ASPECT 2023

2023 MELBOURNE

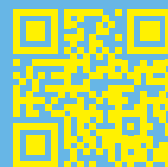**IRSE///**

ASPECT 2023 International Conference

Melbourne, Australia 21-24 November 2023

www.aspect23.info

Platinum sponsors

FRAUSCHER

JMDR

Gold sponsors

DT INFRASTRUCTURE A GAMUDA Company

JOHN HOLLAND

RioTinto

Silver sponsors

ALSTOM · mobility by nature ·

PS PARK SIGNALLING a Unipart Company

RICARDO

SCHWEIZER ELECTRONIC

SIEMENS

Wabtec CORPORATION

Bronze sponsors

AGONICS

ARTC

elsafe Railway Division

4Tel

NetworkRail Consulting

railRS3ltd

Signet Solutions

UGL

V/Line

Coffee cart sponsor

HITACHI Inspire the Next

Lanyard sponsor

Quantum Rail Signalling and Systems

Photo Shutterstock/Leonid Andronov.

ASPECT 2023
MELBOURNE

IRSE ///

Tuesday 21 November: Day One

0830 Registration and coffee	
0900 Welcome	
0915 Opening ceremony	
0930 Keynote address	
1040 Morning break	
1110 Day One Session 1	
Session 1A: **IT/OT Security and IoT**	**Session 1B:** **Safety and Assurance**
Five years after NIS: cyber security lessons for the global rail community *Alexander Patton, NCC Group, Japan*	Why would a train planning system suddenly need a CENELEC Certification? *Dr Markus Montigel, Rail velation, Switzerland*
Taking apart cyber risks in Signalling systems – Hollywood mystery or real life drama? *John Boss, John Boss Consulting, Netherlands*	Assuring resilient interfaces *Stephen David Turner, Stockton Engineering Management, UK*
The application of Internet of Things Standards for an improved cyber security of railway systems *Ir Henry Cheung, IRSE Hong Kong*	Train management system *Agus Maryanto, PT Len Industri, Indonesia*
Panel discussion	Panel discussion
1240 Lunch	
1340 Day One Session 2	
Session 2A: **Communications**	**Session 2B:** **Asset Management – 1**
The future is calling: strategies to survive the 5G railway revolution *Tyson Moore, Metrolinx, Canada*	Environment digitalisation: a new approach to improve rail transit safety *Chunhai Gao, Traffic Control Technology, China*
Study on application of 4G/5G mobile radio systems to train operation systems *Taishi Ohmi, Hitachi, Japan*	Smart ETCS solution – high density ETCS and Intelligent Asset Management System (IAMS) *Federico Nardi, Hitachi, Italy*
Development of wireless ATP function utilising mobile networks and GNSS *Fumiya Osawa, East Japan Railway, Japan*	Predictive condition based monitoring system for point machines *Pfariso Khalushi, Fazi Rail, South Africa*
Panel discussion	Panel discussion
1510 Afternoon break	
1540 Day One Session 3	
Session 3A: **ETCS**	**Session 3B:** **The Signal Engineer**
Driver behaviour with ETCS braking curves *Pieter van der Beek, Ricardo Rail, Netherlands*	Simulation based learning of signalling concepts and principles for software engineers *Krishnan G Venkateswaran, University of Birmingham, UK*
An outlook on future ETCS global integration challenges based on lessons learned *Sander Willer, Mott MacDonald, Netherlands*	Skills integration: the challenges and opportunities of converging global technology *Martin Fenner, Tilt Consulting, UK*
East Coast Digital Programme: the next generation railway *Jerry Sinden, Siemens Mobility/East Coast Digital Programme, UK*	Are we forgetting the Signal Engineer? *Peter Woodbridge, Siemens Mobility, UK*
Panel discussion	Panel discussion
Closing announcements	Closing announcements
1800 Evening Social – nibbles and drinks	

