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WELCOME MESSAGES

THE CONGRESS CHAIR

It is my honour to invite you to join the 26th Intelligent Transport Systems (ITS) World Congress from 21 to 25 October 2019 at Suntec Singapore Convention & Exhibition Centre.

The Land Transport Authority of Singapore (LTA) and ITS Singapore are delighted to be co-hosting the World Congress in Southeast Asia for the first time.

Singapore’s strategic location between the East and West has earned her the reputation of a top Asia-Pacific destination for business events, supported by world-class conference and event facilities. This will attract strong interest and active participation from the region, and open doors to fast-growing markets such as China, India and Southeast Asia.

The 2019 Congress theme of “Smart Mobility, Empowering Cities” reflects Singapore’s commitment to create the most liveable smart city in support of a higher quality of life and an ever-connected community. With a comprehensive format of plenary and interactive sessions, as well as a dynamic exhibition with technical demonstrations and tours, the World Congress 2019 will be an opportunity for our sponsors and partners to network, discuss and share ground-breaking transport technology, and forge mutually beneficial partnerships to further unleash the power of ITS.

We are excited with the opportunity to hold an exceptional 26th ITS World Congress in 2019 and look forward to forging mutually beneficial partnerships at the event with your active participation and sponsorship.

ITS SINGAPORE PRESIDENT

It was in 2015 that Singapore was accorded the honour to host the 26th ITS World Congress, the first ever in Southeast Asia. Ever since, the Steering and Working Committees with its many sub-committees, comprising Singapore Government Agencies led by the Land Transport Authority of Singapore and volunteer members from the industry and academia, worked earnestly as Team Singapore to make this event a success.

Over the five days, the ITS World Congress will provide a great platform for sharing, networking and showcasing the latest technologies, innovations and ideas for the advancement of Intelligent Transportation Systems around the world.

While in Singapore, we hope you take time to enjoy the attractions of our Lion City, immerse into our multi-racial atmosphere, the rich tapestry of arts and culture, and the diversity of our culinary experience.

Welcome to Singapore and we wish you a wonderful and memorable time at the 26th ITS World Congress.

ITS ASIA–PACIFIC

Hajime Amano
Secretary General
ITS Asia-Pacific

On behalf of ITS Asia-Pacific, I would like to invite you to the 26th ITS World Congress in Singapore.

In these challenging times, high levels of connectivity and communication are essential to the delivery of quality services to the citizens of our region. ITS technologies are increasingly being used to promote safety, efficiency and sustainability. ITS is not only a science and technology discipline but an enabler with the ability to create value and drive change in various sectors.

This year’s Congress will look in particular at connected and automated mobility; multimodal transport for people and goods; policies, standards and harmonization;? and cybersecurity and data privacy – all areas which ERTICO drives forward through ITS World Congress in Singapore.

ERTICO – ITS EUROPE

Jacob Bangsgaard
Chief Executive Officer
ERTICO – ITS Europe

On behalf of ERTICO – ITS Europe and our network of Partners, it is my pleasure to welcome you to the 26th ITS World Congress in Singapore.

ERTICO – ITS Europe is proud to co-organise this event with ITS Asia-Pacific and ITS America, and join our hosts ITS Singapore and the Land Transport Authority of Singapore, in their ambition to promote smart mobility solutions and services.

I am particularly glad that the Congress is hosted in Singapore, which is a global finance and transport hub, widely recognised as one of the world’s smartest and most technologically advanced cities. Singapore also has one of the highest standards of living in Asia. Singapore truly reflects the Congress theme “Smart Mobility, Empowering Cities”, which places cities and urban agglomerates at the heart of the conversation and looks at more sustainable and smarter mobility services for everyone.

The ITS World Congress is one of the most significant events globally, bringing together all sectors of the transport industry, public and private, to present and discover more about the latest ITS innovations. The 2019 Congress will look in particular at connected and automated mobility, multimodal transport for people and goods, policies, standards and harmonisation, and cybersecurity and data privacy – all areas which ERTICO drives forward through our activities and projects. We are excited to work with our partners and continue to collaborate in deploying and promoting intelligent transport and services across the world.

I look forward to meeting many of you and having the chance to share ideas at this amazing event for the entire mobility community.

ITS AMERICA

Shailen Bhatt
President and Chief Executive Officer
ITS America

On behalf of the Intelligent Transportation Society of America (ITS America), welcome to the 26th ITS World Congress in Singapore! ITS America is proud to join with ITS Asia-Pacific and ERTICO – ITS Europe in organizing this exciting event, and congratulations to ITS Singapore and the Land Transport Authority of Singapore for their efforts to bring the ITS world together in the coming days.

As you know, the theme is “Smart Mobility, Empowering Cities,” which completely aligns with Singapore’s reputation as one of the world’s smartest cities. It promises to be an exciting conference, and one in which you will have an opportunity to delve into the technical program’s eight themes: crowdsourcing and big data analytics; cybersecurity and data privacy; innovative pricing and travel demand management; intelligent, connected and automated vehicles; multimodal transport of people and goods; policies, standards and harmonisation; safety for drivers and vulnerable users; and sustainable smart cities.

At ITS America, our vision is a better future transformed by intelligent mobility – one that is safer, greener and smarter. We advance the research and deployment of intelligent transportation technologies to save lives, improve mobility, promote sustainability, and increase efficiency and productivity. Our members, along with other industry stakeholders, are eager to engage with others around the world who share these same goals. The 2019 World Congress in Singapore is the venue in which we can make important connections with policymakers, entrepreneurs, researchers, academics, investors, and many others. I am confident it will be as exciting and valuable for you as I know it will be for me. Have a great week, and I look forward to seeing you in Singapore!
Please visit for networking and interaction. Its missions are: interests of those in public and private organisations, practitioners, academics and researchers related to ITS, and create opportunities implementing initiatives that will provide better access for various diverse groups such as the elderly, mobility challenged and also leverage technology to enhance the efficiency of road operations, optimise our road capacity and provide information on road conditions to drivers.

Another strategy is to optimise our road network through the use of policies and technology. Apart from increasing the capacity of the road network, we have put in place vehicle ownership policies to keep the car population at levels supportable by road infrastructure development, and have introduced congestion charging to better manage congestion along the heavy corridors. We also leverage technology to enhance the efficiency of road operations, optimise our road capacity and provide information on road conditions to drivers.

Thirdly, we seek to provide for the diverse needs of our society and contribute to a quality, liveable environment. This includes implementing initiatives that will provide better access for various diverse groups such as the elderly, mobility challenged and families with young children.

Please visit www.lta.gov.sg for more information.

INTELLIGENT TRANSPORTATION SOCIETY SINGAPORE

The Intelligent Transportation Society (ITS) Singapore is a non-profit association with the aim to bring together the professional interests of those in public and private organisations, practitioners, academics and researchers related to ITS, and create opportunities for networking and interaction. Its missions are:

- To promote & support the development of the ITS industry in the interests of Singapore
- To represent Singapore and support the activities & interests of the ITS AP & ITS WC entities
- To champion, promote & protect the interests of companies, business organisations, educational and research institutions, firms, partnerships & other entities legally organised for ITS business in Singapore
- To act as the advisory, consultative & coordinating body for the ITS Industry
- To promote, organise, manage & stage seminars, conferences, exhibitions & other events relevant to the ITS Industry

Please visit www.itsingapore.org.sg for more information.

LAND TRANSPORT AUTHORITY

Formed in 1995, by merging four public sector entities to streamline its operation and regulatory works, Land Transport Authority (LTA) is responsible for planning, operating, maintaining and regulating the whole of Singapore’s land transport infrastructure and systems. Its vision is to create a people-centred land transport system with the mission to connect people and places, and enhancing travel experience.

One of the main thrusts of our transport strategies is to make public transport a choice mode, or a viable alternative to the car. We aim to provide a quality public transport system to support the growth of travel demand in future. This includes expanding our rail network, improving the quality of bus services and making sure that the whole system is well-integrated, while ensuring that the system is financially sustainable.

Another strategy is to optimise our road network through the use of policies and technology. Apart from increasing the capacity of the road network, we have put in place vehicle ownership policies to keep the car population at levels supportable by road infrastructure development, and have introduced congestion charging to better manage congestion along the heavy corridors. We also leverage technology to enhance the efficiency of road operations, optimise our road capacity and provide information on road conditions to drivers.

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Please visit www.lta.gov.sg for more information.
WORLD CONGRESS BOARD OF DIRECTORS

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Andrew Chow (Deputy Co-Chairman), President, ITS Singapore & President, Singapore Business, ST Engineering Electronics Limited

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Darren Ong, Manager, Rail Research & Standards, Land Transport Authority
Ling Tim Soh, Deputy Director, Intelligent Transport System Operations, Land Transport Authority

PROGRAME
PROGRAMME AT A GLANCE

FRIDAY
MONDAY
TUESDAY
THURSDAY
WEDNESDAY
26 Oct 2019
25 Oct 2019
22 Oct 2019
24 Oct 2019
23 Oct 2019
21 Oct 2019
21 Oct 2019
22 Oct 2019
24 Oct 2019
23 Oct 2019
25 Oct 2019

Youth Leadership Development Programme
 Associated Events

Congress Session Plenary 1
Exhibition
Demonstrations
Technical Tours

Congress Session Plenary 2
Exhibition
Demonstrations
Technical Tours

Congress Session Plenary 3
Closing Ceremony
Exhibition
Demonstrations
Technical Tours

Opening Ceremony Welcome Reception

VENUE FLOOR PLANS

SUNTEC CONVENTION AND EXHIBITION CENTRE LEVEL 3

SUNTEC CONVENTION AND EXHIBITION CENTRE LEVEL 6
What are the top few salient points that we should focus on for Connected and Automated Mobility?

How can we find the right balance between sharing public and private data which is essential for the development of Connected and Automated Mobility?

How should we craft out a framework to address ethical and liability issues when the safety of the technologies without stemming growth?

What level of infrastructure support should we develop for automated vehicles to ensure safe and efficient travel?

Can self-driving vehicles really help to ease traffic congestion, or do they make it worse?

Will the emergence of advanced communication and computing technologies enable the development of automation systems for a harmonious transportation eco-system that can speed up the proliferation of Connected and Automated Mobility in a seamless manner?

Focused on multi-intermodal autonomous mobility, infrastructure and policy.

PL 01: ADVANCING CONNECTED & AUTOMATED MOBILITY DEPLOYMENT

Focus on multi-intermodal autonomous mobility, infrastructure and policy.

Tuesday, 22 October 2019 | 11:00 – 12:30 | Summit Room

Connected and Automated Mobility is poised to transform the movement of people and goods, vehicle ownership and mobility services. The recent leap in technology, enabled by progress in AI, new sensors and computing power is helping us to approach this new frontier faster. It could potentially bring huge benefits by making transportation safer, more accessible and sustainable. However, the path to achieve a harmonious transportation eco-system that can speed up the proliferation of Connected and Automated Mobility in a seamless manner is littered with many challenges that need to be first overcome.

What are the top few salient points that we should focus on for Connected and Automated Mobility?

How should we design a viable and progressive live-testing approach to validate the safety of the technologies without stemming growth?

What level of infrastructure support should we develop for automated vehicles and how should this infrastructure interact with the vehicles?

Can self-driving vehicles really help to ease traffic congestion, or do they make it worse?

How should we craft out a framework to address ethical and liability issues when the safety of the technologies without stemming growth?

What level of infrastructure support should we develop for automated vehicles and how should this infrastructure interact with the vehicles?

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How should we craft out a framework to address ethical and liability issues when the safety of the technologies without stemming growth?
PL 02: PROMOTING INNOVATIVE MOBILITY SERVICES
Focus on challenges and ideas for realising innovative or integrated mobility services such as Mobility on Demand and MaaS.
Wednesday, 23 October 2019 | 11:00 – 12:30 | Summit Room

Traditionally, transport authorities have always been looking for ways to make public transport more attractive and increase patronage through conventional means. With the emergence of new transport modes, e.g. ride-sharing, shared taxis, bike-sharing, car-pooling, demand-responsive transport, there is a great opportunity to complement the classic public line transport and enable this shift to meet the increasing and diverse user mobility demands. However, to enable a truly integrated multi-modal and a just in-time mobility service that brings together public authorities, new transport service providers, travel brokers, public transport operators and other stakeholders, there is a need to consider new innovative ideas and address the key challenges in the current transportation framework.

- How should we promote the fair use of public and private open big data without stalling competition? How should we promote crowdsourcing and collaboration and help monetise data for all stakeholders?
- Do we need investments in new transport infrastructure, equipment and operation systems to enable this new just in-time framework?
- How should we enhance our e-ticketing system or encourage open payment methods to cater for this new paradigm shift?
- What changes should we make to our legal and regulatory framework to ensure sustainability of service quality and ease the inclusion of new entrants?
- What business models should the various non-conventional and conventional stakeholders adopt to ensure sustainability? Are business models based on Open Data sustainable in the long term?
- Which approach to public and private partnership model is feasible?

Keynote Speaker: Ping Sook Koy, Chief Executive, Government Technology Agency, Singapore
Moderator: Lisa Lim, Chief Transport Planner, Group Director, Policy and Planning, Land Transport Authority, Singapore
Speakers:
- Mu-Han Wang, Director General, Department of Science and Technology Advisory, Ministry of Transportation and Communications, Chinese-Taipei
- Roger Millar, Secretary, Washington State Department of Transportation, USA
- Henrik Hololei, Director General, DG MOVE, European Commission

PL 03: INTELLIGENT MOBILITY SOLUTIONS FOR A SUSTAINABLE SMART CITY
Focus on providing people with intelligent mobility solutions, multi-modal options and preferred mode choices.
Friday, 25 October 2019 | 13:30 – 15:00 | Summit Room

As cities expand, they are faced with inherent problems related to mobility such as high emissions, noise pollution, congestion, accidents and accessibility to transport. Capitalising on these problems and increasing user demands, we have witnessed new entrants to the mobility sector offering alternative transport modes with improved fuel efficiency and automation to plug the gaps. These new mobility trends will have to complement mass transit that will continue to be the most attractive option for economical, safe, clean and sustainable mobility. A well-functioning and comprehensive system, with timely and real-time information updates, and easily accessible public transport systems are keys to achieving global targets on sustainability. To address the challenges of a sustainable mobility system for a smart city, we would need to take a more entrepreneurial and innovative look into the transport eco-system.

- What new ideas and innovations can we introduce to achieve a more sustainable urban mobility solution?
- How can we provide access to safe, affordable, accessible and sustainable transport systems for all, including persons with special needs, women, children and older persons?
- How can we capitalise on the new emerging modes to make it easier and attractive to board collective means of transport?
- How can we introduce innovative use of energy and traffic management approaches to reduce environmental impact of transport?
- What new policies, regulations and business models can we use to better leverage the new emerging transport modes to benefit the masses?

Keynote Speaker: Chong Kheng Chua, Deputy Chief Executive (Infrastructure & Development), Land Transport Authority, Singapore
Moderator: Shiang Long Lee, President, Land Systems, ST Engineering Singapore
Speakers:
- Dennis Walsh, Chief Engineer, Queensland Transport and Main Roads, Australia
- Steve Morris, President, Design and Consulting Services, AECOM, USA

CONCLUSION AND CLOSING CEREMONY
Friday, 25 October 2019 | 15:00 – 16:00 | Summit Room

The conclusions, including key developments and pointers for the future will be presented by Professor Eric Sampson, Chief Rapporteur, based on inputs prepared by a team of Rapporteurs drawn from all regions. The Closing Ceremony will summarise key moments that made the 26th ITS World Congress unique. It will include among others, official closing keynote speeches from the organisers, Land Transport Authority of Singapore and Intelligent Transportation Society Singapore, the Singapore 2019 highlights video, best session and paper awards, Youth Leadership Development Programme Grand Challenge awards, video presentations and invitations by the 27th ITS World Congress (Los Angeles 2020), the 28th World Congress (Hamburg 2021) and 29th World Congress (Suzhou 2022) and Passing of the Globe Ceremony.
ES 01: TECHNOLOGY AND SAFETY ISSUES FOR CONNECTED AND AUTOMATED DRIVING
Tuesday, 22 October 2019 | 09:00 – 10:30 | Nicoll 3

It is crucial to have a shared planning framework including a harmonised approach towards safety validation and roadworthiness testing, as well as open platforms to enable data sharing. Deployment will only be possible if future users understand the basics of the new technologies and the benefits they can bring as well as the need for behavioural changes. What are we doing to achieve this? What “living labs”, deployment sites do we have or are being planned? What is the focus? How are we sharing lessons learned? How do we ensure automated vehicles will live up to its promise of improving road safety? How soon can we achieve this? What safety technologies are needed? Can human errors be a thing of the past? Besides technology, what other considerations are needed to ensure zero accidents?

Moderator: Angelos Amditis, Research Director & ERCICO Chairman, Institute of Communication & Computer Systems (ICCS), Greece

Speakers:
- Toshihiro Sug, Director for Automated Driving Planning Office, National Police Agency, Japan
- Ed Bradley, Program Manager, Toyota North America, Board Member, ITS America, USA
- Paul C. Åke, PE, Director, Michigan DOT, USA
- Andreas Hotz, Director Driverless Mobility, Continental, Germany

ES 02: AUTOMONOUS VEHICLES TESTING - HOW DO WE ADDRESS LEGISLATION DISCREPANCIES?
Tuesday, 22 October 2019 | 14:00 – 15:30 | Nicoll 3

Autonomous Vehicle testing facilities have existed for several years. Real world testing in live traffic has started across the world and there have been some challenges in this testing. Connected Automated Vehicle (CAV) legislation has a big impact on Autonomous Vehicle testing. For example, in the USA, the legislation is not uniform and there are some states that have enacted legislation, some have issued executive orders, some have both in place, and some have none. What about the rest of the world? What is being done to ensure that deployment of Autonomous Vehicles will be done in a safe and expeditious manner so that CAV systems can be designed to operate globally?

Moderator: Shalani Bhatt, President and CEO, ITS America, USA

Speakers:
- Geoff Allan, Chief Executive Officer, National Transport Commission, Australia
- Jennifer Cohen, Secretary, Delaware DOT, USA
- Ken Leonard, Director, Intelligent Transportation Systems, ITS Joint Programs Office, U.S. Department of Transportation, USA
- Phil Blythe, Chief Scientific Advisor, UK Department for Transport, UK

ES 03: AUTOMONOUS VEHICLES IN PUBLIC TRANSPORTATION – SEPARATING HYPE FROM REALITY
Tuesday, 22 October 2019 | 16:00 – 17:30 | Nicoll 3

The introduction of Autonomous Vehicles in public transportation will bring significant benefits/impacts to customers, society, transit systems, other travel modes and transportation networks. Not knowing when a fully autonomous vehicle will be in use, industry experts have worked to envision a future that may not necessarily match what ends up being a reality; e.g. autonomous vehicles will signal end of public transportation as we know it. The reality is that this scenario may not happen at all, or even if it happens, MaaS-style services expand including the equivalent in freight, Delivery as a Service (DaaS). The scope of urban traffic management will need to expand beyond road vehicles to cover all modes including cycling and walking, and beyond ground transport to integrate drones. Because the new services are able to transform current transportation system into one that is significantly more flexible. While the vision is promising, securing these outcomes depends on the operational and business models which in turn require a cooperative framework where data and information are shared, policy outcomes are achieved and the public and private sectors working together for the benefit of the entire community. What roles should authorities play and what governance options should be put forth? Should authorities become a MaaS operator, joint venture with the private sector or assign full control to the private sector? Can the relevant stakeholders cooperate to jointly build a cooperative eco-system that would ensure the success of MaaS and help unlock its true potential?

Moderator: Jacob Bangsgaard, CEO, ERCICO - ITS Europe, Belgium

Speakers:
- Shi-Chuan Chang, Deputy Director of Transportation Bureau, Kaohsiung City Government, , Chinese-Taipei
- Roger Millar, Secretary, Washington State DOT, USA
- Chris Bennett, Executive Director Digital Products Delivery, Transport for New South Wales, Australia

ES 04: FREIGHT PORTS AND CROSSINGS
Wednesday, 23 October 2019 | 09:00 – 10:30 | Nicoll 3

With increasing global freight movements from manufacturer to end user, ITS is important for every step of the goods movement process. This session will focus on two often overlooked aspects of the global journey: ports and international border crossings. Technology is needed now more than ever to rapidly manage the increases in freight and associated data that allow for just-in-time, next day, and two-hour ‘guaranteed’ deliveries that are expected from consumers. The ports, as well as border crossings are often bottlenecks in the logistics chain due to regulatory, safety, and bureaucratic processes. Innovative technology strategies are changing long border queues and extensive port delays and turning them into highly efficient and rapid handoffs. This Singapore Executive Session is the first in a series of ITS World Congress sessions dedicated to specific aspects of the goods movement process that starts globally and ends at the consumer’s doorstep. Los Angeles (2020) and Hamburg (2021) will each explore a different aspect of the freight journey and showcase how ITS is making a difference from the global down to the local vantage point.

Moderator: Richard Easley, President and Founder, E-Squared Consulting Corporation, USA

Speaker:
- David Foo, Director Ops-Tech, Maritime and Port Authority, Singapore
- Xiaodong Wu, Vice-mayor, Suzhou City, China
- Gene Serekia, Executive Director, Port of Los Angeles, USA
- Phanphanh Zuesongdham, Head of Digital and Business Transformation, Hamburg Port Authority, Germany

ES 05: TRANSFORMING MAAS FROM IMAGINATION TO REALITY
Wednesday, 23 October 2019 | 14:00 – 15:30 | Nicoll 3

With rapid urbanisation, Mobility as a Service (MaaS) offers the prospect of integrating shared and diverse transport modes that breaks down silos, reduces waste, pollution, congestion and costs for community-wide travel for both people and goods. It encourages more variability into the supply side of transportation, and could transform current transportation system into one that is significantly more flexible. While the vision is promising, securing these outcomes depends on the operational and business models which in turn require a cooperative framework where data and information are shared, policy outcomes are achieved and the public and private sectors working together for the benefit of the entire community. What roles should authorities play and what governance options should be put forth? Should authorities become a MaaS operator, joint venture with the private sector or assign full control to the private sector? Can the relevant stakeholders cooperate to jointly build a cooperative eco-system that would ensure the success of MaaS and help unlock its true potential?

Moderator: Jacob Bangsgaard, CEO, ERCICO - ITS Europe, Belgium

ES 06: MANAGING URBAN SPACE
Wednesday, 23 October 2019 | 16:00 – 17:30 | Nicoll 3

The management of urban space is already difficult- passenger and freight traffic competing for access, finding space for active modes such as walking and cycling, and incorporating parking. These are all “2D problems” and are likely to grow as individual transport modes become more interconnected, physically and digitally, and MaaS-style services expand including the equivalent in freight, Delivery as a Service (DaaS). However the future looks even more complex as cities are starting to get requests for 3D solutions: making urban space available for both manned and unmanned drones. The scope of urban traffic management will need to expand beyond road vehicles to cover all modes including cycling and walking, and beyond ground transport to integrate drones. Because the new services are able to share knowledge on their origin, destination and position cities and traffic management will get new tools to optimise the operations in the transport system and achieve their policy goals. How do we want urban traffic management to develop?

