadastral Survey Requirements

Russell Priebbenow *Qld Dept of Natural Resources, Mines and Energy*

The department is undertaking a review of Queensland's Cadastral Survey Requirements. The review presents an opportunity to consider how the standards could be improved. It will also consider the effect of legislative changes that have impacted on how certain land actions must be dealt with. The standards will contain amendments related to the introduction of GDA2020.

Numeric Cadastre Adjustment

Jaimie Dodd *Qld Dept of Natural Resources, Mines and Energy*

The Digital Cadastral Database (DCDB) is a digital, graphical representation of all current land parcels in Queensland, and is a valuable dataset for those dealing with land related information. However, the DCDB is not as spatially accurate as it could be, with boundaries in some urban areas depicted over 2.5 metres from the legally defined boundary.

In an effort to resolve the discrepancies between the DCDB and legal boundaries, Land and Spatial Information has been conducting a numerical cadastre pilot over the Cross River Rail subject area to determine if a better estimate of the boundaries can be obtained by running least squares adjustments on observations from survey plans, the existing DCDB and coordinates on control marks.

Preliminary adjustments have demonstrated that it is possible to apply this process to achieve significant improvements in the boundary representations when compared to highly accurate imagery.

SBQ Update

Peter Murphy *Brazier Motti & Surveyors Board of Qld*

Peter will be providing an update on the Surveyors Board of Queensland's current activities and priorities.

[Back to program](#)



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session B

Our journey adopting QGIS in a corporate environment

Emma Hain *SMEC*

We have achieved something amazing at our large international engineering company in the open source space that we want to share our experiences with our community.

We adopted QGIS to supplement our previous GIS software where it fell short in tool and licence availability. QGIS is now used more than the commercial alternatives by our GIS Staff in some regions and as our default corporate spatial software for non-GIS staff.

I'll reveal how we got management and IT to agree to switch over to open source software and share the secrets of what our workplace implemented to support the software and contribute to the ongoing development of the QGIS product.

Plus, I'll also delve into the nasty bits, the issues we encountered: -

- Expected and unexpected
- Ones we fixed
- The ones we are fixing
- The tricky ones that are still confounding us

It has been an exciting journey so far and the response we have from our company is encouraging and a real tribute to the amazing community that has created QGIS, and I'd love to share our experiences and advice with you!

Making Sense of the Range of Available 3D Spatial Data

Rob Clout *Aerometrex*

The Spatial profession is undergoing an unprecedented time of digital transformation, where organisations are being bombarded with new technologies and innovation. The challenge for many is understanding what data is available, what is easily achievable and what specifications should be asked for when procuring data. State and Federal Government have carried out pilot projects across the country to acquire demonstrable examples of the range of different technologies and innovations through a series of pilot projects to enable clients to assess capabilities, formats, quality and costs to help educate the market. Examples in Queensland include the high profile Cross River Rail project that has generated datasets that include individual textured building models delivered as CityGML Level of Detail 2 and 3 that have underpinned BIM modelling, and also high-resolution mesh models delivered via OGC WebServices. Examples are also being carried out at Local Government level with great examples including the Ipswich City Centre at High resolution captured from helicopter, drones and ground level capture. These examples are helping define what is possible to allow ease of procurement and to help set clear expectations



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session B cont.

Application of GIS on Elderly Healthcare in Developing Countries

Satya Singh *University of the Sunshine Coast*

The use and relevance of Geospatial application like GIS in elderly health care is significantly increasing in any public health planning for better health care management and to provide cost-effective, timely-fashioned and efficient health care service to aged residents. However, the potential of geospatial research on elderly healthcare is not well translated and implicated in developing countries, thus the validation and possible applicability of GIS is crucial in context to developing countries. Aims/Objectives: The objective of this study is to identify the potential use of GIS on the elderly healthcare of developing countries with a focus on Geospatial health parameters (social, bio-physical, financial, medical) for providing cost effective solutions, efficient use of the budget and identifying the resources in developing countries Methods: As a model of developing countries, the research is focused on qualitatively exemplar of Nepal case to entire elderly population consisting of a literature survey on GIS designing and secondly the real impact assessment in a nationally re-presentative sample. Results: By applying the GIS to the elderly, we can track the vulnerable population needing healthcare services from multi-dimensions including social aspect to real health care services. A pre-intervention and post-intervention evaluation will clearly explore the potential of GIS applicability in context to health care improvement to elderly and this approach can be a role model and replicated in other developing countries. Conclusion: This potential approach using GIS will be a first-time milestone endeavour for neglected older people healthcare improvement in an evidence-based manner in developing countries.