Wednesday 22 November: Day Two

0830 Registration and coffee	
0900 Day Two Session 1	
Session 1A: **Autonomous Trains**	**Session 1B:** **Interactive Session 1**
Development of the forward obstacle system *Kiwamu Sato, Hitachi, Japan*	**Training Session 1: Surge Protection Demystified: Practical advice for a protected signalling system** We will help demystify surge protection, with training on surge components, earthing, and cabling with the aim of giving practical advice and a demonstration to enable designers to create a coordinated system to protect signalling systems.
The research and implementation of the key perception safety technologies for driverless train autonomous operation *Anthony Weiqing Xue, Traffic Control Technology, China*	
Using Artificial Intelligence for onboard signalling enforcement and train position monitoring *Derel Wust, 4AI Systems, Australia*	
Panel discussion	
1030 Morning break	
1100 Day Two Session 2	
Session 2A: **Performance Optimisation**	**Session 2B:** **Interactive Session 2**
Optimising railway signalling control through multi-agent reinforcement learning for real-time train route setting *Hao Ni, University of Birmingham, UK*	**Training Session 2: Axle Counter and Interlocking Engineering** Engineers from Siemens Mobility Australia will introduce current generation axle counter and interlocking technology. Axle counter allocation, configuration, calibration and testing will be demonstrated, along with an axle counter reset scenario. Participants will also be familiarised with interlocking and axle counter data.
Rail initiatives for the 2026 Victorian Regional Commonwealth Games *Dan Williams, V/Line, Australia*	
Development of FS-ATO System combined with intermittent ATP with continuous speed checks *Takuro Shindo, RTRI, Japan*	
Panel discussion	
1230 Lunch	
1330 Day Two Session 3	
Session 3A: **Project Delivery**	**Session 3B:** **Interactive Session 3**
Successful delivery of metro projects depends on the quality of the interface and integration *Bassam Mansour, HSS Integrated, Malaysia*	**Emergency Scenario** Volunteers will act out a scenario in which an incident occurs on the railway. The problem will need to be diagnosed and resolved while a reasonable train service is maintained. Audience will influence and discuss decisions.
Invisible forces at the contract interfaces: How does the contract and organisational context shape the rail control infrastructure, and how do we shape the contract to get the system outcomes we want? *Alex McGrath, V/Line, Australia*	
3D physics-based rail signal planning workflows – case studies to analyse suitability across stakeholder and interface complexity in rail planning *Ben Guy, Urban CGI, Australia*	
Panel discussion	
1500 Afternoon break	
1530 Day Two Session 4	
Session 4A: **Global and Local Integration**	**Session 4B:** **Interactive Session 4**
An assessment of the global delivery of integrated train control solutions for urban and mainline railways *Branko Hoogewoonink, Mott MacDonald, Netherlands*	**IRSE Innovator** Loosely inspired by the globally popular Dragons' Den / Shark Tank TV series, IRSE Innovator will allow entrepreneurial engineers to pitch original rail innovation concepts to a panel of senior industry figures. The judges will challenge contestants on the cost, benefits, risks, feasibility and originality of their concept. Challenges from the audience will also be encouraged. Judges will award a $1,000 study grant to the contestant with the most well-received concept.
Analysis of best practices and lessons learned regarding global integration for megaprojects Mike Taylor, AECOM, Australia	
The future of rail: the importance of global integration to ensure the rail industry continues to thrive *Aimee MacDonald, Tilt Consulting, UK*	
Panel discussion	
Closing address and announcements	Closing address and announcements
1930 Conference Dinner	