Moderator: Pia Karjalainen, Senior Manager, Urban Mobility, ERCICO - ITS Europe, Belgium

Speaker:
- Andy Taylor, Director of Strategy, Cubic Transportation Systems, USA
- Tina Quigley, Regional Transportation Commissioner of Southern Nevada, USA
- Mahmood Hikmet, Head of Research and Development, Omma Automations, New Zealand
- Iain Macbeth, Head of Futures, Transport Innovation Directorate, Transport for London, UK
ES 07: MOMENTS OF TRUTH IN MAAS IMPLEMENTATION
Thursday, 24 October 2019  |  09:00 – 10:30 | Nicoll 3

Maas is often considered the holy grail of Servicification of Mobility. Maas truly makes mobility mode independent by making any mode of transportation which makes the journey faster, cheaper and better available to commuters at a click of a button. However, implementation of Maas involves creating an entire new eco-system by integrating each mode of mobility which currently operates in their own silos. What have made Maas solutions attractive, and are these transplantable or do there need adaptation to suit different parts of the globe? If so, what are these adaptations? What have been the challenges so far and how have these experiences been shared?

Moderator: Brian Negus, Ambassador, ITS Australia, Chair, Collaborative ITS Consulting Australia, Australia
Speakers: Colin Lim, CEO, mobilityX, Singapore
Neil Pedersen, Executive Director, Transportation Research Board (TRB), USA

ES 08: TODAY’S MOBILITY: ACCESSIBILITY, INCLUSIVITY AND SAFETY
Thursday, 24 October 2019  |  11:00 – 12:30 | Nicoll 3

Currently, there are global discussions about issues associated with women’s mobility, including safety, access in terms of social equity, and the lack of women in the transport industry in general. For example, in many countries around the world, a majority of women do not feel safe while travelling by public transport. Further, in addition to safety, access to transport can be limited for women (e.g., the so-called “pink tax”), resulting in women not having the same opportunities as men in terms of employment, healthcare and other critical life activities. Finally, the lack of women in key senior positions in the transport industry has meant that the issues of safety and inclusivity are not necessarily addressed by public and private transport service providers. This session will not only explore these challenges, but also how these challenges are being addressed by the top women in the transport and ITS industries. Lastly, this session will discuss the ways in which these leaders are making transport accessible to all people through the policies they help to establish and implement.

Moderator: Carol Schweiger, President, Schweiger Consulting LLC, USA
Speakers: Susan Harris, Chief Executive Officer, ITS Australia, Australia
Amy Ford, Director, Mobility on Demand Alliance, ITS America, USA
Leslie Richards, Secretary, Pennsylvania DOT, USA

ES 09: IS PROLIFERATION OF NEW TECHNOLOGIES CREATING A LEVEL PLAYING FIELD?
Thursday, 24 October 2019  |  14:00 – 15:30 | Nicoll 3

Disruption created by the proliferation of new technologies is redefining the rules of the game in every field especially in ITS. What are these new technologies that are permeating in the entire eco-system? While cars are getting more connected and automated, what needs to be done with the road infrastructure to make the system truly smarter and connected? What and how have new technologies open up the opportunity for entry of new players from emerging field who erstwhile didn’t have any access to the transportation value chain? In this session, experts will share on the effectiveness of new technologies such as AI and Blockchain, the role of new players in the eco-system and what are the various scenarios that will arise out of them.

Moderator: Dean Zabrieszach, Chief Executive Officer, HMI Technologies Pty Ltd / Ohmio Automation Ltd, Australia
Speakers: T Russell Shields, Chair, Hypmi LLC, USA
Ramin Massoumi, Senior Vice President & General Manager, Renis, USA

ES 10: DRIVING ITS THROUGH THE POWER OF DATA
Thursday, 24 October 2019  |  16:00 – 17:30 | Nicoll 3

Recent years have highlighted the value and power of using data in ITS and mobility solutions. What are the roles of the government, academia and industry to establish an open data environment for the sharing of ITS data? Should governments solely take up roles that are for the civic good, while leaving the private industry to focus on how they can monetise data? This session will focus on what roles each of government, academia and industry should play to establish robust and wide-reaching data sharing environments. In addition, transportation executives will discuss future initiatives, including embracing Industry 4.0, integrating data and analytics with cloud computing, Internet of Things (IoT), intelligent machines and big data techniques to identify potential areas where such an environment might deliver results while still addressing key considerations such as privacy, security and accountability for managing the data.

Moderator: TBC
Speakers: Sjahrunzam Samsudin, Chief Executive Officer, Touch n Go Sdn Bhd, Malaysia
Jarrett Wieden, Executive Vice President, Panasian Corporation of North America, USA
Carlos Braceras, Executive Director, Utah DOT, USA

ES 11: FREIGHT MOVEMENT FOR SMART CITIES
Friday, 25 October 2019  |  09:00 – 10:30 | Nicoll 3

Ports and hubs are key part of the transport network of a city, a region or a country but have the common challenges of meeting increasingly strict environmental regulations, new requirements for sustainable land-use and a general push to reduce impacts on traffic, air quality and energy consumption. In this Session freight managers, city authorities and other stakeholders will address innovative and sustainable strategies for the port city of the future and show how ITS can help to manage the arrival of cargo from the marine side, its transit through the city in parallel with passenger traffic, and integration with wider freight networks. A key to success for both passengers and freight is collaborative planning and execution of operations both at port level and also in the city. The Session will review how ITS solutions can enable mutually beneficial working between actors such as port and city authorities, terminal operators, infrastructure managers, logistics services providers, ICT companies and end users, and strengthen local and international freight transport networks. We will discuss traffic management standardisation and interoperability, and some new approaches to the development and pilot deployment of linked digital information systems for networks and corridors. We will also consider whether “out of the box approaches” are needed – and if so what they might look like.

Moderator: Zeljko Jefic, Deputy Director - Innovation & Deployment, ERTICO - ITS Europe, Belgium
Speaker: Patrick McKenna, Director, Missouri DOT, USA
Gary Dolman, Head of Bureau, Department of Infrastructure, Transport, Cities and Regional Development, Australia
Lars Arke, Head of Sales Projects, HHLA (Hamburger Hafen und Logistik Aktiengesellschaft), Germany

ES 12: DEMAND MANAGEMENT STRATEGIES AND PRACTICAL CONSIDERATIONS
Friday, 25 October 2019  |  11:00 – 12:30 | Nicoll 3

Expanding the road network to meet growing travel demand is now recognised as unsustainable. It is necessary to manage travel demand and road pricing is an option to do this. There are several possible forms of road pricing – from fixed to variable time-of-day pricing based on fixed points, cords or distance travelled. What are the considerations for deciding the form of pricing that is best suited for a community? What are the technological, infrastructure and financing needs for the various forms of road pricing? What complementary measures are needed to influence road users to change their travel behavior? How important is the payment medium for effective road pricing? Would it be better to have payments made at point-of-use (using stored-value smartcards) or have post-payment arrangements based on credit cards and other back-end payment systems?

Moderator: Stephen Hewitt, Business Director – Transport Advisory Global, Beca Ltd, New Zealand
Speaker: Xiaojing Wang, Chairman, China ITS Industry Alliance, China
Soren Tellegen, Executive Vice President, Kapsch, Austria
SIS 01: HIGHLY CONNECTED AND AUTOMATED MULTIMODAL URBAN SYSTEM
Monday, 21 October 2019 | 09:00 - 10:30 | Room 327

We know that our roads are increasingly congested and often dangerous. Many people would argue that the burgeoning industry around automated vehicles is the way forward. By taking out human error, we have the potential to make our roads safer than they have been since cars first appeared in the late-19th century. However, automated vehicles are just one solution. To truly mitigate the risks of driverless cars and to seize the opportunities offered by new technologies, we need to implement systems where all elements of the environment are communicating and reacting to one another. We need to bring together the transport network as a whole to enable growing cities’ populations to move through easily, and most importantly, safely.

Using sensors, we can connect cars, bikes, traffic lights, intersections, pedestrian movement and even the footpaths. This allows us to see all road users, not just those in vehicles. We are not simply giving cars right of way, instead we are looking at transport solutions for all users at the points in time when they interact with one another. What also makes this exciting is the technology’s ability to evolve: it is “intelligent connectivity” with potential to adapt as our cities grow and infrastructure changes. This special session is devoted to multimodal highly connected and automated urban projects.

Organiser:
Majid Sarvi, The University of Melbourne, Australia

Moderator:
Satoshi (Sam) Oyama, Association of Radio Industries and Business, Japan

Speakers:
Nobuyuki Ozaki, Toshiba Infrastructure Systems & Solutions Corporation, Japan
Peter Sweatman, Cavita, USA
Haseo Yoo, KAIST, Republic of Korea
Majid Sarvi, The University of Melbourne, Australia

SIS 02: RADIO COMMUNICATION TO REALISE CONNECTED VEHICLES
Monday, 21 October 2019 | 09:00 - 10:30 | Room 328

World Radiocommunication Conference 2019 (WRC-19) Agenda Item 1.12 is on global or regional spectrum harmonization of ITS Applications. V2X communications, Vehicle to Vehicle (V2V) Communication and Vehicle to Infrastructure (V2I) Communication have been deployed in Japan. Cooperative ITS (C-ITS) and automated driving will also be introduced soon in North America and Europe. This session features representatives from ITU-R, Japan, Europe, United States, etc., who will discuss ITS radio communication policies, standards, and technologies. The session will also include a discussion on current issues and solutions of international harmonisation of ITS radio communication standards toward WRC-19.

Organiser:
Yusuke Nishimura, Ministry of Internal Affairs and Communications, Japan

Moderator:
Sabotchi (Sami) Oyama, Association of Radio Industries and Business, Japan

Speakers:
Koji Harai, Ministry of Internal Affairs and Communications, Japan
Sergio Buonomo, International Telecommunication Union, United Nations

SIS 03: COMMUNICATING THE BENEFITS OF INNOVATIVE TECHNOLOGY
Monday, 21 October 2019 | 09:00 - 10:30 | Room 329

When deploying innovative and new technology, it is crucial that the right message is formed and communicated to the traveling public and media. This session will have panelists from the Americas, Asia-Pacific, and Europe. A discussion of what it takes to communicate the benefits of that technology to customers, stakeholders, the media and other audiences will take place. Each panelist will describe the challenges of learning what the innovative technology is, forming a message about the technology that is understandable to the average person, and sharing the message via various media and social media outlets. Each media and social media platform required a variant on the message that targeted the specific audience for the platform.

Organiser:
Sue Otzian, Tampa Hillsborough Expressway Authority, USA

Moderator:
Bob Frey, Tampa Hillsborough County Expressway Authority, USA

Speakers:
Sue Otzian, Tampa Hillsborough Expressway Authority, USA
Markus Wiederer, Siemens Mobility, Germany
Brent Cain, Arizona Department of Transportation (ADOT), USA
Dennis Walsh, Queensland Department of Transport and Main Roads, Australia

SIS 04: AUTOMATED SHUTTLE SYSTEMS FOR REAL MOBILITY ISSUES OF CITIES AND USERS
Monday, 21 October 2019 | 09:00 - 10:30 | Room 330

In public discussion and industry debate on automated vehicle fleets in urban areas, the concepts of automated, shared, on-demand and sustainable are often confused. Moreover, the operational design domain of the different levels of automation and thereby the feasibility of automation in different environments is regularly misunderstood, as is the expected impact of automated vehicle systems on traffic safety, traffic demand and public space. For automated vehicle systems to be effective and mutually beneficial, real city mobility issues and needs of different user groups must be the basis. Level 4 automated shuttle systems have proven to be ready for pre-commercial deployment and able to offer a mobility solution for different use cases. The panel will present the state-of-the-art in automated shuttle systems based on applications which are in full operation today, and address concept definitions, operational design domain constraints and societal impact.

Organiser:
Jaap Vreeswijk, MAP traffic management, The Netherlands

Moderator:
Jaap Vreeswijk, MAP traffic management, The Netherlands

Speakers:
Randell Iwasaki, Contra Costa Transportation Authority, USA
Daniel Ruiz, Meridian Mobility, UK
Alfred Hamstra, 2getthere, The Netherlands
Miranda Blogg, Queensland Department of Transport and Main Roads, Australia
Sue Chrzan, Tampa Hillsborough Expressway Authority, USA
Yusuke Sasaki, SB Drive, Japan
**SIS 05: VERIFICATION AND VALIDATION OF AI FOR AUTONOMOUS DRIVING**

Monday, 21 October 2019 | 11:00 - 12:30 | Room 327

AV systems make use of AI for vision and prediction for their decision making mechanisms. These mechanisms target “better than human” decisions for safe behaviour of the AV. This SIS is approaching the AI for AV from safety point of view. First, new safety requirements relevant to the intelligent systems are elaborated and why new standards considering AI must address safety of the intended functionality (SCOF) is explained. Relationship between AI-predictable misuse and new safety concept in the example of one of the automotive Tier 1 World Leaders is shared. Second, adequacy of the existing testing, inspection and certification methods is questioned. Common approach for Deep Learning (DL) systems is to collect large amounts of data and tweak parameters until an acceptable error rate is achieved. Traditional testing methods for safety don’t scale well to DL, as error cases are unbounded. New methods are needed to quantify and mitigate risk. Several promising approaches aiming unpredictability of AI performance are under development. Third, the exponential increase in cyber security threats that are enabled by the rise in AI is evaluated. With the advancement of research on adversarial attack, a carefully designed noise that only changes few pixels of the image could totally change the prediction of the perception system. One way to tackle this problem is to make the perception system more interpretable. Algorithms offering promising possibilities for predictability of AI are mentioned. Last, role of interpretability and explicability of AI in public acceptance is considered. Besides the accepted economic value, the way for the mass deployment of AV’s needs to tackle public acceptance. An important element is the ethical question of which decision by AV is acceptable in case of accident. Ethical aspect is closely linked with liabilities and regulations. Interpretable and explainable AI lays the foundation of its regulation.

**Organiser:**
Nina Guan, China Highway & Transportation Society (CHTS), China

**Moderator:**
Arnaud Lago, Robert Bosch GmbH, Singapore

**Speakers:**
Letao Liu, Nanyang Technological University, Singapore
Eley Querner, TÜV SUD Asia Pacific Pte Ltd, Singapore
Maxime Flament, 5G Automotive Association, Belgium

**SIS 06: AUTOMATED DRIVING: AUTOMATED VEHICLE & INTEGRATED SYSTEM OF CONNECTED AUTOMATED VEHICLES AND HIGHWAYS**

Monday, 21 October 2019 | 11:00 - 12:30 | Room 328

Driven and influenced by technologies such as 5G, Edge Computing, and AI, Connected and Automated Vehicle Highway (CAVH) Systems have become one of the forefront areas in transportation research and development. CAVH will comprehensively improve the efficiency, safety, and sustainability of the road traffic, and bring significant social and economic benefits, thanks to the support from the smart vehicle and the smart road/infrastructure together. Transportation is a complex system, and the individual vehicle’s intelligence is incomplete, which means that the coordination is urgently required. The Working Committee on Automated Driving (WCAOD) of China Highway & Transportation Society (CHTS) invites speakers from policy making authority, research institute, university, representative enterprise etc from China and Europe to share their research achievement, experience etc. and network with the delegates to promote enhance the communication, cooperation and industry development.

**Organisers:**
Jian Zhang, Research Center for Internet of Mobility, Southeast University, China
Xuqin Duan, China Highway & Transportation Society (CHTS), China

**Moderator:**
Nina Guan, China Highway & Transportation Society (CHTS), China

**Speakers:**
Hao Hu, Huawei, China
Wefeng Wang, China Design Group Co., Ltd., China
Xiaoping Song, Zhejiang Provincial Institute of Communications Planning, Design & Research Co., Ltd, China
Yi Zhang, Tsinghua University, China
Sue Bai, Honda R & D America’s, Inc., USA

**SIS 07: AT THE END OF PAVED ROAD**

Monday, 21 October 2019 | 11:00 - 12:30 | Room 329

Current light vehicle and truck automation companies are all focused on a structured environment that is paved and is preferably well marked. While full-scale deployment of AVs is still a long way away, there is a segment of the road infrastructure that gets little focus: unpaved roadways. Within the United States ~60% of the roads are paved. For deep penetration of AVs to occur outside the urban area new techniques will need to be developed to handle unpaved roads. Many of the currently utilised sensors and mapping techniques will struggle in that environment as it changes significantly with the seasons and the visual cues radically vary. The session will focus on the challenges that need to be solved. Session would have 2-3 min “opening statement” (no slides) and then roundtable.

**Organiser:**
Chris Mentzer, Southwest Research Institute (SwRI), USA

**Moderator:**
Steve Dellenback, Southwest Research Institute (SwRI), USA

**Speakers:**
Eley Querner, TUV SUD Asia Pacific Pte Ltd, Singapore
Yasuhiro Aoyama, Panasonic Corporation, Japan
Muhammad Marizwan bin Abdul Manan, Malaysian Institute of Road Safety Research (MIROS), Malaysia
Henry Meng, Smart System Network Institute, Institute for Information Industry (III), Chinese-Taipei

**SIS 08: INTELLIGENT MOBILITY FOR CONNECTED TWO-WHEELERS SAFETY**

Monday, 21 October 2019 | 11:00 - 12:30 | Room 330

A more intelligent transportation system could enhance driving safety in order to achieve Vision Zero target. From the development of ADAS to autonomous vehicle, automobiles are capable of recognizing the surrounding environment to achieve active safety. However, there is a lack of safety assistance mechanism on two-wheelers such as motorcycles and bicycles. To ensure the driving safety of two-wheelers, the future intelligent transportation system should be able to identify automobiles and two-wheelers through the roadside detectors, and the detected information could be communicated among roadside units, automobiles and motorcycles. Also, Deep learning technologies have been developed to identify the automobiles and two-wheelers. The OBU could alert the driver at dangerous crossroads, and remind the driver about the situation in the front to avoid accidents when appropriate. In this session, we will focus on intelligent ITS system, AI applications on intelligent driving and connected motorcycle driving safety and some related topics.

**Organiser:**
Henry Meng, Smart System Network Institute, Institute for Information industry (III), Chinese-Taipei

**Moderator:**
Mc-Hari Wang, Ministry of Transportation and Communications (MOTC), Chinese-Taipei

**Speakers:**
Henry Meng, Smart System Institute, Institute for Information industry, Chinese-Taipei
Muhammad Matzwan bin Abdul Manan, Malaysian Institute of Road Safety Research (MIROS), Malaysia
Yasuhiro Aoyama, Panasonic Corporation, Japan
Ivy Kuo, National Cheng Kung University, Chinese-Taipei
Ricardo Sigua, Institute of Civil Engineering, University of the Philippines, Philippines
Maxime Flamet, SG Automotive Association, Belgium
SPECIAL INTEREST SESSIONS

**SIS 09: CHALLENGE OF INTEGRATING AUTOMATED VEHICLES INTO THE DIGITAL INFRASTRUCTURE**

Digitalisation of road transport and emergence of Automated Driving brings together different challenges in particular the need for data exchange between vehicles and the infrastructure. What data is needed to support Automated Driving? How should the automated vehicle be integrated with the digital infrastructure currently under development? Will the traffic be managed differently? What data quality and security do we need? Answer to these questions is one key for defining an optimal automated transport system. This session brings together speakers from different organisations and/or standardisation body with expertise about digital infrastructure / traffic management, Automated Driving and data services. The ambition of this session is to share our knowledge about need for data and propose a way forward for cooperation between DAFD and Traffic Management as part of the digital Infrastructure.

**Organiser:** Jean-Charles Pandazis, ERTICO - ITS Europe

**Moderator:** Jean-Charles Pandazis, ERTICO - ITS Europe

**Speakers:**
- Johanna Tamidaki, ERTICO - ITS Europe
- Martin Schlocher, Elektrobit, Germany
- Matthias Unbehaun, TISA, Belgium
- Prokop Velicka, HERE Technologies, Germany
- Satoru Nakajo, Center for Spatial Information Science, The University of Tokyo, Japan
- Stephane Dreher, ERTICO - ITS Europe

**SIS 10: COMPLEX SELF DRIVING FIELD OPERATIONAL TESTS USING EVOLVED IT INFRASTRUCTURES**

Field Operational Tests now involves Self Driving vehicles to evaluate complex safety relevant functions supported by evolved Digital Infrastructures. Many Field Operational Tests aim also at assessing the impact of IT infrastructure, including Cloud and Mobile Edge computing, IoT as well as enhanced connectivity, which provides the Big Data to advance self-driving. Therefore Field Operational Tests need to address new challenges while dealing with new and bigger datasets, provided and managed by complex cloud and mobile edge infrastructure. Last but not least Field Operational Tests aim also at evaluating new business models and issues like data privacy or liability in the context of Self Driving. The session will present how Field Operational Tests experts address these new challenges and answer new questions about Field Operational Tests. How far the current FESTA can be used for POT? How does the Big Data contribute to the actual Self Driving evaluation?

**Organiser:** Francois Fischer, ERTICO - ITS Europe

**Moderator:** Rita Bhhandari, ERTICO - ITS Europe

**Speakers:**
- Francois Fischer, ERTICO - ITS Europe
- Álvaro Arrue, Applis (DataQ), Spain
- Thomas Voza, BMW, Germany
- Hyunseo Ho, Electronics and Telecommunications Research Institute (ETRI), Republic of Korea
- Ralf Wielandt, T-Systems International, Germany

**SIS 11: SUSTAINABLE ITS ASSET MANAGEMENT STRATEGIES MEETING TECHNOLOGY CHALLENGES**

ITS asset management has been an emerging and challenging research area. Rapid changes and evolution in technology further add to the challenges, as existing ITS technologies become obsolete they are required to be upgraded or replaced more frequently. To optimise the reliability, availability and maintainability of ITS and rationalise the investment in ITS asset maintenance and management, continuous effort has been made on the ITS asset performance and condition monitoring, and identification of strategies and tools. Australian and New Zealand road agencies have been leading the development of national ITS asset strategy framework, ITS performance evaluation methodology, reliability-centred maintenance (RCM) and ITS device certificate and testing etc. The session will include a global view and share best practices amongst ITS asset managers from Australia, New Zealand, Canada, US and Singapore.