Natural Disaster, Risk Mitigation & Recovery in the Nursery Garden Industry

Peter James *Cohga*

Production and retail nurseries in Queensland are participating in a data mapping pilot program aimed at increasing the rate of recovery and improving business resilience following natural disasters. Nursery & Garden Industry Queensland (NGIQ)'s 'Cyclone Debbie Agricultural Recovery and Resilience Project' identified a need for nurseries impacted by a natural disaster to re-assess their nursery site as part of a whole-of-business review and risk mitigation strategy. The nursery industry is a significant sector of Australian horticulture. In 2015/16 the nursery industry produced approximately 1.618 billion plants that entered the environment, with a farm gate value of \$2.29 billion. NGIQ teamed up with key players in the spatial industry to map nursery sites to assist with business preparedness and recovery. Drones were used to capture high resolution imagery and lidar which was used to create 3D models of the nursery assets and surrounding landscape. This information along with other relevant open data such as state infrastructure (property, road, rail, waterways, etc.), local infrastructure (sewerage, water, power, etc.), and other relevant disaster data such as flood levels, were amalgamated into a user-friendly web mapping solution. It can take up to three years for a nursery to fully recover from a disaster, and the need for nurseries to provide accurate and timely damage reporting to government, insurance and financiers is critical to recovery.

Spatial data mapping can provide a nursery owner with the ability to promptly measure and assess the financial loss of infrastructure, buildings and damage to specific growing areas. This can make reporting the initial loss assessment quicker and less stressful. This paper outlines how the spatial industry and the nursery gardens industry collaborated on a solution that provides real benefits to the individual nursery businesses as well as to the nursery industry as a whole.

[Back to program](#)

Please note, this program is a draft and subject to change.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session C

Overview of AS5488 2019.1 (Subsurface Utility Information)

Ian Lambert *Lambert Locations*

On June 12, 2013, Standards Australia launched a new Standard (5488) which has – for the first time – outlined a consistent approach was instrumental on the committee for the upgrade of the standard released May 6 2019.

AS5488 was first published in June 2013 and for the first time a unified standard is achievable.

On May 6 2019 the second version was published. As locators and surveyors, it is important to understand how the standard came about and how the changes affect the locating industry.

We will discuss how quality levels are achieved to create a common output for end users to identify with.

A Low-Cost High-Precision Geo-Location Solution for UAV's

Todd Morschel *Monitum*

Providing a high-precision geo-location solution is a critical procedure for the UAVs applications, e.g., precision farming, aerial mapping & surveying, and environmental monitoring. In the tradition of aerial triangular (AT), the georeferencing is usually realized by ground control points (GCPs) method which is an expensive, time-consuming, and sometimes, dangerous process. With recent Global Navigation Satellite System (GNSS) receivers and antennas development, it has been proved that an affordable GNSS receiver and antenna can be used to achieve centimeter-level accuracies by real-time kinematic (RTK) or post-processed kinematic (PPK) technologies. However, in general, an RTK/PPK UAV is more expensive than a normal one because of specific paired hardware and software. In this contribution we have developed a precise, low-cost PPK GNSS system for lightweight UAV (e.g., DJI Inspire) to achieve the goals Accuracy, Cost-effective, Efficient and Safety (ACEs), which is designed to (1) provide better than 10 cm positioning **accuracy**, (2) the **costs** around AUD 1000, (3) improve the **efficiency** by reducing the field and office working hours, (4) reduce or eliminate the need for GCPs to improve the personal **safety**. Not only the hardware integration and equipment installation information are introduced, but also the data collection and processing methods are presented in this paper. To better evaluate the developed system performance, we did two separate flight tests: a corridor survey and a block digital surface model (DSM) generation. Both the check points' coordinate and DSM elevation discrepancy are applied to assess the system accuracy. Results indicate that it is feasible for the develop UAV PPK system to provide high-precision geo-location solutions in the two typical experiment cases.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session C cont.

Corporate Future Proofing of Mine Survey Departments

Nigel Atkinson *Retired - Anglo American Coal*

The paper will start by introducing myself and the work I have been doing over a period from 2013 to 2017 in Australia, South Africa and to a lesser extent in Canada. The concepts of Future Proofing will be explained and the need of a Principal Surveyor to carry out this process. A Global Corporate Survey Standard will be introduced and its application to the business that will be audited using an Operating Management System (OMS).

The practical challenges of applying one global standard to four different sets of legislation will be discussed. The difference between a 100% audit result and continuous improvement will be analysed. The importance of being able, when necessary, to update the auditing process on a regular basis will be stressed. The reasons why a Principal Surveyor is required to "oversee" these processes will be presented.