Thursday 23 November: Day Three

0815 Coffee	
0845 Day Three Session 1	
Session 1A: **Future Sustainable Railways**	**Session 1B:** **System Definition**
Inclusive mobility as a service: a technological approach to accessibility *Alessandra Scholl Sternberg, Siemens Mobility, Netherlands*	The case for embracing modern visualisation *Darren Choytooa, Network Rail Consulting, Australia*
Portfolio thinking – a roadmap to the future railway *Simon MacMull, Mott MacDonald, Australia*	Introducing signalling equivalent units to Victoria *David Ness, Major Transport & Infrastructure Authority, Australia*
The South African railway system – a sustainable approach to recovery *Portia Nkuna, Fazi Rail, South Africa*	A modern train control system on a page *Philip Dubery, CPC Systems, UK*
Panel discussion	Panel discussion
1010 Morning break	
1040 Day Three Session 2	
Session 2A: **Integration and Operation**	**Session 2B:** **Technology**
Using tabletop testing as preparation for operational railway commissioning *Amanda C Elliott, Innovace Designs, UK*	Applying technology to improve track worker safety *Graham Hjort, 4Tel, Australia*
Railway Integration Engineer and Manager: reflections on the changing role, perception, education and training of signalling engineers *Felix Schmid, University of Birmingham, UK*	Distributed railway signalling architectures with Object Controllers *Florian Einböck, Frauscher Sensor Technology, Austria*
Formal verification of railway signalling: from academia to industry *Dominic Taylor, SYSTRA, UK*	Study on interlocking device on cloud computing environment *Natsuki Terada, RTRI, Japan*
Panel discussion	Panel discussion
1205 Lunch	
1305 Day Three Session 3	
Session 3A: **Safety and System Approvals**	**Session 3B:** **Asset Management – 2**
Investment in home-grown rail technology solutions for train control systems and asset management addressing aspects from design, delivery, implementation, operation and maintenance activities *Lawrence Dean, DT Infrastructure, Australia*	Challenges in maintaining the signal system for the High Speed Line in Hong Kong *KW Pang, Self-employed consultant, Hong Kong*
Development of on-board risk assessment method based on "Railway Dynamic Map" for autonomous train operation *Yuki Ota, RTRI, Japan*	Robotisation ERTMS trackwork; use case Netherlands, an application in practice *Ben van Schijndel, Strukton Rail, Netherlands*
A method to determine Quantiative Risk Acceptance by comparing target individual risk in the rail industry *Yan Li, Traffic Control Technology, China*	A method to decide a signalling system asset's design life and actual life *Xi Zhao, Ricardo Rail, China*
Panel discussion	Panel discussion
1430 Afternoon break	
1500 Day Two Session 4	
Session 4A: **AI and Automation**	
Key requirements for the effective, safe and ethical use of Artificial Intelligence (**Presidential paper**) *Rod Muttrum (ITC), Fourth Insight, UK*	
Machine learning in railway signalling applications – revolution or evolution? *Roger Short, Retired, UK*	
Safety in autonomous train control: slips, trips, and falls *Cameron Fraser, Thales, Canada*	
Panel discussion	
Closing address and announcements	
1830 Steam trip on Puffing Billy	

Please note that only the primary author for each paper has been listed in the tables above.

ASPECT 2023 site visits

Melbourne has been involved in a rail infrastructure boom in the last eight years focusing on new trains, major core network capacity improvements, upgraded and new stations, removal of 110 level crossings and the introduction of CBTC high-capacity signalling. In additional Victoria's country rail network has undergone significant upgrade placing a strain on traditional signalling resources.

The site visit day is an optional one-day extension in addition to the three-day ASPECT 2023 programme. There will be two site visits on offer, each accommodating up to 100 people per visit:

- Tour 1 – Metro Tunnel, stations and systems
- Tour 2 – Caulfield to Pakenham Line upgrade and level crossing removals

Delegates are to nominate which tour they prefer to be on at the time of booking.

Tour 1
Metro Tunnel

Sites planned for visits include:

- **New Town Hall station and Metro Tunnel**
- **New station, control room and environs**
  - CBTC and Platform Screen Door equipment rooms
  - Using robot dogs to gather asset data
  - CBTC test train
- **V/Line Regional Train Control Centre**
- **RNA test labs**
  - CBTC test lab
  - Train Control System test lab

Tour 2
Caulfield-Pakenham Line

Sites planned for visits include:

- **Dandenong Signal Control Centre**
  - Operating floor and equipment rooms.
  - Level crossing removal presentations
- **Noble Park overhead station**
  - Essential Services Power Supply System
  - Signal Equipment Room
  - Station Control Room
- **East Pakenham Train Maintenance Facility**
  - Mixed mode (CBTC and conventional) test track including CBTC test train
  - CBTC equipment rooms
  - Platform screen door test facility
  - High-Capacity Metro (HCMT) Train Condition monitoring system
  - HCMT train simulators

ASPECT 23 Committee

Robert Baird, IRSE Australasia
Steve Boshier, IRSE President
Robert Cooke, IRSE Singapore
Moemedi Goitsemang, IRSE Australasia
Georgina Hartwell, IRSE Australasia
Brian Luber, IRSE Australasia
Daniel Martin, IRSE Australasia
Alexander Patton, IRSE UK
Alessandra Scholl-Sternberg, IRSE Nederland
Richard Stephens, IRSE Australasia

PPE requirements for both tours

Delegates must bring their own lace-up metal-capped safety boots with ankle support. Australian delegates are encouraged to bring Victorian rail safety vests and hard hats if they have them. Otherwise the IRSE will provide other required PPE.