**Organiser:** Clarissa Han, Australian Road Research Board, Australia

**Moderator:** Clarissa Han, Australian Road Research Board, Australia

**Speakers:**
- Qudus Warrizada, Roads and Maritime Services, Australia
- Dean Parker, Auckland Motorway, New Zealand
- Clarissa Han, Australian Road Research Board, Australia
- Francois Thibodeau, Service de l’urbanisme et de la mobilité, Canada
- Mun Oong Cheng, Land Transport Authority, Singapore
- Tom Kern, American Association of State Highway and Transportation Officials, USA

**SIS 12: INTELLIGENCE AS A FOUNDATION FOR SMART MOBILITY THROUGH SMART TRAFFIC SIGNALS**

Traffic control on arterial roads and city streets makes an important contribution to keeping smart cities moving. The continuous optimisation decisions made by control systems can only be as intelligent as the data they receive. This session explores how cities around the world are realising benefits from emerging data sources from Connected and Automated Vehicles as well as Bluetooth and Wifi to better inform real-time optimisation control. What role does the richness of the data sources and the confidence in the provided data play in achieving good outcomes? This session will feature both practical real-world examples and strong interaction between speakers and the audience. It explores real progress being made now with an eye to the opportunities of the future. There will be an emphasis on proven results and proven progress to complement the discussion around the excitement of the possible.

**Organiser:** Andrew Somers, Transoptim, Australia

**Moderator:** Andrew Somers, Transoptim, Australia

**Speakers:**
- Thomas Riedel, Adaptive Traffic Control AG and Verkehrs-Systeme AG, Switzerland
- David Johnston, Intelligent Transport Services, Australia
- Kei U. Jo, Johnny Leung, Synergistic Traffic Consultancy, Australia
SIS 13: INCLUSIVE AND SUSTAINABLE SHARED, PERSONALISED, AUTOMATED AND CONNECTED MOBILITY IN SMART CITIES
Tuesday, 22 October 2019 | 09:00 – 10:30 | Room 329

Mobility in urban and suburban areas faces significant challenges with respect to accessibility, safety, security, environment, service quality of public transport and financing. Shared and automated mobility services have the potential to address these challenges and to offer concrete solutions which are not technically or economically feasible with conventional public transport systems. This session will report on expectations from local authorities to meet policy goals in cities, strategies developed by transport authorities to facilitate integration of automated vehicles and associated shared mobility services in existing public transport systems, and lessons learnt from trials and commercial operations by public transport operators and mobility service providers.

Organiser:
Guido Di Pasquale, Union Internationale des Transports Publics - UITP

Moderator:
Guido Di Pasquale, Union Internationale des Transports Publics - UITP

Speakers:
Guido Di Pasquale, Union Internationale des Transports Publics - UITP
Ulla Tikkanen, Forum Virium Helsinki, Finland
Patrick Meurze-Haondyde, Directorate General for Research and Innovation, European Commission
Goh Hui Guan, Land Transport Authority, Singapore
Scheherazade Zeki, Keolis, France
Keith Hall, Federal Transit Administration, U.S. Department of Transportation, USA

SIS 14: ROAD INFRASTRUCTURE CONCERNING ADS
Tuesday, 22 October 2019 | 09:00 – 10:30 | Room 330

How should a road administrator consider road traffic lanes that are authorized for ADS (Automated Driving System)? In general, ADS requests a road administrator to improve road maintenance, rehabilitation and management, in order for automated vehicles to run safely and smoothly. Moreover, some ADSs require V2I communication systems in order to ensure a specified level of safety.

In this session,
(i) the role of road administrators,
(ii) the ideal service level of road infrastructure; and
(iii) the additional infrastructure requirements for V2I communication
will be discussed based on feasibility studies and field operation tests of ADS.

Organiser:
Masato Ohta, Ministry of Land, Infrastructure, Transport and Tourism, Japan

Moderator:
Hironao Kawashima, Keio University, Japan

Speaker:
Martin Böhm, AustriaTech, Austria
Robert Singers, Mercon Strategic, USA
Scott Kuzniik, Modern Traffic Consultants, USA
Masato Ohta, Ministry of Land, Infrastructure, Transport and Tourism, Japan

SIS 15: AUTONOMOUS VEHICLE CHALLENGES AND OPPORTUNITIES IN ASIA-PACIFIC
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 327

Traffic environment in the Asia-Pacific region is significantly different from elsewhere in the world, as trucks, buses, scooters, bicycles, and pedestrians all navigate on the road simultaneously in densely-populated cities from Bangkok to Taipei. Such mixed traffic flow is the challenge for autonomous vehicles (AV) developers. What works in the West may not adapt to Asia-Pacific region. AVs have to learn different skills—or perhaps learn differently—to respond to the dynamic driving situations and live peacefully with local drivers. On the other hand, would this give rise to technical advantage and business opportunities for regional players? Would the region be the cradle for new R&D, funding, and market development models? In this session, AV researchers, engineers, and operators are invited to share their stories of localised technologies and market expectation, from sensor fusion to deep learning, and from vehicle manufacturing to test ride. And you are mostly welcomed to share your insight in this unstoppable trend.

Organiser:
Men-Peng Wu, China Engineering Consultants Inc., Chinese-Taipei

Moderator:
Murphy Sun, Sunsys International, Chinese-Taipei

Speakers:
Richard Harris, Real ITS Global, UK
Wentao Che, Kokusai Kogyo Co., Ltd, Japan
Huei-Ru Tseng, Industrial Technology Research Institute, Chinese-Taipei
Martin Ting, 7StarLake, Chinese-Taipei
David Shen, Turing Inc., Chinese-Taipei

SIS 16: NEW BUSINESS MODELS DERIVING FROM HIGHER AUTOMATION LEVELS IN FREIGHT AND LOGISTICS
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 328

Freight and logistics are witnessing rapid technological changes due to connectivity and automation. At the same time, new business models are emerging which purportedly have the potential to revolutionise the freight transport sector. It is increasingly argued that automation has the capability to cut operation costs, however, it still remains unexplored whether this will be the case. In addition, most of the cost savings are believed to be derived from a reduction in the labour required. However, this raises several questions on whether the role of the driver, and his/her respective skillset, will remain essential and relevant in the years to come. The session objectives are to shed light on this growingly important questions on the interaction of automation and freight transport, and take a deep dive in order to assess if and how emerging business models can materialise and thrive in the sector.

Organiser:
Zeljko Jefic, ERTICO - ITS Europe

Moderator:
Fernando Liers, ALICE – Alliance for Logistics Innovation through Collaboration in Europe, Belgium

Speakers:
Matthias Kliché, Continental, Germany
Niels Dekker, Rotterdam World Gateway, The Netherlands
Mats Rosenquist, Volvo Group Trucks Technology, Sweden
**SIS 17: ADVANCED WEATHER RESPONSE SYSTEMS**

Tuesday, 22 October 2019  |  14:00 - 15:30  |  Room 329

Advanced weather-responsive traffic management strategies increase the effectiveness of traffic operations during adverse road weather conditions, and weather-responsive maintenance management strategies help reduce costs associated with winter maintenance. Twenty-one percent of crashes occur during adverse weather conditions. On average, nearly 6,000 people are killed and over 440,000 are injured in weather-related crashes each year. Likewise, the delays associated with weather can be profound, resulting in significant losses in efficiency. Advanced weather response systems provide relevant and timely information to agencies on the need for appropriate traffic intervention methods to mitigate the impacts of weather-related road and traffic conditions. The result is improved mobility, reduced delays, and safer travel during inclement weather.

**Organiser:**
John Barton, HNTB, USA

**Moderator:**
John Barton, HNTB, USA

**Speakers:**
Carlos Braceras, Utah Department of Transportation, USA
Roger Millar, Washington Department of Transportation, USA
Leslie Richards, Pennsylvania Department of Transportation, USA

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**SIS 18: LEARNING LESSONS FROM C-ITS EARLY ADOPTERS**

Tuesday, 22 October 2019  |  14:00 - 15:30  |  Room 330

In the UK, we are developing mechanisms to support the implementation of C-ITS technologies on the road network and ensure that best practice is captured and disseminated. We are providing central government funding for “learning for all” support networks to ensure dissemination and learning happen. Funding for C-ITS comes with a requirement to evaluate what is done but the challenges encountered and lessons learnt from evaluations are rarely published. Published evidence from field operational trials is scarce, meaning there are no templates to follow when developing an evaluation approach. In this session we will share experience of C-ITS rollout and evaluation by looking at the InterCoR programme and the UK Department for Transport’s competition to promote C-ITS in English Local Authorities. We will also bring in experience from elsewhere around the globe to show what other ‘best practice’ initiatives are taking place in disseminating C-ITS learning.

**Organiser:**
Darren Capes, Department for Transport, Institution of Engineering and Technology, UK

**Moderator:**
Darren Capes, Department for Transport, Institution of Engineering and Technology, UK

**Speakers:**
Gary Crackford, Dexp, USA
Steve Dellenback, Southwest Research Institute (SwRI), USA
Alan Quek, Land Transport Authority, Singapore
Timothy Gammans, One Arup & Partners, UK
Representative from, ERTICO – ITS Europe

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**SIS 19: CRIMINAL LIABILITY SCHEME FOR AV ACCIDENT**

Tuesday, 22 October 2019  |  16:00 - 17:30  |  Room 327

Automated driving technology is becoming real. In the very near future, automated vehicle will join into our world. We will soon face an intermixed traffic. Automated driving vehicles will contribute to reduce traffic accident but not all of them, and they could possibly lead a new type of accident. Our legal system could make any contribution to this era? We will discuss about criminal liabilities for automated vehicle accident and seek reasonable way to be settled.

**Organiser:**
Masayuki Satoh, ITS Japan, Japan

**Moderator:**
Masayuki Satoh, ITS Japan, Japan

**Speakers:**
Takayoshi Imai, Hosei University, Japan
Julie Van Dort, Department of Transport, Victoria, Australia
Eric Landot, Avocat au barreau de Paris, France

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**SIS 20: ALTERNATES TO DIGITAL MAPS**

Tuesday, 22 October 2019  |  16:00 - 17:30  |  Room 328

There has been significant discussion of the development and usage of high definition digital maps to aid the movement of automated vehicles. While these maps work exceedingly well in pristine environments they are not as effective when road environments change seasonally or are covered by snow. The emerging technologies being developed to provide localization with non-traditional approaches will be discussed. Speakers would make 12-15 minute presentation (with slides) along with Q/A.

**Organiser:**
Chris Mentzer, Southwest Research Institute (SwRI), USA

**Moderator:**
Ryan Lamm, Southwest Research Institute (SwRI), USA

**Speakers:**
Chris Mentzer, Southwest Research Institute (SwRI), USA
Xiaofeng Gu, CSIG Tencent, China
Bernhard Morys, Mercedes-Benz, China

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**SIS 21: USING ITS TO FACILITATE DYNAMIC CURB/CITY SPACE ALLOCATION AND PRICING/CHARGING**

Tuesday, 22 October 2019  |  16:00 - 17:30  |  Room 329

In the 4th Mobility as a Service Summit held during the 2018 ITS World Congress, there were numerous discussions about how mobility in cities could be improved by using specific locations for different purposes during various times of day. For example, a specific curb could be used during rush hour as a pick-up or drop-off point for ridesourcing vehicles, and as a recreational space during the rest of the day. Further, there could be a charge for using curb space for ridesourcing vehicles. Similarly, at one time of day, city space could be used for parking, and at other times, it could be used for another purpose. This session will explore the use of ITS to facilitate dynamic space allocation and pricing/charging.

**Organiser:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Moderator:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Speakers:**
Sabrina Sussman, Zipcar, USA
Ryan Lamm, Southwest Research Institute (SwRI), USA
Masayuki Satoh, ITS Japan, Japan
Shaleen Srinivasa, Immense Simulations, USA
Richard Esley, E-Squared Engineering, USA
SIS 22: ENABLING AUTOMATED AND INTEGRATED URBAN PUBLIC TRANSPORT SERVICE

Tuesday, 22 October 2019 | 16:00 – 17:30 | Room 330

This session addresses the organisational, functional and technical challenges to enable and implement automated and integrated public transport services, focusing on the integration of new kinds of vehicles and services on the roads. Traditional traffic controls ask for radical rethinking to balance the new automated on-demand transport modes within urban road traffic flows, without requesting major modifications of existing infrastructure. The most obvious changes happen on the vehicular side and through the increasingly complete connectivity of the fully integrated transport system. Distribution and protection of information, together with system security, become crucial elements and need increased. The session discusses these aspects against the background of international cases with a focus on technological and functional aspects. Cross-sector discussions are initiated by presentations by international professionals from agencies, industry and academia. Part of the research, touched in this session, is supported by the National Research Foundation of Singapore, under its CREATE programme.

Organiser:
Fritz Busch, Technical University of Munich, TUMCREATE Ltd Singapore, Germany
Andreas Rau, TUMCREATE Ltd Singapore, Singapore

Moderator:
Robert Bertini, University of South Florida, USA

Speakers:
Malika Meghani, Singapore-MIT Alliance for Research and Technology (SMART), Singapore
Sascha Westermann, Hamburger Hochbahn AG, Germany
Fritz Busch, Technical University of Munich, TUMCREATE Ltd Singapore, Germany
Marcus Zwick, Siemens Mobility GmbH, Germany
Anupam Chattopadhyay, Nanyang Technological University, TUMCREATE Ltd Singapore, Singapore

SIS 23: TESTING OF AUTOMATED DRIVING ON PUBLIC ROADS: CHALLENGES AND FIRST LESSONS LEARNED

Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 325

Today, automated driving technology has matured to a level motivating tests on public roads. These tests will answer key questions before market introduction: what is happening both inside and outside the vehicles, how vehicle security can be ensured, evaluating societal impacts and emerging business models. In Europe, the large-scale research project LiPiPilot brings 1,000 drivers in 100 vehicles to tests across 10 countries. First results show that studying automated driving is as much methodology development as measuring driver and vehicle behavior. With the implementation of automated driving technologies in Asia, we can see emerging new businesses and opportunities for drivers, the industry and society. The USA show little constraints for the introduction of self-driving vehicles resulting in diverse testing activities. Today’s session introduces this international perspectives providing insights on methodological questions on test design, subjects and data management, safety and other societal impacts and constraints in assessing them.

Organiser:
Aria Etemad, Volkswagen Group Research, Germany
Sarah Metzner, EICT GmbH, Germany

Moderator:
Angelos Amditis, ICCS, Greece

Speakers:
Aria Etemad, Volkswagen Group Research, Germany
Satu Innamaa, VTT Technical Research Centre of Finland Ltd., Finland
Nicolas Vignard, Toyota Motor Europe, Belgium
Panagiotis Lytritis, ICCS, Greece
Takahiko Uchimura, ITS Japan, Japan
Jane Lappin, Toyota Research Institute, USA

SIS 24: SUSTAINING SMART CITY SAFETY AND MOBILITY THROUGH EFFICIENT AND SUSTAINABLE OPERATION OF COMMERCIAL VEHICLES ON HIGHWAYS

Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 326

Traffic incidents continue to severely impact transportation safety and efficiency in cities throughout the world. The purpose of this session is to emphasize the criticality of Traffic Incident Management (TIM) to sustaining safety and mobility in smart cities. The coordinated multidiscipline and multilayered approach to responding to roadway emergencies, illustrates the need for the session to also present a deliberate and balanced integration of smart technology, data, people and training for managing traffic incidents successfully. Technology and Intelligent Transportation Systems, has always been foundational to effective TIM. Today, rapid advancements in vehicle and roadway automation and smart city technologies are enabling vehicles to be connected with each other and roadway infrastructure. As these advancements take place, it remains critical to engage the roadway operators, particularly those from the public safety community, to understand their unique needs and challenges for responding to traffic incidents, particularly those involving electric and automated vehicles.

Organisers:
Robert Murphy, AECOM, UK
Steven Cyra, HNTB Corporation, SA

Moderator:
Robert Fischer, Geospatial Transportation Information Management Association (GTIMA), USA

Speakers:
Valerie Briggs, USDOT FHWA Office of Transportation Management, USA
Brad Freeze, PE, Tennessee DOT, USA
Robert Murphy, AECOM, USA
Joseph Sagai, Maryland Department of Transportation, State Highway Administration, USA
Yee Sin Lay, Land Transport Authority, Singapore
Jan Willem Tenhof, Rijkswaterstaat, The Netherlands

SIS 25: TRANSFORMING FREIGHT MOVEMENT THROUGH ITS (TFM)) PART I: ROADWAY EFFICIENT AND SUSTAINABLE OPERATION OF COMMERCIAL VEHICLES ON HIGHWAYS

Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 327

Road freight transport faces several main challenges: (1) greening, reducing GNS emissions and fossil fuel dependency, (2) managing an increasing flow of heavy vehicles on existing infrastructure, (3) extending the lifetime of ageing road infrastructure exposed to longer and heavier trucks, (4) financing the maintenance and operation of the infrastructure and collecting the fair price for the infrastructure use. Combined ITS solutions can resolve these challenges. They include smart infrastructure, access programs, electric road systems, high capacity vehicles, advanced heavy traffic monitoring and direct enforcement, routing and monitoring of connected vehicles, free flow tolling and tax per kilometer infrastructure and fleet managers, carriers and regulatory bodies are the main actors, which need to build together to implement these solutions. A feedback of the best practices in Europe, North America and Asia will be reported, and the panel discussion will identify the most promising ways and solutions for the near future.

Organisers:
Chris Kontidiotis, Transport Certification Australia, Australia
Bernard Jacob, AECOM, USA

Moderator:
Malika Seddi, ASFA – Association of French Toll Motorway Operators, France

Speakers:
Chris Kontidiotis, Transport Certification Australia, Australia
Martin Knopp, USDOT FHWA, USA
Bernard Jacob, AECOM, USA
Ryan Klop, Transport Canada, Canada
Marko Jandrisits, ASFINAG / ASECAR, Austria

28th ITS World Congress Singapore 2019 | 21-25 October Preliminary Programme
SIS 26: HOW ROAD USAGE CHARGING AND URBAN VEHICLE ACCESS REGULATIONS CONVERGE?
Wednesday, 23 October 2019 | 09:00 - 10:30 | Room 328

How will Mobility management handle the convergence of RUC and UVARs? Both of these are intended to address a range of issues including but not limited to air quality, reduction in congestion, fairer alternative to fuel taxes and modal shift. The next few years will likely see the rollout and implementation of RUC (as replacement of fuel excise taxes and for travel demand management) in addition to current or future UVAR projects. This session will address the different technical approaches as well as regulatory and fiscal aspects, e.g. what has worked well, what has not? This Special Interest Session will bring together a panel of experts from both public and private sectors to explore this issue. Experts and government representatives working on this issue in the USA, Europe and Asia-Pacific will help us understand the potential convergence of road usage charging and urban vehicle access regulations.

Organiser:
Steve Morello, D’Artagnan Consulting, USA
Moderator:
Steve Morello, D’Artagnan Consulting, USA
Speakers:
Andrew Pickford, Transport Technology Consultants Ltd, UK
Tilly Chang, San Francisco County Transportation Authority, USA
Scott Wilson, D’Artagnan Consulting, Australia
Claire Depre, European Commission, Belgium
Suzanne Hoadley, Polis Network, Belgium

SIS 27: THE ROLE AND BENEFITS OF MOBILITY ON DEMAND IN THE MULTIMODAL JOURNEY
Wednesday, 23 October 2019 | 09:00 - 10:30 | Room 329

Public transport is the most efficient way of moving large numbers of people while creating sustainable environments where communities want to live, travel, connect. However not everyone has access to public transport close to their home, and finding options for that first and last mile connectivity is critical if we want to encourage mode shift. With the advances made in technology, Mobility On Demand now has the potential to play a relevant role in this multimodal journey, as it can give access to a wider range of shared mobility options to local communities and improve the accessibility to public transport. Through this session we will hear experts discuss concrete ways of getting the full benefit of Mobility On Demand and examples where these types of services have increased the use of shared mobility solutions and to change people’s perceptions by adapting to their mobility needs.

Organiser:
Segolène Deleley, Koolis Downer, Australia
Moderator:
Sue Wiblin, Koolis Downer, Australia
Speakers:
David Adelman, Via, USA
Chen Cai, DATAR/CTSI, Australia
Joshua Brydges, Go Get, Australia

SIS 28: CROWD-SOURCED DATA ANALYTICS IMPROVING NETWORK-WIDE TRAFFIC MANAGEMENT, OPERATIONS AND SAFETY
Wednesday, 23 October 2019 | 09:00 - 10:30 | Room 330

The combination of crowd-sourced data, cloud computing and on-line data analytics is enabling network-wide applications – region-wide, statewide and nationwide – that are improving road safety, reducing network delays and increasing the cost-effectiveness of transportation investments. This session will highlight several key recent advancements from leading organisations in three different countries where crowd-sourcing and big data analytics are making positive impacts. Each advancement presented is capable of scaling to other regions, states and countries, worldwide.

Organiser:
Rick Schuman, INRIX, USA
Moderator:
Tom Z. Johnson, P.E., INRIX, USA
Speakers:
Graham Hanson, Department for Transport, UK
Leslie Richards, Pennsylvania Department of Transportation, USA
Rick Schuman, INRIX, USA
Yang Laitu, Cennavi Technology Co. Ltd, China

SIS 29: 5G FOR ITS: THE FUTURE BASELINE FOR INTER-MODAL MOBILITY AND AUTOMATED DRIVING
Wednesday, 23 October 2019 | 14:00 - 15:30 | Room 330

The initial deployment of 5G - the next generation of mobile communication systems - just started. 5G contains numerous features that appeal to the transportation industry, enhanced mobile broadband, ultra high reliability and low latency, and massive IoT - just to name a few. Building on the successful SIS on 5G during the ITS Congress in Copenhagen, the goal of this session is to elaborate on how different stakeholders in the ITS community are planning to employ and benefit from 5G technology, and where they see risks and opportunities.

Organiser:
Tim Leinmüller, Denso Automotive Deutschland GmbH, Germany
Moderator:
Tim Leinmüller, Denso Automotive Deutschland GmbH, Germany
Speakers:
Eetu Pilli-Sihvola, Finnish Transport and Communications Agency, Finland
Jim Misener, Qualcomm, USA
Jovan Zagajac, Ford, USA
Satoshi Nagata, NTT Docomo, Inc., Japan
Ollie Inaksson, Ericsson, Sweden
This session will present the latest technological developments and deployment of truck platooning around the World. The remaining technical locks and emerging or implemented solutions will be presented. Platooning and operation of trucks at different levels of automation will be discussed, from level 1-2 (driver helped) to level 4 (driver on-board but not driving in a platoon or in some other circumstances) and even level 5 (no driver on-board). E.g. stand-alone trucks operating driverless is a concept under investigation in Japan, China and U.S. The role of the infrastructure (equipment, sensors, data, TVI and V2I communication, etc.) will be addressed. Impacts and benefits of platooning, scenarios and guidelines for implementation, business models and standardization, regulation and certification issues will be discussed.