The challenges of "overseeing" 21 mines on 3 continents will be discussed. The simple but effective answer from management was: "Look at the business, see where you can add the most value and concentrate your efforts there". When dealing with different cultures "Carefronting" is necessary to make improvements: that is, caring enough about individuals to front them up. The challenges of Future Proofing for the Boom and Bust of the 21st century will be presented. The answer to these challenges is to: Put the right person, in the right place, at the right time. Without forgetting about technology, we must ensure that our surveyors are trained to be effective, self-motivated and above all adaptable to changing situations. They must think outside the box and where possible always consider how they can add value to the business.

Spatial Challenges for Cooperative Vehicles, the Queensland Experience

Justin White *Qld Department of Transport and Main Roads*

Queensland Department of Transport and Main Roads' (the department) Cooperative and Automated Vehicle Initiative (CAVI) is designed to prepare the department for vehicles with cooperative and automated capabilities on our road network. This includes testing and trialling cooperative intelligent transport systems technologies (that is, vehicles that 'talk' to other vehicles, infrastructure and road operations systems) and a cooperative and highly automated vehicle (that is, one that can operate in automated mode under certain conditions). The first of four major components of CAVI to be completed will be the Ipswich Connected Vehicle Pilot. This Pilot will see around 500 vehicles retrofitted with C-ITS technologies, along with signalised intersections and key arterial roads and motorways. The Pilot will commence from late 2019, and as Australia's largest trial of C-ITS technologies, will allow vehicles, infrastructure, road operations systems, and cloud-based data sharing systems to 'talk' to each other in real-time to generate safety-related warnings and messages to the driver. Several use-cases will be tested including emergency electronic brake light warning, stopped or slow vehicle warnings, turning warnings for bicycle riders and pedestrians, red light warning, road works warning, in-vehicle speed warning, back-of-queue warning on motorways, and hazard warnings. The spatial requirements for the pilot are significant and unusual, however they also represent part of what will become the new normal for transport authorities. This presentation will provide an overview of CAVI and specifically the Ipswich Connected Vehicle Pilot, the challenges faced in relation to positioning and spatial data, the solutions adopted, and future developments that will help solve these problems.

[Back to program](#)

Please note, this program is a draft and subject to change.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session D

Sugarcane Yield Estimation by UAV Photogrammetry Survey

Clancy Sharp *University of Southern Queensland*

In this research project I aim to estimate sugarcane yield using imagery captured with a camera mounted to an unmanned aerial vehicle (UAV), by applying 3D photogrammetry techniques, which surveyors often use for topographic mapping and volume computations, integrated with spectral analysis techniques, which are often used to interpret information about the earth's surface from aerial or satellite (i.e. remotely sensed) images. The key achievement so far is not only finding a correlation between cane height and yield, but rather proving that this could be done with consumer-grade equipment with a method that may feasibly be scaled up to larger areas.

Considerations in Monitoring Projects

Brent Dawson *Ultimate Positioning Group*

Brent will be presenting examples of current monitoring sites throughout Australia and how modern surveyors are collecting real time monitoring data. Detailing the hardware and software required, installation process and deliverables for end users. He will also discuss the variety of sensors being used by surveyors to collect a dataset that can be used by other professions for analysis and decision making.

Terrestrial laser scanning best practices and examples of efficient data processing

Jennifer Ludwig *C.R. Kennedy*

The use of laser scanning solutions is becoming increasingly mainstream, with software solutions integrating point cloud data better and better. As simple as pushing a button to start a scan may seem, the success of a laser scanning campaign depends on much more than just the knowledge on how to operate the scanner. To efficiently achieve relevant deliverables, it is crucial to use the right instrument and the appropriate workflow for the job. In this presentation, we will look at general best practices for laser scanning, and I will also share some tips and tricks for some less common workflows.

Once the field work is done, we need to extract the required data from the full 3D point cloud. Today this is very often achieved using a combination of software, involving all sorts of difficulties and manual operations. But there are solutions that help you to be more efficient. We will look at some actual examples of workflows that are completed in a fraction of the time taken in the past.

Native Title and the role of the Cadastral Surveyor

Dale Atkinson *Atkinson Surveys*

There have been over 120 Native Title Determinations registered in Queensland. Complicated legal concepts, lengthy federal court judgements and cultural sensitivities have made this a very avoidable issue for the cadastral surveyor. This talk attempts to provide a basic understanding and argues that there is a vital role for cadastral surveyors to play in this process.