PRICING

The ASPECT 2023 Conference comprises three days of papers, interactive sessions on day two and includes the three conference socials.

The pricing breakdown is shown in the table below.

For all delegates, there is the option to add one of the technical visits available on Friday 24 November at an additional cost of $130 for all delegates. These are limited in capacity and therefore, we recommend early booking.

All payments must be in Australian dollars and will be accepted online through the Eventbrite booking system using major credit and debit cards. If you book and are unable to attend, a full refund will be made less a $150 administration fee before 20 August 2023, or 75% refund less the administration fee before 21 October 2023. After this date refunds will not be possible, but you will be able to transfer the booking to a colleague – email registration@aspect23.info if this is required.

ALL COSTS ARE SHOWN IN AUSTRALIAN DOLLARS.

IRSE member rates		Non-IRSE member rate	
IRSE members (any grade)	$1350	Non IRSE member	$1750
IRSE members (retired & not working)	$990		
IRSE younger members (under 35 years)	$990		
Site visits (day 4) $130 for members and non-members.			

RESERVE PAPERS

A number of reserve papers have been selected and their authors will be invited to include their papers within the conference proceedings. In case of an author being unavailable to present their paper, reserve papers may be selected to be presented in their place at the conference.

EXHIBITION

Alongside the conference papers being delivered, ASPECT 2023 will feature an exhibition of products and services from large and small suppliers. This will take place in the foyer outside the conference auditorium, where refreshments will be served, and the session breaks and lunches will give good opportunities for delegates to explore the exhibition and network with others.

SPONSORSHIP

We still have some sponsorship packages available for ASPECT 2023, if your company is interested in sponsoring then please email Brian Luber at sponsorship@aspect23.info for details.

VENUE

ASPECT 2023 will be based in the heart of downtown Melbourne, Australia, at the Melbourne Convention and Exhibition Centre. There are direct flights to two airports:

- Melbourne Airport at Tullamarine (MEL) 22km from the city.
- Avalon Airport (AVV) 55km from the city.

Hire cars, taxis, rideshares and a shuttle service are available from both airports.

The city offers clean, reliable and affordable public transport. The free City Circle tram also has a historical commentary.

Directions to the evening socials will be provided for delegates at the event: all are within central Melbourne except for Puffing Billy, where we will travel by train to the venue and return by coach, all included as part of the conference price. Travel to and from Technical Visits will be provided from central Melbourne.

ACCOMMODATION

Melbourne has a wide range of accommodation to suit all tastes and budgets, so no group reservation has been made, but a range of recommended hotels can be found at aspect23.info

TOURISM

For more information about what Melbourne has to offer during your stay, activities to consider whilst in the country or more details on the cultural offerings visit www.visitmelbourne.com

SOCIAL EVENTS

All social events are included for delegates of the main ASPECT 2023 conference. A limited number of extra tickets can be purchased for all socials to allow delegates to bring guests, please see the booking site for further details. The events are:

Tuesday 21 November

A networking drinks reception will be held on the three-masted cargo vessel Polly Woodside. Built in Belfast in 1885, the ship carried coal and wheat between England and South America. After travelling 1.5 million miles and circumnavigating the world 17 times, the Polly Woodside now welcomes you aboard.

Wednesday 22 November

Conference Dinner at the State Library Victoria, Ian Potter Queen's Hall. Opened in 1856 as the library's original reading room, The Ian Potter Queen's Hall is one of Melbourne's most breath-taking historical venues. Having undergone significant renovations, The Ian Potter Queens Hall has been restored to reveal its original 19th century heritage design.

Thursday 23 November

Closing social at Puffing Billy. Step into a timeless world of wonder with Australia's favourite steam train, Puffing Billy, located in the heart of the Dandenong Ranges one hour east of Melbourne. Built in 1900 the railway is now a major tourist attraction that invites visitors to come and experience a century-old tradition.

IRSE AUSTRALASIAN SECTION

The IRSE Australasian Section is a large, active, innovative IRSE local section and the current IRSE President, Steve Boshier is one of its members. Like other local sections it promotes the interests and objects of The Institution of Railway Signal Engineers through technical meetings, seminars, local section meetings site visits and webinars and has previously hosted IRSE International Conventions in 2002 and 2015.