Organisers:
Bernard Jacob, IFSTTAR, France
Richard Easley, E-Squared Engineering, USA
Moderator:
Richard Easley, E-Squared Engineering, USA
Speakers:
Young Tae Kim, OECD - International Transport Forum
Manika Hoedemarke, TNO, The Netherlands
Steven Shladover, the University of California PATH Program, USA
Stephen Boyd, Peloton Technology, USA
Barbara Krosse, TNO, The Netherlands
Richard Bishop, Bishop Consulting, USA

Data collection, analysis and sharing continues to be vital for improving mobility and tools that facilitate mobility, such as Maas. However, public entities can be challenged to obtain operational data from private mobility providers, such as ridesourcing companies (e.g., Uber, Lyft). This data is critical to understanding not only the market share of various mobility services in a city or region, but also the impact that these services have on transport in general. Other aspects of data such as data management, privacy and governance are equally important. This session will explore exemplary local and regional governments’ policies and programs that address data issues. Future, this session will describe how the Finnish Act on Transport Services addresses the more efficient use of data and open data requirements. Finally, this session will describe how the City of Columbus addressed data security and privacy policies to protect information across several USDOT projects, and how ridesourcing, taxi, carsharing, the US National Renewable Energy Lab (NREL) and Ohio Bureau of Motor Vehicles partnered with Smart Columbus to collect, analyze and share vehicle and trip data.

Organiser:
Carol Sweger, Schweiger Consulting LLC, USA
Moderator:
Carol Kuester, Metropolitan Transportation Commission, USA
Speakers:
Laura Eiro, ITS Finland, Finland
Chen Cai, DATA61|CSIRO, Australia
Sherry Kish, HNTB, USA
Mandy Bishop, City of Columbus, USA
Kate Zezhdra, HNTB, USA

It is the most important problem through many countries to prevent road traffic users from having traffic accident, especially critical accident, which are negative products in motorized societies. Many of traffic accidents are occurred by human error. In order to make the traffic environment even safer, adopting advanced technologies, including automated driving technologies, is expected as one of the key tools. Japanese Police is developing and deploying the V-I Cooperative systems that avoid traffic accidents and contribute to deployment of highly automated driving systems. These kind of systems are also developed and deployed by US and EU and attract people’s attention. This session aims to introduce the development and deployment of V-I Cooperative systems and to discuss some technological and political subjects of V-I Cooperative systems for traffic accidents avoidance.

Organisers:
Nakaba Izumoto, National Police Agency, Japan
Takashi Kimura, UTMS Society of Japan, Japan
Moderator:
Takashi Oguchi, The University of Tokyo, Japan
Speakers:
Nakaba Izumoto, National Police Agency, Japan
Shintaro Watanabe, UTMS Society of Japan, Japan
Yuchi Takayanagi, Panasonic System Solutions Japan Co., Ltd., Japan
Andras Cserepinszky, NKI LLC, Hungary

Mobility as a Service (MaaS) has gained tremendous attention since it was introduced in ITS Europe Congress in Helsinki 2014. Its common definition has been expanding to cover all innovative new mobility services and embrace the disruption as a whole. This works well in western cities, where the new services, aided by digitally-able clientele, the availability of travel data and infrastructures, as well as public-private collaboration mechanisms, find their natural habitat. However, the world outside western cities seems not to be yet touched by the magic of MaaS. This session aims to explore the applicability of MaaS to the other three segments in a quadrant consisting of Western cities, rural areas, developing countries and megacities in developing countries. Baseline and needs are clearly very different, but is there something in the thinking behind the MaaS concept that could be picked up and transferred, perhaps slightly modified, to ease the challenges in those areas? As a result of this session, we will have a better understanding of the aspects needing attention when developing MaaS for rural and developing areas.

Organiser:
Lidia Signor, ERTICO - ITS Europe
Moderator:
Zeljko Jeftic, ERTICO - ITS Europe
Speakers:
Roman Pison, World Bank, Austria
Carolin Capone, GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH, Thailand
Valene Leifer, Iona Mobility Rising, USA
So Morita, Tokyu Group, Japan
Vladimir Vorotovic, PTV Group, United Kingdom

Wednesday, 23 October 2019  |  14:00 - 15:30  |  Room 330
**SIS 34: IMPACT ASSESSMENT OF AUTOMATED VEHICLES ON TRAFFIC FLOW AND ENVIRONMENT**

**Wednesday, 23 October 2019 | 16:00 - 17:30 | Room 326**

Automated vehicle is expected to improve traffic flow and reduce traffic congestion and environment impact, but it can have negative impact depending on running performance of the vehicle or its deployment scenario. This session invites speakers from Europe, the US and Asia Pacific to introduce projects related to impact assessment of automated vehicles on traffic flow and environment and exchanges views on how should we introduce the new technology into the real world.

**Organisers:**
Takashi Oguchi, The University of Tokyo, Japan
Daisuke Oshima, Pacific Consultants Co., Ltd, Japan

**Moderator:**
Hisatomo Hanabusa, Tohoku University, Japan

**Speakers:**
Daisuke Oshima, Pacific Consultants Co., Ltd, Japan
Jaap Vreeswijk, MAP, traffic management, The Netherlands
Steven Shladover, the University of California PATH Program, USA
Hisato Hanabusa, i-Transport Lab. Co., Ltd, Japan

**Wednesday, 23 October 2019 | 16:00 - 17:30 | Room 327**

**SIS 35: TRANSFORMING FREIGHT MOVEMENT THROUGH ITS (TFMI) PART III: SMART MULTIMODAL URBAN FREIGHT AND LOGISTICS**

The session will present how ITS are changing urban freight operations and policies. Technological developments facilitate the optimisation of urban supply chains, especially the Internet of Things and tracking & tracing, automation and connectivity (in the warehouses as well as for freight vehicles), e-mobility, and on-demand delivery services. New technologies for the design and construction of logistics facilities in urban environments make it easier to consolidate urban freight flows and provide better tools for increasingly faster omni-canal deliveries. Traffic, parking and enforcement management systems open the way for more innovative and sustainable urban freight policies, effectively integrating freight into the smart city. Companies, from start-ups to very large groups, are designing new vehicles to deliver goods in cities, from cargo-bikes to urban barges to drones. Examples from around the world will be presented, showing the achievements but also the challenges of these new developments.

**Organisers:**
Bernard Jacob, IFSTTAR, France
Wen-Tung Chiu, Urban Redevelopment Authority, Singapore

**Moderator:**
Wen-Tung Chiu, Urban Redevelopment Authority, Singapore

**Speakers:**
Laetitia Dablanc, IFSTTAR, France
Joe Sun Lee, Korea Transport Institute, Republic of Korea
Eiichi Taniguchi, University of Kyoto, Japan
Genevieve Giulano, University of Southern California, USA
Tom Cherrett, University of Southampton, UK

**Wednesday, 23 October 2019 | 16:00 - 17:30 | Room 328**

**SIS 36: CONNECTING VEHICLE AND INFRASTRUCTURE AROUND THE WORLD**

This session discusses how Connected Vehicle deployments around the world have been implemented. The session will focus on lessons learned, data volumes, security, and converging technologies (i.e., DSRC and C-V2X/5G). Each deployment will share what worked, did not work, and what they would do again or change if they could. As one would expect, these deployments are generating massive amounts of data. Deployments will discuss how they are currently handling the data volumes and what future techniques they are considering for the future as the data volumes grow. Deployments will discuss the aspects of implementing security and challenges of making it work not only locally and nationally. Finally, as technologies are evolving, it is important that Connected Vehicle deployment work with providers to determine the path forward for integrating, merging, and migrating the technologies.

**Organiser:**
Steve Novosad, HNTB Corporation, USA

**Moderator:**
Steve Novosad, HNTB Corporation, USA

**Speakers:**
Bob Frey, Tampa-Hillsborough County Expressway Authority, USA
Marcus Welz, Siemens Mobility Inc., USA
Kyle Connors, Cisco Systems, USA
John Hibbard, Georgia Department of Transportation (GDOT), USA

**Wednesday, 23 October 2019 | 16:00 - 17:30 | Room 329**

**SIS 37: CITIZENS IN MOTION: WHO'S DRIVING YOUR FUTURE?**

The panel discussion will cover key findings from different global regions/cities based on Arcadis’ Citizens in Motion report including current connected and autonomous vehicles (CAV) activities and initiatives, challenges and opportunities, lessons learned and best practices, recommendations, potential approaches, and common themes. The research takes a practical look at 14 global cities (Asia – Dubai, Hong Kong, Singapore; Australia – Melbourne, Sydney; Europe – Amsterdam, Berlin, Brussels, Edinburgh, London, Paris, North America – Los Angeles, New York, San Francisco) to see how CAV might enable them to improve their mobility. The panelists are from different global regions – North America, Europe and Asia – providing local and valuable insights in their CAV eco-systems. The panel provides a strong platform for conversations that can lead to further exploration and influence for CAV planning by these and other global cities.

**Organiser:**
Michelle Long, ARCADIS, USA

**Moderator:**
Ahkil Chauhan, ARCADIS, USA

**Speakers:**
Richard Harris, Real ITS Global, UK
Manwan Abboud, ARCADIS, USA
Pete Costello, Iteris, Inc., USA
John Batten, ARCADIS, Hong Kong
Mark Keppens, ARCADIS, Belgium
Jensen Borst, TNO, The Netherlands
Raj Ponnaluri, Florida Department of Transportation (FDOT), USA
SIS 38: IMPLEMENTATION PROGRAMS OF CONNECTED AUTOMATED SHUTTLE AS URBAN PUBLIC & SHARED MOBILITY

Wednesday, 23 October 2019 | 16:00 - 17:30 | Room 330

This session demonstrates the worldwide programs of on-going programs in the cities with connected automated shuttle bus for utilizing first and/or last mile connectivity between different type of zones as a public or shared transport. Recently, it is reported that there are more than 50 cities in the world which have adopted a kind of automated driving shuttle to be tested as a new urban mobility to upgrade their conventional public transport systems. The potential feasibility of the connected automated shuttle bus would be discussed in this session with comparisons of different cases in the world in terms of connected and automated functions, mobility purposes, infrastructure cooperation, policies with regulation and legislation, etc.

Organiser: Young-Jin Moon, The Korea Transport Institute (KOTI), Republic of Korea
Moderator: Sangsoo Lee, Hanyang, Republic of Korea
Speakers: Young-Jin Moon, The Korea Transport Institute (KOTI), Republic of Korea
David Shen, Turing Inc., Chinese-Taipei
Charles Karl, Australian Road Research Board, Australia
Young Gi Song, SpringCloud Inc., Republic of Korea
Seesung Chae, Pire S&S Co., Republic of Korea

SIS 39: INTEGRATING 3D MOBILITY IN THE MAAS ECOSYSTEM

Thursday, 24 October 2019 | 09:00 - 10:30 | Room 325

Some of the most disrupting and upcoming transport means are Drones. In a near future, flying or even hybrid taxis may become an important means to transport both people and goods. This session discusses the possible blocking factors and impact of Drones integrated in the urban mobility of tomorrow. This mobility will be largely based on the Mobility as a Service paradigm where travelers won’t own the transport system but rather use it as a service. The session will focus on the impact of roboticized traffic systems such as Drones and automated vehicles on the planning of MAAS in the future urban and sub-urban regions. This evolution in transport systems also has a large impact on the infrastructure which must be available in a city. Finally, user acceptance but also privacy issues are important topics which will be discussed in this session.

Organiser: Pia Karjalainen, ERTICO - ITS Europe
Moderator: Pia Karjalainen, ERTICO - ITS Europe
Speakers: Sascha Westermann, Hamburger Hochbahn AG, Germany
Teru Vuorenmaa, Robots Expert Finland Oy, Finland
Klaas Neumann, Volocopter, Germany
Thiago Tavares, VA, Belgium
Claire Depre, European Commission

SIS 40: SHARING DATA FOR TRAFFIC INFORMATION BETWEEN ROAD AUTHORITIES AND SERVICE PROVIDERS

Thursday, 24 October 2019 | 09:00 - 10:30 | Room 326

Traffic data is the basis for exploring new ways of using traffic information as a tool for traffic management and for exploring new possibilities in relation to connected and automated vehicles, MAAS and smart cities with the aim of improving traffic safety and mobility. Read authorities and service providers have different goals, roles and business models in relation to traffic data. Read authorities typically have information on incidents on the roads and attach importance to all drivers receiving both safety related traffic information and information on incidents as quickly and correctly as possible in order to reduce the risk of accidents and improve mobility. Service providers develop traveler services and integrate a variety of different data sources. Service providers add significant value to the traffic information received from road authorities and provide drivers with a wide range of traffic and travel related services.

Organiser: Charlotte Nuamann Holstrom, Danish Road Directorate, Denmark
Moderator: Charlotte Vithen, Danish Road Directorate, Denmark
Speakers: Nicholas Cohn, TomTom, USA
Rick Schuman, INRIX, USA
John Wall, Austroads, Australia
Thomas Møller Thomsen, Federation of Danish Motorists – FDM, Denmark

SIS 41: DELIVERING ON PROACTIVE CONGESTION MANAGEMENT

Thursday, 24 October 2019 | 09:00 - 10:30 | Room 327

Over the last two decades we have seen a shift to a more multimodal approach towards traffic management, but the complexity and impacts of these challenges increase. In August 2018, the NSW government announced a $123m investment into Intelligent Congestion Management Program (ICMP), targeting integration of operational information of all modes, increasing coordination and information available to end users. This session includes speakers involved in the delivery of the ICMP project including Transport for NSW, Cubic Transportation Systems and WSP. The discussion will also focus attention on the wider challenges being experienced globally in our cities, and will include perspectives from Australia, USA, New Zealand and Scandinavia.

Organiser: Scott Benjam, WSP, Australia
Moderator: Scott White, Transport for NSW, Australia
Speakers: Chris Bay, Cubic Transportation Systems Ltd, Australia
Matthew Gallaughet, WSP Australia, Australia
Andy Hooper, WSP-OPLUS, New Zealand
Stefan Myhrvarg, Ericsson, Sweden
The ITS sector is actually confronted with an advent of new transport technologies and solutions. AI, automation, multimodal platforms, micro-mobility and many more. Infrastructure will still be our common baseline. What kind of new functions are needed to match those new demands in an effective way. How do we digitalize our infrastructure or even build a new Digital Transport Infrastructure (DTI) layer? The session will come forward with a common definition of our future DTI. It will also highlight specific goals and ambitions of industries, sectors-coupling (ICT, energy, ..), robustness, ready for automation. How could a future proofed functional framework look like – what should be the basic/core elements, functionalities and applications. The participants will share good practice (technically, organisational, sector-coupling (ICT, energy, ..), robustness, ready for automation) and discuss a common way & outreach for future initiatives.

**Organiser:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Moderator:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Speakers:**
- Yosuke Hirakawa, Maas Tech Japan, Japan
- Sams Sahala, Forum Viini, City of Helsinki, Finland
- Søren Sørensen, SFMCON ApS, Denmark
- Carol Kuester, Metropolitan Transportation Commission, USA

**SIS 44: ARTIFICIAL INTELLIGENCE AND CLOUD COMPUTING DRIVE THE DIGITAL TRANSFORMATION OF ITS INDUSTRY**

Time lost in lengthy commutes wastes energy and the valuable time of citizens and businesses, negatively impacting an economy and lowering overall productivity. The digital transformation to cloud-based technologies can help resolve these challenges, improving the attractiveness of cities to inward investment and improve the quality of life for everyone living or visiting the city. As populations continue to grow and the trend to city migration continues, the topic of transportation and urban mobility becomes one of the largest challenges faced by civic leaders to the sustainable economic growth of their urban centers. Siemens, Microsoft and Dell are 3 market leading companies active in their individual domains driving the future of the ITS industry and enabling the digital transformation of Urban Mobility to provide innovative business and technology answers to the aforementioned challenges.

**Organiser:**
Hendra Tjioe, Siemens Mobility Pte Ltd, Singapore

**Moderator:**
Steffen Endler, Siemens Pte Ltd, Singapore

**Speakers:**
- Fred Kalt, Siemens Mobility Pte Ltd, Singapore
- Charles Savoie, Dell EMC, Australia
- Holger Kani, Microsoft, Germany

**SIS 45: PLANNING, DESIGN AND APPLICATION FOR AUTONOMOUS MOBILITY: INTERNATIONAL PERSPECTIVES**

This session will address the planning, design and application for autonomous mobility from integrated and international perspectives. From Singapore, the session will feature the planning, design, and simulation of an “autonomous district” including understanding how autonomy might impact urban form and how urban design and planning can steer the impact of autonomy in planning a new city; details of simulation modeling approaches designed to understand autonomy’s impacts on vehicular ownership, travel behavior, parking and residential choices; the latest integrated urban design experiments and agent-based land-use sketch planning. The application of dynamic autonomous rapid transit (DART) in Singapore as well as Toyota e-Platform in Japan will also be discussed. From European perspective, the session will address the planning for automated vehicles. Finally, from USA, the session will feature an initial analysis of a new data set on how the top 600 cities in the USA are exploring the issue of autonomy.

**Organiser:**
Bingran Zuo, SMART Future Urban Mobility, Singapore

**Moderator:**
Chris Zegras, MIT, USA

**Speakers:**
- Chris Zegras, MIT, USA
- Pierre Fourni, SEC Future Cities Lab, Singapore
- Tanvi Maheshwari, SEC Future Cities Lab, Singapore
- Zain I A Abedin, TUMCREATE, Singapore

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**SIS 42: MAAS: SHOULD MOBILITY CHOICES, CITY GOALS AND PRIVATE SECTOR OPPORTUNITIES BE BALANCED?**

**Thursday, 24 October 2019 | 09:00 - 10:30 | Room 328**

With the focus of Mobility as a Service (Maas) being primarily on customers, how can a city or region be sure that customers will make mobility choices that meet the city’s goals? Further, is it the city or region’s job to provide an environment in which the private sector can compete in offering either a mobility platform or mobility services, such as bike sharing. It has been suggested that this balance should be part of the eventual governance of Maas, but there is not enough evidence to support this premise yet. This session will discuss the positive and negative aspects of this balance and whether such a balance should be considered in the future.

**Organiser:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Moderator:**
Carol Schweiger, Schweiger Consulting LLC, USA

**Speakers:**
- Zain Ul Abedin, TUMCREATE, Singapore
- Tanvi Maheshwari, SEC Future Cities Lab, Singapore
- Pieter Fourie, SEC Future Cities Lab, Singapore
- Chris Zegras, MIT, USA

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**SIS 43: DIGITAL TRANSPORT INFRASTRUCTURE - DEFINITIONS, ELEMENTS AND FUNCTIONS**

**Thursday, 24 October 2019 | 09:00 - 10:30 | Room 329**

The ITS sector is actually confronted with an advent of new transport technologies and solutions. AI, automation, multimodal platforms, micro-mobility and many more. Infrastructure will still be our common baseline. What kind of new functions are needed to match those new demands in an effective way. How do we digitalize our infrastructure or even build a new Digital Transport Infrastructure (DTI) layer? The session will come forward with a common definition of our future DTI. It will also highlight specific goals and ambitions of industries, operators and on policy level. How is the alignment and prioritisation of goals handled in different regions (e.g. Infrastructure-Fitness, sector-coupling (ICT, energy, ..), robustness, ready for automation). How could a future proofed functional framework look like – what should be the basic/core elements, functionalities and applications. The participants will share good practice (technically, organisational, financing) and discuss a common way & outreach for future initiatives.

**Organiser:**
Martin Russ, AustriaTech, Austria

**Moderator:**
Martin Böhm, AustriaTech, Austria

**Speakers:**
- Martin Rus, AustriaTech, Austria
- Valérie Shuman, Shuman, USA
- Marid Sane, The University of Melbourne, Australia
- Satoru Nakao, University of Tokyo, Japan
- Ahmed Nazer, HERE, Belgium
SIS 47: PUTTING ITS IN ITS PLACE: PLACE CENTRIC APPROACH TO TECHNOLOGY DEPLOYMENT
Thursday, 24 October 2019 | 11:00 - 12:30 | Room 327

We as an industry are preoccupied with chasing the latest new technology. But isn’t focussing on improving people’s lives and the places where we live, work and play more important? And that is what happens when you take a Place lens to looking at Intelligent Transport Systems (ITS). In our session, we will use Place as an ordering principle to consider ITS. This means adopting a cumulative view of ITS technologies anchored in place and anchored in what makes sense for people. We will explore multimodal transport for people and transport in a place-setting, to consider – how do we plan and design future ready places?

Organiser: Graham Pointer, WSP Australia, Australia
Moderator: Graham Pointer, WSP Australia, Australia
Speakers: Mary Haverland, WSP Australia, Australia
Richard Price, Lendlease, Singapore
Peter Colacino, Infrastructure Australia, Australia

SIS 46: AN IN-DEPTH UPDATE ON THE UNITED STATES FIRST SMART CITY: COLUMBUS, OHIO
Thursday, 24 October 2019 | 11:00 - 12:30 | Room 326

At a high level, most of us understand the various technologies that comprise a “smart city”. But how should these solutions be deployed and integrated into the communities in which we live? This session will examine the disruption caused by these solutions, and how cities and regions can plan for the deployment of these technologies, regardless of their current level of technology adoption. The session will include an in-depth look at Columbus OH and the approaches they have taken in deploying their smart city projects, as well as other success stories from around the world. The session will include short presentations from each speaker, followed by 30-40 minutes of moderated discussion and open audience question and answer. Topics for Presentation:
1. Sustainability is Adaptability
   Speaker: Christian Chenard-Lemire, Genetec Inc., Canada
2. What is ITS Utopia?
   Speaker: Jim Barbaresso, HNTB, USA
3. Challenges and Lessons Learned from the U.S. First Smart City
   Speaker: Mandy Bishop, Columbus

Organiser: Diane Newton, HNTB, USA
Moderator: Diane Newton, HNTB, USA
Speakers: Christian Chenard-Lemire, Genetec Inc., Canada
Jim Barbaresso, HNTB, USA
Mandy Bishop, City of Columbus, USA

SIS 48: TOWARDS A SUSTAINABLE TECHNOLOGY DRIVEN PORT CITY
Thursday, 24 October 2019 | 11:00 - 12:30 | Room 328

Ports play a substantial role in the European economy and development, as nearly 75% of trade is handled in ports. However, their low adaptation level to future expansion and intensified interactions with the hinterland, hinders them from realising their full growth potential. The constant evolving port development makes it necessary to shift economies and social structures towards more sustainable models. The goal of this session is to bring ports and public authorities around the world together, to identify means that will facilitate the transition of ports to a more sustainable profile. The session will offer the opportunity to debate on current needs and future challenges and gather key insights on disruptive innovations in port-city operations and on possible means for boosting multi-modality. In particular, the session will delve into current trends and technological innovations which can lead to a sustainable relationship between ports and their surrounding cities.