[Back to program](#)

Please note, this program is a draft and subject to change.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session E

Tides 102: Port Datum, Chart Datum, AUSHyroid, Australian Height Datum and AUSGeoids

John Broadbent *Coastal Impacts Unit, Qld Department of Environment and Science*

Reduction of GNSS derived soundings to chart datum is dependant on a knowledge of the height of chart datum relative to the zero ellipsoid surface.

Providing a Baseline for Future Change along Australia's Coastline

Mick Hawkins *Fugro*

The Australian coastline requires modern and integrated coastal management systems to ensure economic, social, environmental and population pressures are managed in a coherent and coordinated way. Government can drive policy to allow investment in comprehensive accurate datasets whilst leveraging more sophisticated analysis techniques to deliver better decisions and business intelligence for the coastal zone.

As seen in recent storms affecting the many Australian states' coastlines, coastal communities must understand and adapt to the stronger waves, winds and surges impacting the coastal environment. The first step in this understanding is the identification of risks to coastal populations and infrastructure. To help with this, remote sensing technology can be used to compile accurate, comprehensive baseline datasets across the coastline to better understand this dynamic environment.

Fugro have been advancing bathymetric capabilities through usage of Airborne Lidar Bathymetry, Satellite Derived Bathymetry, Autonomous Vessels and deep machine learning for rapid product turn around. These new technologies allow for highly detailed base line mapping of the shallow nearshore waters in a safe manner with zero impact on the local habitats.

High definition topographic and bathymetric base line data can be invaluable for conducting environmental change and modelling, changes in habitat and analysis of the effects of sea-level rise and storm damage.

This presentation will review the technology and processes used to capture a seamless state-wide dataset of coastal assets and adjoining sediment compartments to enable suitable coastal zone modelling.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session E *cont.*

Satellite-derived bathymetry: Global state-of-the art, local examples

Magnus Wettle *EOMAP*

Satellite-derived Bathymetry (SDB) has been in the research and development domain since the early 1980's, with commercial applications beginning in 2005. Key to the development of SDB has been the 1) development of sensor- and location- independent physics-based methods, 2) streamlining of processing workflows and 3) tracking and understanding of accuracies and uncertainties. A milestone for SDB uptake by the wider community occurred in 2015, when the United Kingdom Hydrographic Office incorporated EOMAP SDB in Admiralty Chart BA2066.

Allowing for differences in performance specifications, SDB is considerably more cost-effective and rapid than traditional survey methods such as MBES and LIDAR. Additional advantages of using SDB include the ability to survey remote, extensive and/or otherwise in-accessible areas. Notably, it is in the shallow water zone, where traditional acoustic methods are the most cumbersome and expensive to deploy, that SDB performs best.

Here, we will present the current state-of-the-art of SDB, outline some of its advantages and disadvantages, and highlight this with case studies in the region. These case studies will include applications such as improving safety of navigation, monitoring coastal change and supporting environmental management.

RC boats, Single beam, Multi beam, colorized point clouds and Slam based solutions

Mark Hickey *C.R. Kennedy*

[Back to program](#)



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session F

Aquawatch Australia Mission: decision-ready information for Australian and Global freshwater and coastal ecosystems

Stuart Phinn *The University of Queensland*

At a national scale there is no single, 24/7 comprehensive, national monitoring system that can provide precise, decision-ready information on the quantity and quality of freshwater across Australia's waterways and reservoirs, and its variations over weeks, months and years across the continent. This information is essential for the operation of all levels of government, large numbers of industries, and sustaining basic water services for all Australians. The AquaWatch Mission proposes to create a system to provide such capability, enabling the generation of linked satellite and ground measurement data streams, products (geospatial data and measurements) and services (automated and machine readable data streams). These will be designed with government, industry and scientific users in Australia and globally, to monitor the amount and quality of above-ground freshwater resources. This would be a world-first freshwater monitoring focused mission with a global footprint.

Driving towards our Digital Future – a practical Deep Learning Framework for Geospatial Applications

Dipak Paudyal *Esri Australia*

With significant interest in the application of Deep Learning (DL) and Artificial Intelligence (AI) across many sectors, this presentation will help understand the principles of commonly applied techniques and identify those relevant to and easily adopted for location analytics and specific geospatial applications.

This presentation will discuss one such solution: ENVI Deep Learning framework – a powerful and flexible way to run Deep Learning applications on Geospatial data. The framework empowers users to create and train DL models using Convolutional Neural Networks (CNN) such as Google's TensorFlow. The presentation will look at how the technology makes a case for practical application in vegetation mapping, agriculture, natural resources management and other areas of GIS.