Organiser: Thomas Dessilles, ERTICO - ITS Europe
Moderator: Angelo Armentis, ICCS, Greece
Speakers: Alessio Picco, CIRCLE S.p.A, Italy
Alexandre Tardo, CNT, Italy
Phanthian Zuesongham, Hamburg Port Authority, Germany
Meng Lu, Dyning, The Netherlands
Yingrong Wei, Deltas, The Netherlands
Tan Tiam Her, PSA International, Singapore

SIS 49: CIRCULAR ECONOMY - HOW TO APPLY “REDUCE, REUSE, RECYCLE” PRINCIPLES TO TRANSPORTATION AND ASSESS THE IMPACTS?
Thursday, 24 October 2019 | 11:00 - 12:30 | Room 329

The transport sector still has a good way to go to be in tune with circular economy and sustainable development principles. But solutions are emerging, including clean fuels, multimodal and shared mobility solutions and streamlining the whole production chain according to Circular Economy’s “reduce, re-use and recycle” principles. In particular Mobility-as-a-Service, (MaaS), aiming at optimisation and more efficient use of transport systems can be as a comprehensive response to the call of the circular economy – it builds on the existing services, but upgrades the ways they are combined, integrated and consumed reducing inefficiencies in the system. This session discusses MaaS and other potential streams of transport sector (shared mobility services, fuels from recycled materials, resource efficient manufacturing) in the Circular Economy framework, introduces some of the services and business models available and explores how they should be approached in policy-making. It also explores how the environmental impacts and compliance could be assessed and discusses the need of creation of harmonised framework for the evaluation of the impacts.

Organiser: Piia Karjalainen, ERTICO - ITS Europe
Moderator: Piia Karjalainen, ERTICO - ITS Europe
Speakers: Kristin Huhtala-Jenks, MaaS Global, Finland
Mengxi Chen, Didi Global, China
David Adelman, Via, USA
Jean-Charles Pandiace, ERTICO - ITS Europe
Dasuke Oshima, Pacific Consultants Co., Ltd, Japan
SIS 50: POSSIBLE ACTIONS FOR PUBLIC AUTHORITIES AND CITIES TO FACILITATE AUTOMATED DRIVING
Thursday, 24 October 2019 | 11:00 - 12:30 | Room 330

Most roadmaps and action plans published by policy makers and national authorities that aim at bringing automated driving to the roads are predominantly focussing on expected benefits that AD will bring. AD under real life conditions however, especially when dealing with mixed traffic, poses serious challenges and many authorities are exploring how they can anticipate and facilitate a successful transition. Cities in particular remain cautious due to uncertainties about market uptake, the overall impact on mobility and their influence on AD developments. The EC-funded CARTRE and ARCADE projects have collected and analysed a large selection of roadmaps, action plans, pilots and test sites to identify areas where strategic alignment across governments and stakeholders could be beneficial. Public authorities and city representatives will discuss the findings, their own approaches and suggested actions in an interactive setting with the audience, to prioritise them and identify which actions will have the largest impact.

Organiser:
Stephanie Dreher, ERTICO – ITS Europe

Moderator:
Ludger Rogge, European Commission DG Research & Innovation

Speakers:
Jaap Vreeswijk, MAP traffic management, The Netherlands
Martin Russ, AustraTech, Austria
Toshihiro Sugi, National Police Agency, Japan
Suzanne Hoadley, Polis Network, Belgium
Bill Sowell, INF ITS Committee, USA
Kirsten McKillop, NTC Australia, Australia

SIS 51: TESTING METHODOLOGIES FOR AUTOMATED DRIVING SYSTEMS
Thursday, 24 October 2019 | 14:00 - 15:30 | Room 326

There are many testing approaches being investigated to assess the performance of ADs to include hardware/software in-the-loop, virtual environment simulation, scenario based testing, and real world mileage accumulation. Each has advantages and disadvantages. This session will explore several of these testing approaches from different parts of the world.

Organiser:
Ryan Lamm, Southwest Research Institute (SwRI), USA

Moderator:
Ryan Lamm, Southwest Research Institute (SwRI), USA

Speakers:
Siddhartha Khastgir, Warwick Manufacturing Group, UK
Peter Burns, Transport Canada, Canada
Hitoshi Watanabe, Yamaha Motor Co., Ltd., Japan
Blaine Leonard, Utah Department of Transportation, USA

SIS 52: NEW ORGANIZATION PARADIGM FOR FOSTERING COOPERATION BETWEEN ORGANIZATIONS
Thursday, 24 October 2019 | 14:00 - 15:30 | Room 327

There is a need to quickly cooperate as we rapidly deploy disruptive technologies for mobility, transport systems, smart cities, and sustainable transportation. Consequently, there is a convergence between public and private sector decisions that impact our communities and our institutions that require new policy-making mechanisms, greater cooperation, and new tools to deal with the societal impact. What are the new organizational paradigms needed to address these changes? Some questions we might ask are: How can we create an environment that promotes cooperation, collaboration, and research for deploying safe and secure ITS systems? How can we improve better coordination and work across multiple organizations and stakeholders? This special interest session will engage speakers and attendees in an interactive format. We’ll start with an expert panel and their observations. The facilitator will then engage the audience in the discussion. Come prepared with your ideas and questions.

Organiser:
C Douglass Couto, Independent Consultant, USA

Moderator:
C Douglass Couto, Independent Consultant, USA

Speakers:
Valmiki ‘Val’ Mukherjee, Cyber Future Foundation, USA
Mark C. Kopko, Pennsylvania Department of Transportation (PennDOT), USA
John Perachio, Perachio & Company, LLC, USA

SIS 53: INTERNATIONAL CITIZENS’ DEBATE ON AUTOMATED MOBILITY: WHAT DO THE CITIZENS’ WANT?
Thursday, 24 October 2019 | 14:00 - 15:30 | Room 328

Citizens, as the main stakeholders affected by the impact of Connected and Automated Driving are rarely included in discussions aimed at defining roadmaps, strategies and policies from cities or authorities. Several debates organised last year in France have shown that the expectations and requirements from citizens are often far away from those formulated by experts and not necessarily in line with strategies defined by authorities. This session will present the first results of a series of Citizens debates organised in about 40 cities in Europe, US, Canada and Singapore, as well as the views from cities and the findings from research activities and workshops carried out in the frame of the EC-funded projects CARTRE and ARCADE. Selected informed citizens will discuss with representatives from authorities and other stakeholders in an interactive setting about the needs, expectations, fears, and the “red lines” for citizens on the future of mobility.

Organisers:
Tiphéri Durand-Fleury, Missions Publiques, France
Stephanie Dreher, ERTICO – ITS Europe

Moderator:
Yves Mathieu, Missions Publiques, France

Speakers:
Stephanie Dreher, ERTICO – ITS Europe
Martin Russ, AustraTech, Austria
Lynette Cheah, Singapore University of Technology and Design, Singapore
Scheherazade Zein, Keolis, France
Albus Offergeld, Michelin, France
Hennette Cornet, TUMCREATE, Singapore
SIS 54: TOWARDS AN OPTIMISED MOBILITY SYSTEM: INTEGRATING TRAFFIC MANAGEMENT AND MAAS

Thursday, 24 October 2019 | 14:00 - 15:30 | Room 329

Traffic Management is the task of managing and optimising road capacity: the speed, volume and direction of traffic. With technological and organisational developments brings new opportunities to manage all types of traffic better, namely closer cooperation between service providers and road operators. This collaboration is predominately limited to re-routing of traditional car traffic but cities are increasingly developing multimodal transport systems and better information and re-routing functionalities for all transport modes and users is required. As such, the need for more integrated multimodal traffic management becomes clearer. But what is needed and by whom to make this a reality? What are the differences and similarities region to region? This session will explore how the TM2O and Maas concepts can support one another and enable better optimised mobility systems. In addition, the associated bottlenecks and enablers of building such synergies will be discussed, bringing a new perspective on Maas and TM2.0.

Organiser:
Stephanie Leonard, TomTom, Belgium

Moderator:
Johanna Tzanidaki, ERTICO - ITS Europe

Speakers:
Stephanie Leonard, TomTom, Belgium
Pia Kjaerulff, ERTICO - ITS Europe
Mohit Sindhwani, Quantum Inventions, a company of Continental Corporation, Singapore
Guilia Devirolli, Sweco, Italy
Eduardo Felici, Ministry of Infrastructure and Water Management, The Netherlands

Carol Schweiger, Schweiger Consulting LLC, USA

SIS 55: PROSPECTS OF A 5G REFERENCE FRAMEWORK FOR CCAM

Thursday, 24 October 2019 | 14:00 - 15:30 | Room 330

5G will boost Cooperative, Connected and Automated Mobility (CCAM) with Cellular V2X (C-V2X) and network slicing enabling delivery of targeted 5G New Radio features for CCAM through a dedicated automotive slice. 5G will not only extend the reach of connectivity (including via satellite) it will also make it more flexible through features like ultra-Reliable Low Latency Communications (uRLLC) for safety-critical services (e.g. cooperative manoeuvres, autonomy failures, cyberattacks, remote-intervention needs), massive Machine Type Communications (mMTC) for seamless integration of CAVs into massive-IoT; enhanced Mobile Broadband (eMBB) for infotainment needs. Dynamic connectivity is pivotal in creating business cases using 5G technologies for CCAM. The emerging business models will require a one another and enable better optimised mobility systems. In addition, the associated bottlenecks and enablers of building such synergies will be discussed, bringing a new perspective on Maas and TM2.0.

Organiser:
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic

Moderator:
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic

Speakers:
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic

SIS 56: ACCESSIBLE AND EQUITABLE MOBILITY: CAN THIS BE ACCOMPLISHED WITH MAAS?

Thursday, 24 October 2019 | 16:00 - 17:30 | Room 326

While many discussions about the future of mobility say that it is shared, electric, autonomous and connected, accessibility and equity are often omitted from this utopian view. It is imperative that mobility - regardless of how it is powered and how it is integrated - is accessible to all (including persons with disabilities and older persons), and equitable, meaning it is available to all irrespective of a traveler’s demographic. This session will explore how accessibility and equity are being considered in the new mobility ecosystem, particularly in schemes that are technology-enabled, such as Mobility as a Service (Maas). Examples include providing methods by which the “unbanked” or those without smartphones can access Maas, as well as ensuring that the “complete trip” offered by Maas will be fully accessible to persons with disabilities and older persons.

Organiser:
Carol Schweiger, Schweiger Consulting LLC, USA

Moderator:
Carol Schweiger, Schweiger Consulting LLC, USA

Speakers:
Rob Lake, Great Community Transport, Australia
Renée Autumn Ray, Conduent, USA
Pia Kjaerulff, ERTICO - ITS Europe, Belgium
Sadaki Horino, Research Institute for Well-informed and Risk-free Transportation (KU-WIRF), Kanagawa University, Japan

SIS 57: COLLABORATIVE ITS – CHALLENGE FOR THE FUTURE INTEGRATED MOBILITY

Thursday, 24 October 2019 | 16:00 - 17:30 | Room 327

The SIS are organised at the request of groups of experts developing and deploying ITS, these interactive, tailor-made sessions provide the opportunity to focus on specific topics of interest. According to the three Congress pillars – Programme, Exhibition and Demonstrations the Shift2Rail EU Executive Director Carlo Borghini and the Chairman of the Shift2Rail EU States Representatives Group Miroslav Haltuf would like to present how the railway research and innovation community the railway operation community and rail supply industry contribute to the cooperation and integration of the entire railway sector into ITS based on principles of multimodality and interoperability. These are the main objectives based on which the Shift2Rail EU is working in close collaboration with ERTICO - ITS Europe on Request of a dedicated SIS.

Organiser:
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic

Moderator:
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic

Speakers:
Carlo Borghini, Shift2Rail Joint Undertaking, EU
Jacob Bangsgaard, ERTICO - ITS Europe
Miroslav Haltuf, H-Comp Consulting / Shift2Rail, Czech Republic
Riccardo Santoro, Ferrovie dello Stato Italiane S.p.A, Italy
Martin Pichl, Ministry of Transport, Czech Republic
Vaclav Kobera, Ministry of Transport, Czech Republic

28th ITS World Congress Singapore 2019 | 21-25 October Preliminary Programme

www.itsworldcongress2019.com #ITSWC19
The objectives of this presentation will be to:
1) Present a new wave of on-demand transit P3s around the world;
2) Discuss insights from the massive amounts of data being analysed;
3) Help operators become more competitive in a rapidly shifting environment; and
4) Discuss how these projects work towards a vision of Mobility as a Service (MaaS).

SIS 58: THE POWER OF SHARED MOBILITY TO MAKE CITIES MORE LIVABLE
Thursday, 24 October 2019 | 16:00 - 17:30 | Room 328

Public transport agencies and operators are facing increased competition from the boom in new mobility. To make matters worse, most new mobility entrants prioritize on-demand private rides – not shared – which has overwhelmed cities with increased congestion. This session will demonstrate that partnerships between technology companies and public transport concessionaires are the key to reversing ridership losses and combating congestion. Featuring leaders from Via, Keolis, Go-Ahead, HP Transportes, and MaaS Alliance, the panel will explore how global transport operators are turning to innovative mobility technology solutions to reimagine their services for future sustainability. The objectives of this presentation will be to:

- Present a new wave of on-demand transit P3s around the world;
- Discuss insights from the massive amounts of data being analysed;
- Help operators become more competitive in a rapidly shifting environment; and
- Discuss how these projects work towards a vision of Mobility as a Service (MaaS).

Organiser:
David Adelman, Via, USA
Moderator:
Representative from ERTICO - ITS Europe
Speakers:
Andrew Edwards, Go-Ahead Singapore, Singapore
Scheherazade Zekri, Keolis, France
Thiago Araújo, HP Transportes Coletivos, Brazil
David Adelman, Via, USA

SIS 59: PATHWAY TO AUTOMATION
Thursday, 24 October 2019 | 16:00 - 17:30 | Room 329

With an increasing number of automated vehicle deployment programs, a dialogue is needed on what is different and similar for these deployment efforts. The session will focus on how the deployment of truck automation is different from light vehicle automation which is different from shuttle deployment. Session would have 2-3 min “opening statement” (no slides) and then roundtable. Deployment leaders from around the world will compare and contrast the different types of deployments. Time will be devoted to discuss what’s next in the rollout of this technology once the trials are complete.

Organiser:
Ryan Lamm, Southwest Research Institute (SwRI), USA
Moderator:
Ryan Lamm, Southwest Research Institute (SwRI), USA
Speakers:
Paul Jennings, University of Warwick, UK
Thiago Araújo, HP Transportes Coletivos, Brazil
Scheherazade Zekri, Keolis, France
Andrew Edwards, Go-Ahead Singapore, Singapore

SIS 60: SECURE ITS FRAMEWORK – STANDARDIZED SECURE COMMUNICATIONS FOR ALL ITS USE CASES
Thursday, 24 October 2019 | 16:00 - 17:30 | Room 330

Secure, trusted interoperability for Cooperative ITS is vital. Until now, there has been tension between trust in the reliability, security, and privacy of systems, versus access and sharing data between services. Deployers have been required to develop ad-hoc solutions with little support, making it hard to deploy robust systems and hindering the ability of ITS to live up to its potential. The solution – an architecturally coherent, globally standardized approach to access control security – is now defined in standards. The ramifications for ITS are significant. In this panel, international experts (Knut Evensen, Q-Free; William Whyte, OnBoard Security; Gianmarco Baldini, JRC; Jonathan Harrod Booth, Consultant) will explain the value, the user experience, the necessary support services, and the global reach of this new approach. Attendees will gain an understanding of the approach and how they can use it to enable new services of their own.

Organisers:
Knut Evensen, Q-Free ASA, Norway
Jonathan Harrod Booth, Harrod Booth Consulting, UK

Moderator:
Dick Schaakse, Transcore, USA
Speakers:
Knut Evensen, Q-Free ASA, Norway
Gianmarco Baldini, European Commission’s Joint Research Centre, Ispra, Italy
William Whyte, On Board Security, USA
Young-Jun Moon, The Korea Transport Institute (KOTI), Republic of Korea

SIS 61: TRAFFIC SIGNAL CONTROL & MANAGEMENT FOR CONNECTED & AUTOMATED DRIVING SYSTEMS
Friday, 25 October 2019 | 09:00 - 10:30 | Room 327

This session will discuss how to develop the technologies for the next generation traffic signal control and management for connected and automated driving systems (CADS) utilising information and communication technology to detect the vehicles approaching the intersections instead of the conventional detectors. The detection technology might include the connected vehicle with V2X communication and a few promising sensors installed in the infrastructure. New hardware and software systems are integrated with an innovative concept of control and management algorithms. A methodology of how to test a system on the road will be discussed in terms of performance measures to be evaluated and validated.

Organiser:
Young-Jun Moon, The Korea Transport Institute (KOTI), Republic of Korea

Moderator:
Young-Jun Moon, The Korea Transport Institute (KOTI), Republic of Korea

Speakers:
Sangyuon Lee, Hanyang, Republic of Korea
Jungtae Woo, The Korea Transport Institute (KOTI), Republic of Korea
Jae Hyung Park, Meta, Republic of Korea
Daesung Park, Maersk Korea, Republic of Korea
Yunhee Cho, Chemtronics, Republic of Korea
SIS 63: ITS FOR LIFE II

Friday, 25 October 2019 | 09:00 - 10:30 | Room 329

ITS is an enabler − not just for improving transportation, rather, for improving ‘life’. The explosion of data, the numerous data sources that have emerged, the incredible number of information distribution systems in existence today provide us with a revolutionary means to positively affect life well beyond just transportation. The second session in this series will continue to explore how we enter a gateway that have emerged, the incredible number of information distribution systems in existence today provide us with a revolutionary means to positively affect life well beyond just transportation. The second session in this series will continue to explore how we enter a gateway that have emerged, the incredible number of information distribution systems in existence today provide us with a revolutionary means to positively affect life well beyond just transportation. 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As the fastest growing economy and contributing to half of the world’s population (4 billion people), Asia-Pacific with its ever evolving socio-economic fabric presents us with many unique and challenging characteristics. Three out of five of its population are millennials, which have been known to have very different views and preferences for mobility solutions. Asia Pacific is also starting to make strong inroads in the forefront on innovation as observed from the increased numbers of unicorn start-up companies. With its population’s propensity to consume information and online services, which also correlates to the fact that Asia Pacific has the largest amount of data transferred on the Internet, Asia Pacific region is expected to have increasing demand and expectation to improve and provide diversity of mobility solutions. In 2017, the Asian Development Bank reported that an investment of USD 1.7 trillion/year in infrastructure was required to sustain the economic growth in this region. In this same report, the transport sector investment was ranked as the second after the energy sector. To support continuous economic growth, the investment in infrastructure of the transport sector was identified as an essential investment to mitigate congestions and traffic accident, which are still common issues in this region. In this session, distinguished speakers from the prominent international institutions are invited to discuss and provide their perspective on the necessary technologies, infrastructure, innovation eco-system, international and national cooperation, policy making and financing schemes to support the expected growth.

**Organiser:**
Kian Keong Chin, Land Transport Authority, Singapore
Moderator:
Kian Keong Chin, Land Transport Authority, Singapore
Speakers:
Young Tae Kim, International Transport Forum-ITF
Bambang Susatono, Asian Development Bank-ADB
An invited speaker from United Nations
An invited speaker from World Bank

**AP 02: ADVANCED TECHNOLOGIES FOR OPERATION AND MAINTENANCE OF ITS FACILITIES**

**Tuesday, 22 October 2019 | 14:00 - 15:30 | Nicoll 2**

ITS deployment has been widely spread for past decades in both developed and developing countries. The operation and maintenance of ITS facilities has become more and more important since it hurts social benefit considerably once a major function failure occurs. Effective and efficient maintenance is also important for road operators to save the cost to conserve ITS facilities. There are a number of advanced technologies and methods through data analysis and/or sensor technology developed for preventing failure. This session will cover both of social and technical aspects. Speakers from Japan, Singapore and Malaysia will present the most recent research to estimate social economic loss by the failure of ITS facilities and their advanced preventive maintenance projects. Audience can share the significance, of social and technical aspects. Speakers from Japan, Singapore and Malaysia will present the most recent research to estimate social economic loss by the failure of ITS facilities and their advanced preventive maintenance projects. Audience can share the significance, of social and technical aspects. Speakers from Japan, Singapore and Malaysia will present the most recent research to estimate social economic loss by the failure of ITS facilities and their advanced preventive maintenance projects.

**Organiser:**
Takahiro Azuma, West Nippon Expressway Facilities Company Limited, Japan
Moderator:
Masao Kawaihara, Tohoku University, Japan
Speakers:
Yotaro Naga, West Nippon Expressway Company Limited, Japan
Yap Hwee Khing, Land Transport Authority, Singapore
Daisuke Mitsuishi, Tohoku University IRIDies, Japan
Masao Numata, West Nippon Expressway Company Limited, Japan
Mitsuuru Nakashima, West Nippon Expressway Company Limited, Japan
Khairil Anwar Abu Kassim, Malaysian Institute of Road Safety Research (MIROS), Malaysia

**AP 03: TRAFFIC STATES AND ENVIRONMENT SENSING BY VARIOUS MANNERS**

**Tuesday, 22 October 2019 | 16:00 - 17:30 | Nicoll 2**

Traffic states and environment sensing is the key for traffic monitoring. Conventionally traffic volume sensing is the focusing point for traffic flow control. Although sensing devices from road side unit are the main and reliable tool for volume estimation, various types of probe data from vehicles, not only using GPS location data and vehicle data such as speed, are becoming popular by deploying statistical approaches to historical probe data. There need discussions how to incorporate probe data into reliable road side data. However, various indirect factors such as bikes disturbing traffic, pedestrian flowing out from events to roads, abnormal unexpected weather and limited traffic information after disasters must be also considered. This session will try to bring various sensing approaches to detect traffic states or environment which effect traffic flow and to discuss in wider range their advantages and disadvantages how they will benefit for drivers.

**Organiser:**
Nobuyuki Ozaki, Toshiba Infrastructure Systems & Solutions Corporation, Japan
Moderator:
Nobuyuki Ozaki, Toshiba Infrastructure Systems & Solutions Corporation, Japan
Speakers:
Yu-Wei Chen, Advanced Public Transportation Research Center, Chinese-Taipei
Ryota Horiguchi, i-Transport Lab. Co., Ltd, Japan
AP 05: TESTING AND VALIDATING AUTONOMOUS VEHICLES USING TRAFFIC SIMULATION

Wednesday, 23 October 2019  |  14:00 - 15:30  |  Nicoll 2

Before testing connected and autonomous vehicles (CAVs) in real traffic on public test areas such as in Karlsruhe, Germany, virtual testing of these test areas using traffic simulation accelerates the development. Advanced traffic simulation models simulate all modes, such as individual human drivers, cyclists, pedestrians and different CAV behaviour, which allows testing under different vehicle/driver populations.