Logan City: Street level imagery for road asset management and broader community

Edoardo Neerhut *Mapillary*

Logan City Council recently uploaded 4.4 million street-level images to Mapillary, leveraging computer vision and artificial intelligence for asset management and opening up a wealth of government data to the public. This joint presentation will cover Logan's transport infrastructure corridor and asset management strategy and the broader impacts of opening up street-level imagery and derived data.

The images Logan City has uploaded represent 2,257 KM of the road network, more than any other city council in Australia has uploaded to Mapillary. Each image uploaded is processed to blur faces and license plates, with each pixel labelled to reflect objects and map features such as crossings, street lights, and kerb cuts. Automatic object detection reduces resources required for asset management, while improving accuracy. It also enables a first cut investigation and assessment from the desktop.

Please note, this program is a draft and subject to change.



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Session F *cont.*

As computer vision capabilities are enhanced, the efficiency gains and range of detectable features grows. Logan is interested in the extraction of road corridor, pavement and footpath defects for existing network and to pick road asset information for newly completed development works or council's delivered new or upgrade road works. This additional data set will compliment as constructed information capture through FME and ADAC schemas for Council's GIS and Asset Management Systems.

All of the imagery and data is available to OpenStreetMap, an open and editable map of the world. OpenStreetMap data is used in consumer facing applications such as Apple Maps, Bing Maps, and Uber. This allows citizens to map bike routes, wheelchair accessibility, public seating and other civic amenities they have an interest in. The final aspect of this collaboration gets citizens involved in the data collection and validation process. We'll conclude showing the ways in which citizens are contributing imagery and training machine learning algorithms to pick up objects more effectively.

Sundale Project – Bridging the Gap between Remote Sensing & Surveying

Liam Thierens Bennett + Bennett

The 375 metre long Sundale Bridge is located on Queensland's Gold Coast. The bridge connects Southport to Main Beach and while it is iconic and culturally significant on the Gold Coast, it is a major bottle-neck and the cause of traffic congestion in and out of Surfers Paradise. The proposed upgrade includes the option of adding a fifth lane to the bridge and upgrades to the adjoining road and intersections. The feasibility of the project was hinged by two main factors; the structural analysis of the bridge and the community consultation. Bennett + Bennett facilitated the delivery of a comprehensive spatial solution that enhanced decision making, design and community engagement opportunities for relevant Local Authorities and Consultant team.

The Sundale Project provided the opportunity to apply multifaceted survey and spatial solutions on a single project that would in turn serve so many stakeholders with differing spatial needs and expectations. These foundational spatial solutions were further leveraged by providing data management services to facilitate the BIM enabled project. Bennett + Bennett utilised a combination of Terrestrial Laser Scanning from the shorelines and Terrestrial Photogrammetry from a boat to provide an accurate digital model of the bridge that was used for structural analysis.

Application of our aerial photogrammetry derived reality mesh in establishing project context in the consultation phase was critical to garnering stakeholder support for the project to proceed to the detailed design phase where the visualisation will enable enhanced communication within the community consultation phase period. The spatially enabled solutions on the project sparked a strategic conversation within the City of Gold Coast to transform the engineering process from an analogue process to a digital engineering process. This project won the 2018 Asia Pacific Spatial Excellence Award for Technical Excellence.

[Back to program](#)



SURVEYING & SPATIAL DAY

FRIDAY 18 OCTOBER | BRISBANE CONVENTION & EXHIBITION CENTRE

Closing Session

Cross River Rail's Digital Network Approach – our approach to the digital enablement of infrastructure in Queensland

Peter Quick *Director, Program Control, Cross River Rail Delivery Authority*

Russell Vine *Executive Director, Marketing & Communications, Cross River Rail Delivery Authority*

This presentation will cover the following:

- Update on the CRR project and timeline
- What is the Digital Network Approach - integration of BIM, GIS and Visual models and information underpinned by a Common Data Environment (CDE)
- 3D survey and GIS development example at Woolloongabba
- Digital Data and the DA's developing management of in a CDE

Challenges & Opportunities: Young Professionals in the Geospatial Industry

Michael Topp *Veris & SSSI Qld Young Professionals*

How can we act now to create the best future for the Australian Geospatial Industry? How can industry partner with academia to produce more job-ready graduates equipped with the skills that future and current jobs need? How can we engage effectively with other industries for collaboration and innovation? Young Professionals are the key – let's explore the challenges and opportunities they face, and how the industry can come together to support its future from what we have learnt through the SSSI National Young Professionals Mentoring Program, the Locate19 Young Professionals Symposium and the South East Asia Survey Congress 2019.

[Back to program](#)