Organiser:
Summer Chew, PTV Group, Singapore

Moderator:
Omid Ejlali, PTV Group, Singapore

Speakers:
Niels de Beer, Nanyang, Sing
Thomas Benz, PTV Group, Germany
Andrey Bordinchuk, Deloitte China, China
Yuich Kitagawa, Toyota Motor Corporation, Japan

AP 06: AUTONOMOUS DRIVING INTELLIGENCE SYSTEM AND FUTURE CHALLENGES OF ADAS IN URBAN ENVIRONMENTS

Wednesday, 23 October 2019  |  16:00 - 17:30  |  Nicoll 2

As an innovation of driver assistance technology, this main core of the session is based on the research project aiming to develop "Autonomous Driving Intelligence System" to prevent risk of accidents and enhance driving safety for elderly drivers in order to improve QoL and vitalise the aged society. The session is also planned to integrate the related researches in wide international spectrum in order to exchange the latest information from speakers about the advanced technology development and technical challenges in the context of advanced driver assistance systems.

The key technologies in the session include
1. sensor fusion and localisation;
2. risk prediction; and
3. human machine interface.

Challenges in crash avoidance in complex scenario, e.g. intersections will be addressed and Field operational test (FOT) in urban area will be shown. HMI design to realise good cooperation with ADAS is also an important issue to increase driver acceptance.

Organiser:
Pongpitham Raksincharnsak, Tokyo University of Agriculture and Technology, Japan

Moderator:
Pongpitham Raksincharnsak, Tokyo University of Agriculture and Technology, Japan

Speakers:
Shintaro Inoue, Toyota Motor Corporation, Japan
Hide Inoue, Kanagawa Institute of Technology, Japan
Takuma Ita, The University of Tokyo, Japan
Yik Diew Wang, Nanyang University of Technology, Singapore
Roman Herzi, Technical University of Braunschweig, Germany
Shengfa Li, Tsinghua University, China
Xiupeng Shi, Nanyang Technological University, Singapore
Chao Chen, Tongji University, China

AP 07: CROWD MOVEMENT ANALYSIS AND MODELLING

Thursday, 24 October 2019  |  09:00 - 10:30  |  Nicoll 2

Urban cities have known a significant increase in their number of inhabitants in the last years. Managing the movement of large masses of travellers on a daily basis is a true challenge for any traffic agency that needs to provide reliable and timely public transport modes, easy pedestrian access and walkable paths and good interconnectivity and flexibility for both public and private travel trips. This session aims at presenting innovative methods for modelling the public transport movement (mode and route choice), analysing the pedestrian walking movement and the impact of public transport disruptions on the travel mode selection. Predicting the number of affected passengers under major public transport disruptions represents a high priority for any traffic management centre which needs to better plan any efficient replacement services. The session addresses these challenges by inviting various international experts in crowd movement and predictive solutions applied to large urban areas.

Organiser:
Adriana-Simona MIHAITA, DATAGI|CSIRO, Australia

Moderator:
Chen Cai, DATAGI|CSIRO, Australia

Speakers:
Christopher Bertoty, DATAGI|CSIRO, Australia
Mo Li, School of Computer Science and Engineering, Nanyang Technological University (NTU), Singapore
Muhammad Afzal, ATSTAR, Singapore
Paul Rybicki, DSpark, Australia

AP 08: CHALLENGES AND OPPORTUNITIES FOR PERSONAL MOBILITY DEVICES IN SMART CITIES

Thursday, 24 October 2019  |  11:00 - 12:30  |  Nicoll 2

Personal mobility devices (PMDs) have been regarded as sustainable transportation for catering the first-and-last mile trip in many cities. In this session, we invite experts from the academia, industry and government to share their insights and experiences regarding its challenges and opportunities. For example, PMD users and pedestrians often share the same space due to existing provisions and infrastructure, hence accidents on the footpaths have continued to rise. PMDs can also be provided by a third-party operator and shared with the general public. It would require not only an intelligent reservation system to fulfil the inherent supply and demand problem, but also an innovative solution to address the redistribution issue, especially during peak hours and in areas with high traffic volumes. Through a discussion of relevant stakeholders, this session promises to come up with a better mobility experience in future smart cities.

Organiser:
Marcia Mayer, Schaeffler, Singapore

Moderator:
Justin Dauwels, Nanyang Technological University, Singapore

Speakers:
Je-Yu Kuo, Nanyang Technological University, Singapore
Benaya Christo, Schaeffler, Singapore
Sarah Cheang, Land Transport Authority, Singapore
Jasmina Sami, Scootbe, Singapore
Ke Sim, Chalwins, Singapore
Anna Ooi, MobilityX, Singapore
Joe Hui Low, Land Transport Authority, Singapore
**ASIA–PACIFIC REGIONAL STREAM**

**AP 09: BEYOND PREDICTIVE ANALYTICS – HARNESSING THE POWER OF OPEN BIG DATA AND PRESCRIPTIVE ANALYTICS TO ENHANCE TRANSPORTATION OPERATING MODELS AND TRAFFIC MANAGEMENT**

Thursday, 24 October 2019  |  14:00 - 15:30  |  Nicoll 2

Leveraging the wave of digitalisation, the transport industry can now tap on the availability of diverse datasets, including probe data from vehicles, road sensors, traffic signals, video and telco geo-location data, to enable new services and to gain insights for service and operations improvements. How can we tap on data fusion of public and private data to provide new open big data possibilities to enable innovation of mobility and traffic management technologies? As the industry is moving up the analytics value chain, from using business intelligence tools to visualise historical data trends, to predicting traffic congestion or detecting any anomalous traffic condition, the next paradigm shift is to consider how to move towards prescribing the best transportation operating model or executing an effective strategy to improve service delivery. How can we optimise the deployment of public transportation based on predicted demand and real-time traffic conditions on the road? How can we improve human traffic flow and queue wait times at transport service hubs by prescribing the matching of demand and supply? This session addresses how we can harness the power of crowdsourced data and prescriptive analytics for the transport industry. Speakers will share relevant case studies and project experiences around open big data and analytics, and discuss the potential challenges in implementation.

**Organiser:**
Soo Kiat Loo, NCS Pte Ltd, Singapore

**Moderator:**
Soo Kiat Loo, NCS Pte Ltd, Singapore

**Speakers:**
Soo Kiat Loo, NCS Pte Ltd, Singapore
Masafumi Kobayashi, Sumitomo Electric Industries, Ltd, Japan
San Zaw, Tibco Software Inc., Singapore
Nicholas Cohn, TomTom, USA

**AP 10: OPTIMISING SUPPLY CHAINS USING DATA: SOME PRACTICAL EXAMPLES AND RECOMMENDATIONS**

Thursday, 24 October 2019  |  16:00 - 17:30  |  Nicoll 2

Our supply chains stand to benefit greatly from the ever-increasing availability of data, yet for the most part this is not yet happening. The sheer volume of data, knowing what is useful, and finding ways to fairly and securely access the data are just some of the challenges that have stood in the way.

Presented by iMOVE Australia, the independent national centre for transport R&D in Australia, this session looks at a number of recent initiatives including

- an Australian requirements study that understood and refined the needs of industry; key recommendations to inform a national government freight strategy
- The successful Transport Network Strategic Investment Tool (TraNSIT), a state-of-the-art model for assessing and optimising infrastructure investments and
- the Transport for NSW Freight Data Hub, which aims to use data to inform and spur innovation and economic growth by delivering freight policy and infrastructure more effectively and efficiently.

**Organiser:**
Jacqueline King, iMOVE Australia, Australia

**Moderator:**
Jeff Kasparian, iMOVE Australia, Australia

**Speakers:**
Andrew Higgins, CSIRO, Australia
Gary Doldan, Bureau of Infrastructure, Transport & Regional Economics, Department of Infrastructure, Regional Development and Cities, Australia
Ian Christensen, iMove, Australia

**TECHNICAL SESSIONS**

**TS 01: HUMAN FACTORS & INTERFACE DESIGN FOR AUTOMATED VEHICLES**

Monday, 21 October 2019  |  09:00 – 10:30  |  Room 308

**Moderator:**
Tongji University, China

**AP-TP1950**
Driver State and Driving Maneuver Analysis in Take-over from Automated to Manual Driving
Akihiro Abe
Shibaura Institute of Technology, Japan

**AP-TP1977**
Analysis of Takeover Time for Autonomous Vehicle on a Freeway Using a Driving Simulator
Sungho Park
Ajou University, Republic of Korea

**EU-TP7146**
Investigation of the Influence of Multitasking on Drivers’ Takeover Performance in Highly Automated Vehicles
Phil Blythe
University of Newcastle upon Tyne, UK

**EU-TP1932**
Investigating consumers’ intention to adopt private autonomous driving vehicles
Ilia Panagiotopoulous
Harokopio University of Athens (HUA), Greece

**EU-TP2067**
Innovative Human Machine Interaction for automated car: Analysis of drivers needs for recommended design
Annie Pauzie
Ifsttar/Lescot, France

**TS 02: ANALYSIS, PREDICTION AND MANAGEMENT OF DEMAND FOR PUBLIC TRANSPORT**

Monday, 21 October 2019  |  09:00 – 10:30  |  Room 309

**Moderator:**
Chris Bax, Cubic Transportation Systems Ltd., Australia

**AP-TP1188**
A Multi-variate Deep Learning Neural Network for Short-term Travel Demand Prediction on Public Transport
Hoang Nguyen
DATA61|CSIRO, Australia

**AP-TP2120**
The Transformation of Private Vehicle Users to Public Transport Users (Case Study: Bali, Indonesia)
I Wayan Armay
BPPTD Bali, Indonesia

**AP-TP2179**
Identifying Potential Point-to-point Customized Bus Routes via Smart Card Transaction Data and Open Source Travel Time Data
Yinguo Qian
Key Laboratory of Road and Traffic Engineering of Ministry of Education, College of Transportation Engineering, Tongji University, China

**AP-TP2196**
The Variation Features of Bus Ridership after the Opening of New Metro Lines: a Case Study in Xiamen, China
Zhe Li
Tongji University, China

**AP-TP2290**
Lesson Learn from TRANS SERASI: Innovating Concept of Travel Demand Management (Student Travel)
I Wayan Armay
BPPTD Bali, Indonesia
EU-TP2043  The CROCODILE corridor: Successful DATEX II deployment in a cross-border setting  Martin Böhm  AustriaTech, Austria

EU-TP2115  The Connected Cloud as a vital building block for automated public transport  Ian Smith  Dubai Government - Road & Transport Authority, United Arab Emirates

EU-TP2303  Comprehensive urban traffic management  Jan Linssen  ARS T&TT, The Netherlands

AP-TP2287  The Implementation of ITCS with “M2M” Technology - Case Study in Indonesia  Haris Muhammadun  Indonesian Traffic Expert Association, Indonesia

AP-TP1820  Whangapara Dynamic Lanes  Blair Monk  Aurecon, New Zealand

AP-TP2308  Bridging the Policy to Implementation Gap to drive Innovation  Scott Benjamin  WSP, Australia

AP-TP2062  NZTA Transport Technology Integration Framework  Henry Wu  JYW Consulting, Australia

AP-TP2306  An innovative and Sustainable ITS Policy and Strategy Planning in Taiwan  Francis Chang  CECI Engineering Consultants, Inc., Chinese-Taipei

AP-TP2159  Determining End of Utility Dates for Existing ITS on Australian Road Network  Qudus Wazirzada  Smart Sustainable Solutions, Australia

EU-TP1843  How Intelligent, Really, Is the Transport Industry? Analysis of Investments in Digitalisation in Finland and Australia  Pekka Leviäkangas  VTT Technical Research Centre of Finland, Finland

AP-TP1942  Development of Mapping Technique for Lane Geometry for Vehicle-to-Infrastructure Communication Based Applications  Jayendra Parikh  Avoidance Metrics Partners LLC (CAMP), USA

AP-TP1831  Curb and Lane Tracking using Local Cues for Autonomous Vehicles  Saurab Verma  Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore

AP-TP2071  Large-scale Image Geo-Localization Based on Multiple Nearest Neighbors With Global Evaluation  Wenquan Deng  Tsinghua University, China

AP-TP2082  Usage of Road Alignment Data to support Automated Driving  Hiroyuki Kameoka  Central Nippon Expressway Company Limited, Japan

AP-TP2243  Implementation and Evaluation of Moving Sensor Detectable Code by Color Markers for Vehicle Position Estimation  Daiki Sakakibara  Aichi Prefectural University, Japan

AP-TP1886  Evaluation of the impact of a vehicle trajectory on traffic by utilizing all vehicle trajectory data observed on expressway  Norihito Shinkai  Regional Futures Research Center, Japan

AP-TP2247  Implementation and Evaluation of Moving Sensor Detectable Code by Color Markers for Vehicle Position Estimation  Daiki Sakakibara  Aichi Prefectural University, Japan

AP-TP2243  Implementation and Evaluation of Moving Sensor Detectable Code by Color Markers for Vehicle Position Estimation  Daiki Sakakibara  Aichi Prefectural University, Japan

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TS 07: DATA GATHERING, SHARING AND FUSION TECHNOLOGIES

Monday, 21 October 2019  |  11:00 – 12:30  |  Room 309
Moderator: Pattara Kiatisevi, Metamedia Technology Co., Ltd., Thailand

EU-TP2198  Design framework for Big Data analysis of Internet-of-Things and crowdsourced data for Intelligent Transport Systems
Evgenia Adamopoulou
Institute of Communication and Computer Systems, Greece

AP-TP1878  Future Mobility Sensing (FMS): An Adaptive System for Data Collection, Fusion and Visualization
Linlin You
Singapore-MIT Alliance for Research and Technology, Singapore

EU-TP1906  Establishment of Quantitative Criteria for Stages of Gentrification Using Multivariate Normal Distribution
Sebin Oh
Seoul National University, Republic of Korea

EU-TP2225  Data Chain for Automotive Function Verification and Validation
Stefan Kaufmann
Ibeo Automotive Systems GmbH, Germany

AP-TP1993  Study on analysis of vehicle dynamics using probe data of ETC2.0 in Japan.
Norihiko KATO
The University of Tokyo, Japan

TS 08: TECHNOLOGIES FOR TRAVEL DEMAND MANAGEMENT

Monday, 21 October 2019  |  11:00 – 12:30  |  Room 310
Moderator: David Ungemah, WSP USA, USA

AM-TP2182  A Cooperative Demand Management Approach to Alleviating Long-Holiday Induced Massive Demand Surges and Severe Traffic Congestion using the Metropia Massive Mobility Management Platform

AP-TP2039  How today’s journey compares - will dynamically changing text colour help or hinder?
Peter Bathgate
Resolve Group Ltd, New Zealand

AP-TP2045  Evaluation of Traffic Demand Management Policies Using License Plate Data: Case Study of Shenzhen, China
Qixiang Huang
Shenzhen Urban Transport Planning Center Co. Ltd, China

AP-TP2209  Intelligence System for Supporting Human-Computer Interaction (HCI) in Transport Demand Management (TDM)
Resdiansyah Resdiansyah
Pembangunan Jaya University/Research and Application Affair of ITS Indonesia, Indonesia

AP-TP1990  Unlocking Shared Mobility Through New Parking Paradigms
Stacey Ryan
ITS Australia, Australia

AP-TP1752  Examination of Location Identification Using GNSS on Japanese Expressways
Kazuki Wakabayashi
Highway Toll Systems Co., Ltd., Japan

TS 09: NEW INNOVATIONS IN MULTIMODAL TRAVEL INFORMATION & PLANNING SERVICES

Monday, 21 October 2019  |  11:00 – 12:30  |  Room 311
Moderator: Stephen Owens, Intelematics, Australia

AP-TP1855  Decision Mining in Public Transport Question Answering Data Based on LDK-KG
Hao Sun
Zhengzhou Tiaamaes Technology Co., China

AP-TP1881  Study on time accessibility of regional public transportation
Lingyang Meng
Beijing University of Technology, China

EU-TP2242  National Access Points – getting closer to MaaS EU-wide
Soeren Soerensen
SMICON ApS, Denmark

AM-TP2156  Toward a Standard Multimodal Data Specification Solution
Renee Ray
Conduent, USA

AP-TP1931  An Adaptive Approach towards Predicting Arrival Times of Commuter Buses in Real Time
Vikash Kumar
New Zealand Transport Agency, New Zealand

TS 10: ITS FOR INTERSECTION SAFETY II

Monday, 21 October 2019  |  11:00 – 12:30  |  Room 312
Moderator: TBC

AP-TP1219  Effect of V2X Motorcycle Safety Warning System on Approaching Speed at Intersection
Tien-Pen Hsu
Institute of Civil Eng National Taiwan University, Chinese-Taipei

AP-TP2111  Surrogate safety analysis of uncontrolled intersections in mixed traffic conditions
Ravishankar K.V.R.
National Institute of Technology, Warangal, India

AP-TP2136  Synergistic Traffic Intersection
Kwok June Johnny Leung
Synergistic Traffic Consultancy, Australia

AP-TP2206  Prediction Model of the Trajectory of Motorcycle Movement for V2V Collision Avoidance System at Intersection
Tien-Pen Hsu
Institute of Civil Eng National Taiwan University, Chinese-Taipei

AP-TP2031  Deployment of the Smart Cooperative Collision Avoidance System for Intersection Safety
Yusan Chiang
Transportation Bureau, Tachung City Government, Chinese-Taipei
A comparison of the SCMS and C-ITS proposals for V2X PKI

Enabling Technologies for Future Transportation Systems: an End-to-End Performance Evaluation

Comparison of DSRC and LTE-V2X PC5 Mode 4 Performance in High Vehicle Density Scenarios

Pan-European deployment of C-ITS: the way forward

Mobility Management and Breaking Barriers between Agencies: The California I-210 Integrated Corridor Management System and Buenos Aires SGIM Examples

ET City Brain System - Innovative Solution to Traffic Management Optimization

Next-Generation Traffic Management Platform

Traffic States Estimation - Deploying Tight Coupling Logics of -- On board unit-based Image Recognition and Cloud-based Estimation --

Traffic management in the digital age - a perspective and call to action for service providers and road managers

Study for Advance of the Prediction Model for Macroscopic Congestion Using Neural Network

Moving Millions A Day: IoT and Cloud Driving ITS

Mining Sequential Patterns of Driving Events and Identifying Driving Styles from Vehicular Dynamic Data

Monitoring air quality to predict fire occurrence for health and safety in Meru-Menora Tunnel using ANN

An Exploratory Study Using Big Data for Improved Safety and Operational Efficiency: A New Zealand Case Study

Study of Advance for the Prediction Model for Macropscopic Congestion Using Neural Network

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Mining Sequential Patterns of Driving Events and Identifying Driving Styles from Vehicular Dynamic Data

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An Exploratory Study Using Big Data for Improved Safety and Operational Efficiency: A New Zealand Case Study

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ET City Brain System - Innovative Solution to Traffic Management Optimization

Next-Generation Traffic Management Platform

Traffic States Estimation - Deploying Tight Coupling Logics of -- On board unit-based Image Recognition and Cloud-based Estimation --

Traffic management in the digital age - a perspective and call to action for service providers and road managers
**TECHNICAL SESSIONS**

**TS 15: SAFETY ASPECTS OF HUMAN MACHINE INTERFACE DESIGN & EVALUATION**
**Tuesday, 22 October 2019 | 09:00 – 10:30 | Room 312**  
**Moderator: Scott Belcher, SFB Consulting, LLC, USA**

- EU-TP1852 Neurocognitive and traffic based handover strategies  
  Horst Wieker  
  Hochschule für Technik und Wirtschaft des Saarlandes - HTW Saar, Germany

- AP-TP1718 Car-driving Interface with Load Cells for Upper-extremity-disabled People  
  Yoshitoshi Murata  
  Iwate Prefectural University, Japan

- AP-TP2030 A rear view mirror system for a motorcycle using Wi-Fi direct  
  Tomotaka Nagaosa  
  Kanto Gakuin University, Japan

- AP-TP2106 Developing an Effective Human Machine Interface for the On-Board Unit for a Traffic Management System  
  Li Huang  
  The University of Tokyo, Japan

- AP-TP2260 Influence of focal distance of head-up display and three-dimensional sound on danger avoidance behavior of drivers  
  Yue Yang  
  Tongji University, China

**TS 16: INNOVATIVE PARKING MANAGEMENT TO MANAGE DEMAND AND ENABLE SMARTER AND EFFICIENT PARKING**
**Tuesday, 22 October 2019 | 09:00 – 10:30 | Room 324**  
**Moderator: Kim Siah Ang, ST Engineering Electronics, Singapore**

- AP-TP2214 How to deploy an innovative mobile services for ITS? A practical case of smart parking Q2O in Taiwan  
  Shaonung Chang  
  National Taiwan University of Science and Technology, Chinese-Taipei

- AP-TP2295 SOSPE On-street Smart Parking Solution  
  Jan Linssen  
  ARS T&T, The Netherlands

- AP-TP2328 The reservation and allocation model of shared parking lots considering multiple factors  
  Ji Bao  
  Tsinghua University, China

- AP-TP2217 Toward to the Evolution on The Future of Smart Car-parking Searching System: An Industrial Perspective  
  Shaonung Chang  
  National Taiwan University of Science and Technology, Chinese-Taipei

- AP-TP2260 A New Shared Parking Strategy Based on Temporal-Spatial Matching Method  
  Yue Yang  
  Tsing University, China

**TS 17: INCORPORATING MOBILITY TRENDS AND REFRAMING BEHAVIOUR FOR MANAGEMENT OF MULTIMODAL TRANSPORT**
**Tuesday 22 October 2019 | 14:00 – 15:30 | Room 308**  
**Moderator: Patrick Son, AASHTO, USA**

- EU-TP1811 How to Accelerate Cycling Through ITS and Technology  
  Marianne Weireich  
  Ramboll, Denmark

- AP-TP2092 Resident’s Travel Frequency and its Influential Factors in Large-Scale Residential Areas on the Megacity Periphery: Case Study of Shanghai, China  
  Kai Zhang  
  Graduate School at Shenzhen, Tsinghua University, China

- EU-TP1721 MaaS: searching for user demand  
  Michael Kieslinger  
  Fluidtime Data Services GmbH, Austria

- AP-TP1747 SimMobility Freight: An innovative framework for agent-based urban freight modelling  
  Andre Romano Alho  
  Singapore-MIT Alliance for Research and Technology, Singapore

- EU-TP1884 Urban Mobility Demand Management strategies - Options for Modern Cities  
  Jose Carlos Riveira  
  Kapsch TrafficCom, Spain

**TS 18: ITS INFRASTRUCTURE FOR AUTOMATED VEHICLES I**
**Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 309**

- AP-TP1841 A Study of Digital Twin for C-ITS utilizing mobile technology  
  Gyori Yun  
  Pohang National University, Republic of Korea

- AP-TP1847 An interim report on joint research in developing technology for the realization of next-generation C-ITS  
  Shin Sakaki  
  National Institute for Land and Infrastructure Management, MLIT, Japan

- AP-TP1860 Development of a Monitoring and Evaluation System to support Singapore Autonomous Vehicles Initiatives  
  Thomas Tong  
  Land Transport Authority, Singapore

- AP-TP1910 Operations of Automated Heavy Vehicles in Australia and New Zealand  
  Ronny Kutadinata  
  Australian Road Research Board, Australia

- AP-TP2047 An analysis of propagation characteristics on infrastructure radar system using 79GHz band under snowfall environment  
  Yoshihito Hayashi  
  Panasonic Corporation, Japan
TS 19: PREDICTION AND ANALYTICS FOR ITS APPLICATIONS
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 310
Moderator: Andrew Pearce, Jacobs Engineering Group, UK

- AM-TP2347 Leveraging the general transit feed specification real-time (GTFS-RT) for traffic signal coordination in a connected vehicle environment
  - Tony Qiu
  - University of Alberta, Canada

- AP-TP1748 A Smart Concrete Pavement Weigh-in-Motion System Based on the Deep Learning Method
  - Dengjiang Wang
  - Beijing Yansan Technology Co., Ltd., China

- AP-TP1762 A Traffic Information System for Long-term Travel Time Prediction
  - Kuan-Rong Lo
  - ChungHwa Telecommunication Laboratories, Chinese-Taipei

- AP-TP1834 Travel Time Prediction Based on a Spatial-Temporal Algorithm Using a Deep Learning Technique
  - Eum Hak Lee
  - Seoul National University, Republic of Korea
  - Xuefang Zhao
  - Tsinghua University, China

- AP-TP1875 A framework including traffic diffusion for short-term traffic prediction

TS 20: TRAFFIC CONTROL & OPERATIONS I
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 311
Moderator: Ed Seymour, Texas A&M Transportation Institute, USA

- AP-TP2006 PaGo: A Path-based Signal Optimization Model for Signalized Intersections with Mixed Traffic Flows in Taiwan
  - Ming Te Tseng
  - Innovation Traffic Technology Co., Ltd., China

- AP-TP1787 A Case Study in Progressing Traffic Incident Management from Good to Great
  - Steven Cyra
  - HNTB Corporation, USA

- AP-TP2327 Development and Field Evaluation of Minnesota Adaptive Ramp Metering System
  - Eil Kwon
  - University of Minnesota Duluth, USA

- AP-TP1735 Traffic Signal Control with Fewer Detectors Using Probe Data
  - Toshiya Yoshioka
  - Sumitomo Electric Industries, Ltd., Japan

- AP-TP1786 Application of Deep Learning to Traffic Signal Control considering Accountability
  - Kiyomitsu Tsuda
  - Shiga Prefectural Police Headquarters, Japan

TS 21: PREVENTATIVE & ACTIVE SAFETY SYSTEMS
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 312
Moderator: Cheol Oh, Hanyang University, Korea

- AP-TP2208 Effects of Road Geometry on Relationship Between Dangerous Driving Behaviors and Crashes of Commercial Vehicles
  - Sedong Moon
  - Seoul National University, Republic of Korea

- EU-TP2072 Designing an On-Board Driving Scene Monitoring Sensory System for Preventing Terrorist Attacks with Road Transport
  - Gorka Velez
  - Vicomtech, Spain

- EU-TP2143 Automatic warning light approach to improve train visibility
  - Ari Virtanen
  - VTT Technical Research Centre of Finland Ltd., Finland

- EU-TP1964 Investigation of pothole detection using in-vehicle data for cooperative applications
  - Chris Huijboom
  - HAN University of Applied Sciences, The Netherlands

  - Christoph Maget
  - Center for Traffic Management, Germany

TS 22: POLICY FRAMEWORK FOR CONNECTED & AUTOMATED VEHICLES
Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 324
Moderator: Anthony Ferguson, Department for Transport, UK

- AM-TP2277 Transport Canada’s Approach to the Safe Introduction of Automated and Connected Vehicles
  - Natalie Ratcliffe
  - Transport Canada, Canada

- AP-TP1888 User Perception of Autonomous Vehicle: a Comparison between Singapore and the United Kingdom
  - Katherine Cai
  - Land Transport Authority, Singapore; Tongji University, China

- EU-TP1864 Support study for Impact Assessment of Cooperative Intelligent Transport Systems
  - Kareen El Beyrouty
  - Ricardo EE, UK

- AM-TP1902 Connected and Automated Vehicles – Preparing a Region for a Revolution in Mobility
  - Mara Bullock
  - WSP Canada

- EU-TP2349 Regulatory framework state of the art for truck platooning
  - Carlos Luján
  - IDIADA Automotive Technology S.A, Spain
**TS 23: AUTOMATED DRIVING TRIALS AND PERFORMANCE ASSESSMENT OF KEY TECHNOLOGIES**

Tuesday, 22 October 2019 | 14:00 – 15:30 | Room 325

Moderator: Paul Potters, Monotch, The Netherlands

**AP-TP2244** Visual Mapping and Localization for Autonomous Vehicle Field Trials in Singapore
Zheng Wu
Panasonic R&D Center Singapore, Singapore

**EU-TP2060** Assessment of GNSS receiver performance in varied multipath environments with innovative real-time multipath simulation systems
Todor Trionski
Sprent Communications, UK

**EU-TP1973** Setting up Experimental Procedure for Level 3 Automated Driving Pilots
Merja Penttinen
VTT Technical Research Centre of Finland Ltd., Finland

**EU-TP2070** Methodological challenges related to real-world automated driving pilots
Satu Innamaa
VTT Technical Research Centre of Finland Ltd., Finland

**EU-TP2216** Assessing mobility impacts of automated driving in L3Pilot
Salla Kuisma
VTT Technical Research Centre of Finland Ltd., Finland

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**TS 25: CONNECTED & AUTOMATED VEHICLE DEPLOYMENT & FIELD OPERATIONS TESTS I**

Tuesday 22 October 2019 | 16:00 – 17:30 | Room 309

Moderator: Sanghoon Bae, Pukyong National University, Republic of Korea

**AM-TP2291** A Mobile Infrastructure to X Experimental Platform for Connected and Automated Vehicle Technology
Zhitong Huang
Leidos, USA

**AP-TP1739** Automated Driving Service Design for Low-Speed Mobility in Resort Facilities
Sachiyo Araki
Yamaha Motor Co., Ltd., Japan

**AP-TP1783** ’A Structured Approach on Capabilities Required to Develop and Deploy Automated Driving’, How and where will Urban Level 4 Automated Driving Emerge?
Serge Lambermont
Autoblok, Singapore

**AP-TP2044** Automated system for traffic scenario classification and trajectory evaluation of autonomous vehicles
Chee Wei Ang
Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore

**AP-TP1907** Safety Management Plans for Automated Vehicle Trials
Charles Karl
Australian Road Research Board, Australia

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**TS 24: FREIGHT, FLEET MANAGEMENT & LOGISTICS MOVEMENT ACROSS A REGION OR COUNTRY**

Tuesday, 22 October 2019 | 16:00 – 17:30 | Room 308

Moderator: Timothy Gammons, Ove Arup & Partners, UK

**EU-TP1757** Trinational Automated Mobility
Horst Wieker
Hochschule für Technik und Wirtschaft des Saarlandes – htw saar, Germany

**EU-TP2239** PESTS assessment of the potential of a dry-port
Gideon Mbiydzenyuy
NetPort Science Park AB, Sweden

**EU-TP2103** Cooperative delivery concepts for compliant city logistics: Case Study in Graz, Austria
Martin Reinharter
AIT Austrian Institute of Technology GmbH, Austria

**AP-TP1858** Validity verification of the support service for vehicle logistics management using ETC2.0 probe data
Yuna Maki
National Institute for Land and Infrastructure Management, NILT, Japan

**EU-TP2083** Early lessons learnt from Connecting Austria – C-ITS-focused level 1 truck platooning
Wolfgang Schildorer
University of Applied Sciences Upper Austria, Austria

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**TS 26: TRAFFIC CONTROL & OPERATIONS II**

Tuesday, 22 October 2019 | 16:00 – 17:30 | Room 310

Moderator: Blair Monk, ITS New Zealand / Aurecon, New Zealand

**AP-TP1824** Introduction of new traffic signal control method to address partial congestion
Kouhei Nishijima
Tokyo Metropolitan Police Department

**AP-TP1830** On the development of event-responsive pedestrian adaptive control
Yoshitaka Yanagida
Metropolitan Police Department, Japan

**AP-TP1846** Study of Probe Imperfections on Vehicle Movement Prediction at a Signalized Intersection
Ming Zhao
Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore

**AP-TP1956** Coordinated Ramp Metering and Urban Road Dynamic and Real-time Traffic Control with Mixed Traffic conditions
Ta-Chun Lin
Transportation Bureau, Taichung City Government, Chinese-Taipei

**AM-TP1753** Improving Smart City Mobility by Applying Real-Time Performance Measures
Robert Edelstein
AECOM, USA
Exploratory analysis of the relationship between kinematic indicators and driving behaviour
Mo Zhou
National University of Singapore, Singapore

The study for the optimum display colours on the road information boards with consideration for colour vision barrier free
Shinji Nishino
Honshu-Shikoku Bridge Expressway Company Limited, Japan

A Study of Effect of Driver’s Individual Difference Based on Car Following Reaction Time
Jianlin Jia
Beijing University of Technology, China

Virtual Infrastructure Simulation & Evaluation - VISE
Katja Miklič
PNZ d.o.o., Slovenia

Simulation and Real-World Validation of Driving Dynamics of a Level 2 Automated Vehicle
Ernst Pucher
TU Wien - Vienna University of Technology, Austria

New tool for evaluating the Cybersecurity level of connected vehicles: CIVICO PROJECT
Lucia Sanz
IDIADA, Spain

Decentralised Databases in Port Management: Technology Implementation Experiences
Sergey Tsiulin
Aalborg Universitet (AAU), Denmark

Electronic Billing of Lading based on Permissioned Blockchain
Yanyan Hu
IBM, Singapore

Ten considerations in framing government access to ITS data
Peter Carr
ERoad Ltd, New Zealand

Protecting Location Privacy of Connected Vehicles: A Note on Adaptive Silent Period Strategy
Wuping Xin
KLD Engineering, P. C., USA

A brief analysis of the current situation and development strategies of intelligent transportation standardization in China
Wei Wang
China Academy of Transportation Sciences, China

ITS Framework architectures as tools for modern transport systems in a networked society – the FRAME NEXT project
Alexander Frotscher
AustriaTech, Austria

Prioritisation of traffic management using RSMP (Roadside Messaging Protocol)
Martin Kaliszczuk
The Danish Road Directorate, Denmark

Local Authority Mobility Platform (LAMP) Framework
Richard Tusting
Connected Places Catapult, UK

Pavement markings for machine vision
Julien Marr
WSP Australia, Australia

Scaled Test Environment for Testing ITS Applications
Frans Tillema
HAN University of Applied Science, The Netherlands

A safety assurance process for automated driving systems
Satoshi Taniguchi
Toyota Motor Corporation, Japan

A framework for consistent safety assessment of Connected and Autonomous Vehicle systems
Mark Cracknell
Moridain Mobility, UK

Connected vehicles and driver distraction – disentangling the ethics
Ian Patey
WSP UK

Quality of life impacts of connected automated driving - Case: AVP
Elina Altoniemi
VTT Technical Research Centre of Finland Ltd, Finland

Exploratory analysis of the relationship between kinematic indicators and driving behaviour
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Quality of life impacts of connected automated driving - Case: AVP
Elina Altoniemi
VTT Technical Research Centre of Finland Ltd, Finland
**TECHNICAL SESSIONS**

**TS 31: CONNECTED & AUTOMATED VEHICLE DEPLOYMENT & FIELD OPERATIONS TESTS II**

**Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 308**

**Moderator:** Raj Ponnaluri, Florida Department of Transportation (FDOT), USA

- **AP-TP2124** Technical challenges found in the FOTs of LSAD Service in Rural Depopulated Areas
  - Satoshi Sawai
  - National Institute for Land and Infrastructure Management, MLIT, Japan

- **AP-TP2207** Planning and Design of a New Dynamic Autonomous Public Transport System: The DART System in Singapore
  - Andreas Rau
  - TUMCREATE Ltd Singapore, Singapore

- **AP-TP2274** Consideration of road operations for long term deployment of Autonomous vehicles
  - Yan Mei Bernadette Lee
  - Land Transport Authority, Singapore

- **EU-TP2051** Specifications for Multi-Brand Truck Platooning
  - Alessandro Coda
  - CLEPA, Belgium

- **EU-TP1877** Self-driving car ISEAUTO for research and education
  - Raivo Sell
  - Tallinn University of Technology, Estonia

**TS 32: MODELLING & SIMULATION STUDIES FOR AUTOMATED VEHICLES I**

**Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 309**

**Moderator:** Vivek Vaidya, Frost & Sullivan, Singapore

- **AP-TP1848** An Integrated Simulator for Testing and Validation of Autonomous Vehicle Applications with Physics-based Rendering Sensors
  - Pranjal Vyas
  - Nanyang Technological University, Singapore

- **AP-TP2087** Modelling Merging Behavior Joining a Cooperative Adaptive Cruise Control Platoon
  - Jia Hu
  - College of Transportation Engineering, Tongji University, China

- **AP-TP2109** On the Need for Novel Tools and Models for Mixed Traffic Analysis
  - Jordan Ivanchev
  - TUMCREATE, Singapore

- **AP-TP2154** Scaling social rules to multi-party traffic negotiations
  - Surabhi Gupta
  - TUMCREATE, Singapore

- **AP-TP1807** A Novel Symmetric Intersection Design to Accommodate Autonomous Vehicles and Cross-Street Pedestrians at Four-arm Signalized Intersections
  - Bao Wang
  - The University of Melbourne, Australia

**TS 33: TRAFFIC CONTROL & OPERATIONS III**

**Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 310**

**Moderator:** Suku Phull, Department for Transport, UK

- **AP-TP1793** Traffic signal control optimization under severe incident conditions using Genetic Algorithm
  - Tuo Mao
  - University of Technology Sydney, Australia

- **AP-TP2065** Cooperative Traffic Signal Control with V2X Data
  - Masafumi Kobayashi
  - UTMS Society of Japan, Japan

- **AP-TP2091** Cross Boundary Incident Management on a Multi-Party Managed Motorway Road System
  - Sui Yong
  - Department of Transport, Australia

- **AP-TP2104** i-transport 2.0
  - Kok Wee Oh
  - Land Transport Authority, Singapore

- **AP-TP1818** Network Operations is Design Led Thinking
  - Blair Monk
  - Aurecon, New Zealand

**TS 34: MOBILITY AS A SERVICE (MAAS) AND MOBILITY ON DEMAND**

**Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 311**

**Moderator:** Andreas Rau, TUMCREATE, Singapore

- **EU-TP1728** Simulation-based shared on-demand service design using Chicago taxi data
  - Raphael Gindrat
  - Bestmile, Switzerland

- **EU-TP2003** Mobility as a Service in Small and Medium-sized Cities
  - Jernej Vozelj
  - PNZ d.o.o., Slovenia

- **EU-TP2121** Accelerate and unlock the scalability of Mobility as a Service
  - Guido Di Pasquale
  - Union Internationale des Transports Publics - UITP, Belgium

- **EU-TP2040** Deployment and Testing of the Helsinki Metropolitan Area MaaS Platform
  - Pekka Eloanta
  - Siteline Oy, Finland

- **AP-TP1912** Developing an ITS Road User Communications Roadmap for Transurban
  - Hossein Parsa
  - Transurban, Australia

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### TS 35: SAFETY FOR VULNERABLE USERS
**Wednesday, 23 October 2019 | 09:00 – 10:30 | Room 312**  
Moderator: Toshio Ito, Shibaura Institute of Technology, Japan

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<td>Chen-Fu Liao</td>
<td>University of Minnesota, USA</td>
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<td>Weijia Xu</td>
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### TS 36: MODELLING & SIMULATION STUDIES FOR AUTOMATED VEHICLES II
**Wednesday, 23 October 2019 | 14:00 – 15:30 | Room 308**  
Moderator: John Hibbard, Georgia Department of Transportation (GDOT), USA

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### TS 37: APPLICATION OF AI, INCLUDING DEEP LEARNING IN AUTOMATED VEHICLES
**Wednesday, 23 October 2019 | 14:00 – 15:30 | Room 309**  
Moderator: Steve Dellenback, Southwest Research Institute (SwRI), USA

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<td>Julia Nitsch</td>
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### TS 38: DATA ANALYTICS FOR TRAFFIC MONITORING & MANAGEMENT
**Wednesday, 23 October 2019 | 14:00 – 15:30 | Room 310**  
Moderator: Soren Tellegen, Kapsch, Australia

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EU-TP2050  Smart Tallinn - real case studies from future transport solutions
Toomas Türk
Tallinn City Government, Estonia

EU-TP2317  Modern tendencies of intelligent transport systems as our reality - the case of Serbia and the world
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AP-TP1911  The Effects of Drivers' Characteristics and Violation Attributes on Duration of Traffic Law Recidivism
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EU-TP2112  England’s National Traffic Information Service; an overview
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EU-TP2258  Making the World Move Developing Smart Mobility with Traffic Data Analysis
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AP-TP2105  Travel Time Modelling using Support Vector Regression in Mixed Traffic Conditions
Ravishankar K.V.R.
National Institute of Technology, Warangal, India

EU-TP1996  ViaRODOS – use BIG DATA to create dynamic mobility model in CZ
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AP-TP2289  Overloaded Vehicle Detection System (OVDS): Automatic detection of overloaded vehicles on the move in Singapore
Jo-Anne Payne
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AP-TP2080  Using Public Transport Smart Card Transaction Data for Active Mobility Infrastructure Planning
Songyu Wang
Urban Redevelopment Authority, Singapore

EU-TP2139  No Ticket To Ride - Are People With Disabilities Left Behind?
Jo-Anne Payne
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AP-TP2145  Feasibility for DRTS Based on Autonomous Vehicle in Taiwan
Sandra Witzel
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AP-TP1935  Public Transport Priority in Melbourne, Australia
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EU-TP2258  England’s National Traffic Information Service; data challenges and solutions
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#### TS 48: SAFETY FOR PEDESTRIANS, CYCLISTS & VULNERABLE USERS

**Thursday, 24 October 2019 | 09:00 – 10:30 | Room 310**  
Moderator: Ng Nixon, ST Engineering, Singapore

- **AM-TP2138**  
  DSRRC Congestion Control for Pedestrian Communications and Beyond  
  Hongsheng Lu  
  TOYOTA InfoTechnology Center, U.S.A., Inc., USA

- **AP-TP1822**  
  Influences of vehicles’ exterior lighting system on the behaviors of cyclists  
  Bo Yang  
  The University of Tokyo, Japan

- **AP-TP1972**  
  Electric Wheel Chair Control by AR Marker Detection and Object Recognition from Smartphone Image  
  Fumiaki Sato  
  Toho University, Japan

- **AP-TP2037**  
  Adopting Connected Vehicle Technology to Improve Bus Service Accessibility for Blind and Visually Impaired Passengers  
  Hsu-Feng Cheng  
  MavWin Technology, Chinese-Taipei

- **AP-TP2081**  
  Improvement of accuracy of UWB Positioning System within the intersection using Kalman Filter  
  Yuki Noda  
  Department of Applied Electronics, Tokyo University of Science, Japan

#### TS 49: CASE STUDIES THAT HELP DEFINE POLICY AND STRATEGY

**Thursday, 24 October 2019 | 09:00 – 10:30 | Room 311**  
Moderator: Alvin Lee, HERE Technologies, Singapore

- **AP-TP2093**  
  Transit Captivity Large-Scale Residential Areas on The City Periphery: Case Study of Jinhexincheng, Shanghai, China  
  Jinping Guan  
  ITS Lab, Dept. of Civil & Environmental Engineering, Massachusetts Institute of Technology, USA

- **EU-TP2285**  
  Hamburg’s ITS Strategy: Change to Mobility 4.0  
  Sebastian Troch  
  Ministry of Economy, Transport and Innovation, Free and Hanseatic City of Hamburg, Germany

- **AP-TP2096**  
  Automated and Zero Emissions Vehicles Infrastructure – an Australian Perspective  
  Jonathan Spear  
  Infrastructure Victoria, Australia

- **AP-TP1922**  
  Green Man +: Making it easier for vulnerable road users to cross roads in Singapore  
  Francis Tan  
  Land Transport Authority, Singapore

#### TS 50: IMPROVING SAFETY OF VULNERABLE ROAD USERS

**Thursday, 24 October 2019 | 09:00 – 10:30 | Room 312**  
Moderator: Pete Castello, Iteris, Inc., USA

- **AP-TP2332**  
  Trade-offs between vehicular efficiency and pedestrian safety on conversion of traffic light phasing to protected only: A modelling approach  
  Francis Kian Seng Tay  
  Land Transport Authority, Singapore

- **EU-TP1759**  
  Improving safety of Vulnerable Road Users by addressing barriers of current Autonomous Emergency Braking (AEB) systems: The project PROSPECT (PROnactive Safety for PEDESTrians and CyclisTs)  
  Ilona Cieślik  
  IDIADA Automotive Technology, Spain

- **EU-TP2328**  
  Perception of safety and safety risks of driverless shuttles  
  Helga Jonuschat  
  Pioneer Consulting International GmbH, Germany

- **AP-TP1929**  
  Physiological Magnetic Stimulation Applying Small ELF Magnetic Field on Elderly Car Driver’s Spine Brought Down Blood Pressure in Hypertension during Driving  
  Kaneo Mohri  
  Nagoya Industrial Science Research Institute, Japan

- **AP-TP1927**  
  Trip Table Estimation and Prediction for Dynamic Traffic Assignment Applications  
  Adriana-Simona Mihaita  
  University of Technology Sydney, Australia

#### TS 51: TRANSPORT MODELLING AND FORECASTING

**Thursday, 24 October 2019 | 11:00 – 12:30 | Room 308**  
Moderator: Serene Sia, ORACLE Singapore, Singapore

- **AP-TP2233**  
  Analysing by microsimulation of externalities on public transport due to the operation of goods on peak hours  
  Andres Felipe Gavilan Orozco  
  Herr, Germany

- **AP-TP1922**  
  Resilience of urban road networks: a case study of Auckland  
  Zoe Chen  
  Stanton, New Zealand

- **AP-TP1927**  
  Trip Table Estimation and Prediction for Dynamic Traffic Assignment Applications  
  Adriana-Simona Mihaita  
  University of Technology Sydney, Australia

- **AP-TP2057**  
  The Development and Trial of an Integrated Real-Time Traffic Simulation and Prediction System for Singapore  
  Zhen Hong Ho  
  Land Transport Authority, Singapore

- **AP-TP2261**  
  The Improvement of Traffic Demand Forecasting Model Based on Four-Step Method under the Background of Large New Era  
  Xiaoling Liu  
  Shenzhen Urban Transport Planning Center, China
TS 52: NEW MULTIMODAL MODES AND INTEGRATED DIGITAL PLATFORM COVERING SCHEDULING, ROUTING AND PRIORITY
Thursday, 24 October 2019 | 11:00 – 12:30 | Room 309
Moderator: Jannike Van Der Zee, ITS Canada, Canada

AP-TP2192 Examination of Enhancement of Bus Priority Control in Next-Generation Urban Transport Systems
Toru Mabuchi
UTMS Society of Japan, Japan

AP-TP1754 Multi-objective path generation method based on neural network
Zonghan Yao
Beijing Key Laboratory of Traffic Engineering, Beijing University of Technology, China

EU-TP2075 BIG IoT – Interconnecting IoT Platforms from different domains – Final Results
Thomas Jell
Siemens Mobility GmbH, Germany

AP-TP1933 An Evaluation of Autonomous Vehicle Shuttles to improve first km-last km transport journeys
Doug Wilson
The University of Auckland, New Zealand

AM-TP2354 A Metaheuristic Algorithm For Multi-Objective Service Timetabling In BRT Type Mass Transportation Systems
Luis Miguel Escobar Falcón
Integra S.A, Colombia

TS 53: MANAGEMENT AND OPTIMIZATION OF LOGISTICS & FREIGHT MOVEMENT ACROSS A REGION OR COUNTRY
Thursday, 24 October 2019 | 11:00 – 12:30 | Room 310
Moderator: Mark Talbot, Redflex, USA

AP-TP2084 Research on Large Data Analysis and Decision-Making of Non-truck operating common carrier
An Ran
China Academy of Transportation Sciences, China

AP-TP2167 Exploring benefits of cargo-cycles versus trucks for urban parcel deliveries under different demand scenarios
Giacomo Dalla Chiara
University of Washington, USA

EU-TP1778 Evaluation of activity chain optimization algorithm benefits
Domokos Esztérgár-Kiss
Budapest University of Technology and Economics, Hungary

EU-TP1801 Predictive Analytics for Parking Occupancy applied to Highway Truck Parking
Manon Raap
Siemens Mobility GmbH, Germany

EU-TP1944 Intelligent transport systems in the Republic of Tatarstan: Integrated solutions of Weight Control, Toll Roads and video enforcement
Rifkat Mirkhanov
“Road Safety” State Company, Russia

TS 54: TECHNOLOGY & SYSTEM FOR SAFETY AND ENFORCEMENT I
Thursday, 24 October 2019 | 11:00 – 12:30 | Room 311
Moderator: David Hytch, Parkgate Consultants, UK

AM-TP2345 Cooperative ADAS Using On-Board Sensing and V2V
Roger Berg
DENSO International America, Inc., USA

Noriyuki Tsukada
SUBARU Corporation, Japan

AP-TP1952 Development and operation of the wrong-way driving avoidance system
Naoki Mitsuhashi
Honshu-Shikoku Bridge Expressway Company Limited, Japan

AP-TP2023 AI-Powered Enforcement Technology Preventing Illegal Parking and Improving Pedestrian Safety at Bus Loading Zone
Beng-Neng Lu
Transportation Bureau of Tachung City Government, Chinese-Taipei

AP-TP1723 Actionable Incident Detection Alarming
Fiona Swan
Transurban, Australia

TS 55: TOLLING SYSTEMS FOR ROAD
Thursday, 24 October 2019 | 11:00 – 12:30 | Room 312
Moderator: Ning He, China ITS Industry Alliance/ Shenzhen Genvict Technology Co., Ltd., China

AP-TP1711 Design of MLFF controller based on DSRC protocol
WeiXing Wang
Beijing Wanji Technology Co., Ltd, China

AP-TP2153 Tolling Development in Malaysia
Azman Masbah
Intelligent Transport System Association of Malaysia, Malaysia

AP-TP2275 From Plaza Tolling to Multi-Lane Free Flow
Gabriel Makki
Kapsch TrafficCom AG, Austria

AP-TP1903 Development of Simplified and portable ETC system for distance-based toll collection method in Japan
Yukinori Matsushita
East Nippon Expressway Company Limited, Japan

AP-TP1737 Application and Future Prospects of Toll and Route Search Systems
Shitaro Ishigaki
Highway Toll, Japan
TS 56: ELECTROMOBILITY & EV CHARGING INFRASTRUCTURE
Thursday, 24 October 2019 | 14:00 – 15:30 | Room 308
Moderator: TBC

I-Yun Lisa Hsieh
Massachusetts Institute of Technology, USA

Hironobu Kitaoka
Toyota Motor Corporation, Japan

Arika Fukushima
Toshiba Corporation, Japan

Paul Booi
TÜV Singapore, Singapore

Katsuyoshi Suzuki
Toshiba Infrastructure Systems & Solutions Corporation, Japan

AM-TP1812
The Future of Electro Mobility in China

AP-TP1797
Grid Power Management by PHV Remote Charging Control

AP-TP1965
Automatic Construction of Prediction Models for Energy Consumption of Various Electric Vehicles under Various Driving Conditions

AP-TP2193
A Simulation Based Approach to Developing a Full Scale Bus Electrification Strategy for Singapore

AP-TP2150
Evaluation of a Practicability of Frequent and Super-Quick Charging Electric Bus Operation in Tropical Climate

TS 57: V2X COMMUNICATION TECHNOLOGIES & COOPERATIVE SYSTEMS II
Thursday, 24 October 2019 | 14:00 – 15:30 | Room 309
Moderator: Sue Bai, Honda R&D Americas, Inc., USA

Shohei Fukatsu
Tokyo University of Science, Japan

Shuntaro Kashihara
KDDI Research Inc., Japan

David Alderson
WSP, Australia

Álvaro Arrié
Applus IDIADA, Spain

Tomas Tichý
ELTOPO, a.s., Czech Republic

AP-TP2151
A Study on Improving Communication and Ranging Performances of the System Combines UWB Radar and Inter-Vehicle Communication

AP-TP2217
A Study on Network Requirements for Remote Driving via Cellular Network

AP-TP2218
Ipswich Connected Vehicle Pilot: Cloud-Hosted Central Facility

EU-TP1876
Testing Cooperative Automation: the Truck Platooning Use Case

EU-TP1883
The Using of C2X in the Mobile Telematics System on Highway

TS 58: TECHNOLOGY & SYSTEM FOR SAFETY AND ENFORCEMENT II
Thursday, 24 October 2019 | 14:00 – 15:30 | Room 310
Moderator: Ryota Horiguchi, i-Transport Lab. Co., Ltd., Japan

Lucheng He
Beijing University of Technology, China

Ian Patery
WSP UK

Karen Boniface
European Commission’s Joint Research Centre, Ispra, Italy

Mash Deovers
Land Transport Authority, Singapore

Hannah Steele
WSP UK

AP-TP2004
Safety evaluation modeling of diverging influence area in freeway interchange based on driving workload theory

EU-TP2025
Connecting Vehicles to a Digital Twin

EU-TP2076
On the Galileo and EGNOS Test Campaign for eCall: Motivation, Methodology and Overall results

AP-TP2066
Operational safety at close-proximity intersections

EU-TP1960
New opportunities in assessing tunnel safety risk

TS 59: FUNDING STRATEGIES, FRAMEWORK AND INNOVATIVE BUSINESS MODELS
Thursday, 24 October 2019 | 14:00 – 15:30 | Room 311
Moderator: TBC

Jin Jin
China Academy of Transportation Sciences, Ministry of Communications, China

Martin Leak
Resolve Group Ltd, New Zealand

Tuomo K. Kinnunen
VTT, Finland

JeongAh Jang
Aju University, Republic of Korea

Oliver Klaus
Insurance Australia Group, Australia

AP-TP1827
Joint Punishment and Transportation Credit Score: An Empirical Research on China’s Credit Transportation Policy

AP-TP2201
To invest now or later? – That is the question

EU-TP2298
Practitioners’ experiences on building co-funded innovation ecosystems

AP-TP2281
Institutional Review for operating 5G-based Automated Driving Services: A Methodology Research

AP-TP1938
Independent Third Party Risk Assessment for Automated Vehicles

EU-TP2066
Operational safety at close-proximity intersections

EU-TP1960
New opportunities in assessing tunnel safety risk

TS 60: INNOVATIVE USE OF TECHNOLOGIES FOR TRAVEL DEMAND MANAGEMENT
Thursday, 24 October 2019 | 14:00 – 15:30 | Room 312
Moderator: Mick Spiers, Cubic Transportation Systems, Singapore

Yusuke Ibuki
Mitsubishi Heavy Industries Ltd, Japan

Nobuyuki Owaeri
Mitsubishi Heavy Industries Ltd, Japan

Kousuke Kawai
Nippon Expressway Research Institute Company Limited, Japan

Alice Klemashevich
TRANSCORE, USA

Xin Zeng
College of Transportation Engineering, Tongji University, China

AP-TP1845
Development of Laser Scanning Type Vehicle Detector

AP-TP1861
Development of Automated Vehicle Classification System Utilizing Machine Learning Technology

AP-TP2152
Vehicle type classification technology by non-contact sensor

AM-TP2144
The Wonderful World of Multi Protocol Transponders Built into Vehicles

AP-TP1775
A new allocation and pricing model for shared parking lots
**TS 61: ADVANCED DRIVER ASSISTANCE SAFETY SYSTEMS - DETECTION AND SIMULATION**

**Thursday, 24 October 2019 | 14:00 – 15:30 | Room 324**

- **Moderator:** David Hytch, Parkgate Consultants, UK

**AP-TP1802** Application of cyber information in the warning of vehicle running safety

*Zeyu Shi*
Key Lab of Transportation Engineering of Beijing, Beijing University of Technology, China

**AP-TP2341** ThinNet: Object Detection Using a Slim and Lightweight Net-work Architecture

*Pongsak Lasang*
Panasonic R&D Center Singapore, Singapore

**AP-TP2116** Forklift Proximity Safety System

*Winfred Quek*
Singapore Institute of Technology, Singapore

**AP-TP2211** Millimetre-Wave Radar System for Pedestrian and Vehicle Perception in Intelligent Traffic Surveillance

*Bin Yang*
School of Electronic and Information Engineering, Beihang University, China

**AP-TP1963** Research on key technologies to deploy Automated Driving in long highway tunnels

*Baofeng Su*
Beijing University of Technology, China

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**TS 62: TECHNOLOGY AND TESTBEDS FOR CONNECTED AUTOMATED VEHICLES**

**Thursday, 24 October 2019 | 14:00 – 15:30 | Room 325**

- **Moderator:** Thomas Walbrun, Siemens Mobility GmbH, Germany

**EU-TP3715** The Future of IEEE 802.11p V2X Standard: NSV Proposals for Performance Improvement while Ensuring Backwards Compatibility

*Vincent Martinez*
NXPI France

**AP-TP3763** Design and Implementation of Intelligent Vehicle-Infrastructure Cooperation System

*Zhiwei Qu*
Technology Co., Ltd., China

**EU-TP1975** Proof of Concept for Scenario-in-the-Loop (SciL) Testing for Autonomous Vehicle Technology

*Máté Szalai*
Budapest University of Technology and Economics, Hungary

**AP-TP2241** Development and Field Demonstration of an Automated Transit Platform in Urban Environment

*Andy Jeng*
Industrial Technology Research Institute, Chinese-Taipei

**AP-TP2089** Improving Communication Performance of DS-CDMA IVC Allocating PN Codes on the Road and Comparison with CSMA/UDFM IVC in Urban Environment

*Makoto Itami*
Tokyo University of Science, Department of Applied Electronics, Japan

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**TS 63: BUSINESS INTELLIGENCE AND DATA ANALYTICS FOR ITS APPLICATIONS**

**Thursday, 24 October 2019 | 16:00 – 17:30 | Room 308**

- **Moderator:** Hamed Beroua, Sensys Networks, USA

**AP-TP1879** Validation of Effectiveness on Integration of Private Sector Probe Data

*Akira Tsukamoto*
Vehicle Information and Communication System Center, Japan

**AP-TP1828** Practical research of purchasing power reflecting movement data

*Tomoki Kobayashi*
East Japan Railway Company, Japan

**AP-TP1930** A PLUS Geospatial Journey in ITS

*Adil Budiman Akhasan*
PLUS Malaysia Berhad, Malaysia

**AP-TP2212** Big data analysis for transport systems

*Sahan Herath*
Sopra Steria Asia, Singapore

**AP-TP1738** Short-term travel time forecast using machine learning approach and well-tuned spatial-temporal input ranges

*Kentarou Takaki*
Sumitomo Electric Industries, Ltd., Japan

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**TS 64: SUSTAINABILITY IN TRANSPORTATION I**

**Thursday, 24 October 2019 | 16:00 – 17:30 | Room 309**

- **Moderator:** Hiroyuki Kumazawa, Osaka Sangyo University, Japan

**AP-TP2155** Effectiveness evaluation of air traffic management technical support system based on ADC-IAH

*Peng Li*
Shenzhen Urban Transport Planning Center, China

**AM-TP2304** Build Connectivity and Sustainability – Lessons Learned From 10 Years of Transit Signal Priority in New York City

*Robert Rausch*
TRANS CORE, USA

**AP-TP1800** Supporting Smart Transit Development in Guan New District, GuiZhou, People’s Republic of China

*Susan Lim*
Asian Development Bank, Philippines

**AP-TP2282** Analysis of the influence of community opening on road capacity

*Huang Heye*
Tsinghua University, China

**AP-TP1962** Study on the Evaluation Method of Electric Bus Performance in Operation and Case Analysis in China’s Typical City

*Zhenguo Qian*
China Academy of Transportation Sciences, China

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**TS 65: ITS INFRASTRUCTURE FOR AUTOMATED VEHICLES II**

Thursday, 24 October 2019 | 16:00 – 17:30 | Room 310

Moderator: Takashi Koyama, Mitsubishi Heavy Industries Machinery Systems, Ltd., Japan

AP-TP2048 Approach for realization of merging point support system as Cooperative ITS

Masayuki Yamamoto Mitsubishi Heavy Industries Machinery Systems, Japan

AP-TP2181 Taiwan's Tainan Shalun Self-driving Test Site

Hung Tien CEC Engineering Consultants, Inc., Taiwan, Chinese-Taipe

EU-TP1856 Elements of Operational Design Domain (OOD) of highly automated vehicles, and their unit costs

Risto Kulmala Traffic Ltd, Finland

EU-TP2033 Catalonia Living Lab: a one-stop-shop for development and testing of connected and automated vehicles in Europe

Stefan De Vries Applis IDA, Spain

EU-TP2267 Aurora - The Intelligent Test-Bed for Snowtamous Driving

Reija Viinanen Snowbox Ltd (establishing company, on-going process), Finland

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**TS 66: SAFETY CONSIDERATIONS FOR ITS SYSTEMS**

Thursday, 24 October 2019 | 16:00 – 17:30 | Room 311

Moderator: Kazunori Inoue, Panasonic Corporation, Japan

AP-TP1705 Analysis of Achievable Benefits by Advanced Driving Assistance Systems (ADAS) Based on Microscropic Traffic Simulations

Cheol Oh Hanyang University, Republic of Korea

AM-TP1772 Analysis of thermal dynamics of hydronic de-icing system designs by means of control-oriented thermal models

Ali Saberi Derakhtenjani Concordia University, Canada

AP-TP1795 A Evaluation of Relative Lane Decision Method Using Path History on V2X Communication Systems

Yuji Hamada Mitsubishi Electric Corporation, Japan


Atsushi Higashi Sumitomo Electric Industries, Ltd., Japan

AP-TP2147 Does speeding make a difference to travel time in urban areas

Gareth Robins EROAD, New Zealand

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**TS 67: SECURE ARCHITECTURES TO DEFEND AGAINST CYBERATTACKS & JAMMING AND SPOOFING PREVENTION**

Thursday, 24 October 2019 | 16:00 – 17:30 | Room 312

Moderator: Tim Leinmueller, DENSO AUTOMOTIVE Deutschland GmbH, Germany

AP-TP1905 Use of ANPR camera to complement GPS location accuracy for vehicles

Wee Han Lim NCS Pte Ltd, Singapore

AP-TP1785 Challenges and solutions to the Internet of vehicles in China

Zhengliang Sun Traffic Management Research Institute, China

AP-TP2008 Rail System Anomaly Detection via Machine Learning Approaches

Huaqun Guo Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore

EU-TP2228 Using Collective Perception for position verification in VANETs

Prachi Mittal Denso Automotive Deutschland GmbH, Germany

AP-TP1946 Vehicle trajectory mining based on traffic camera data

Bei Wang Guangzhou Municipal Engineering Design & Research Institute CO, Ltd, China

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**TS 68: ITS FOR EMERGENCY**

Thursday, 24 October 2019 | 16:00 – 17:30 | Room 324

Moderator: Steven Cyra, HNTB Corporation, USA

AP-TP2190 Emergency vehicle priority at signalised junctions

Mohamad Farhan Sukri Land Transport Authority, Singapore

EU-TP1740 “GLONASS+112” emergency management system of the Republic of Tatarstan

Bulat Ismagilov Ministry of Information and Communication of the Republic of Tatarstan, Russia

AP-TP1817 Improving Tunnel Evacuation Outcomes Through Targeted Flash Messages

Jeff Dusting Transurban, Australia

AP-TP1854 Disaster Management of a Tunnel on the Metropolitan Expressway

Kohta Minami Metropolitan Expressway Co. Ltd., Japan

AP-TP2097 Synergising the Project Safety Review Process and the Use of Intelligent Transport Systems in Managing Road Tunnel Fires

Ngai Keen Wong Land Transport Authority, Singapore

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**TS 69: USE OF DATA FOR IMPROVING ITS SOLUTIONS**

Thursday, 24 October 2019 | 16:00 – 17:30 | Room 325

Moderator: Chung Chin-shin Edward, The Hong Kong Polytechnic University, Hong Kong

AP-TP2107 A Modelling framework and identification of Urban Road Network Traffic Condition

Chong Chee Chung ST Engineering Electronics, Singapore

AP-TP1936 The simplified measuring system for congestion at a rest area

Akiyuki Ohkawa Central Nippon Highway Engineering Nagoya Co., Ltd., Japan

AM-TP1773 Hierarchical Analysis of Speeding Behaviour, Violations, and Crashes Using Real-Time Speed Data from the National Performance Management Research Data Set in the United States

Jaeyoung Lee University of Central Florida, USA

AP-TP2266 Pedestrian detection and analysis: applications on smart lamp-post

Xiaoyong Zhang Shenzhen Urban Transport Planning Center Co. Ltd, China

EU-TP1706 Finding traffic quality measures with signal change data only

Thomas Riedel Adaptive Traffic Control AG and Verkehrs-Systeme AG, Switzerland

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TS 74: CASE STUDIES OF MOBILITY AS A SERVICE (MAAS) DEPLOYMENTS

Friday, 25 October 2019 | 11:00 – 12:30 | Room 309

Moderator: Makoto Miwa, NEC Solution Innovator, Japan

AP-TP1750 Design and Implementation of a Novel Business Model on the Integration of Maas and Consuming Service in China: A Case Study of Guangzhou

AM-TP1899 Trust as a Service - Managing Rider’s Confidence in the Sharing Economy

AM-TP1920 Vanpooling and its effect on commuter stress

AP-TP2034 The strategic roadmap for Maas Service in Taiwan

AP-TP2108 Application of Project Management System on Maas Development- A Case Study of Kaohsiung City in Taiwan.

Xianglong Liu
China Academy of Transporation Sciences, China

Andy Taylor
Cubic Transportation Systems, USA

Crissy Ditmore
Cubic Transportation Systems, USA

Chien-Pang Liu
Ministry of Transportation and Communications, Chinese-Taipei

Wei-Yen Lin
Feng-Chia University, Chinese-Taipei

TS 75: USE OF CRUCIAL BIG DATA FOR TRAFFIC MANAGEMENT

Friday, 25 October 2019 | 11:00 – 12:30 | Room 310

Moderator: Cai Chien, DATA61|CSIRO, Australia

AP-TP2292 Tourists Identification Using Unlabelled Cellular Signalling Data: A Case Study of Shanghai, China

AP-TP1805 An intelligent traffic flow estimation system for traffic planning in Macau

AP-TP1823 How Big Data and New Technology Influence Future Transport Systems: Research in Guangzhou as an Example

EU-TP2226 Utilizing ITS and Big Data to Develop a 3D Smart City Platform as a Planning and Operations Tool

Chen Qian
Tongji University, China

Ngoc-Vai Chiang
Transport Bureau, Macau

Ming Li
China Center for Urban Development, China

Terry Smith
Surface Mobility, United Arab Emirates

TS 76: SUSTAINABILITY IN TRANSPORTATION II

Friday, 25 October 2019 | 11:00 – 12:30 | Room 311

Moderator: King W. Gee, AASHTO, USA

AP-TP2185 A Study on The Use Intentions of Potential Users to Public Bicycle Services in a University Campus

EU-TP1784 Generic Validation Approach for Microscopic Traffic Simulation and Drivetrain Simulation in the District of Aachen

AP-TP2101 Smart Street Lighting System

AP-TP2126 Implementation Strategies to Make Cities Sustainable Through emphasizing TOD concept: Indian Context

EU-TP2127 Answering to cities’ mobility needs - public-private-partnerships fostering innovative AV development

Chien-Hung Wei
National Cheng Kung University, Chinese-Taipei

Yiqun Xia
Institute for Automotive Engineering (ika) RWTH Aachen University, Germany

Say Yaw Foo
Land Transport Authority, Singapore

Prashanth Shekar Lokku
National Institute of Technology, Warangal, India

Ulla Tikkanen Forum Virium Helsinki, Finland

AP-TP2119 Real-Time Evaluation of the On-Board Comfort of Standing Passenger in Bus Transit Services

EU-TP2176 "Companion": ASFINAG's Driver Support System on Personal Devices

AP-TP2020 Study of Drivers Health Monitoring System in The Expressway Rest Areas Using Toilet

AP-TP1970 Detection of Driver’s Awakening Level

AP-TP1968 Effect of driver’s task for keeping awakening level high in automated driving

Nicoletta Rassu
University of Cagliari, Department of Civil Engineering, Environment and Architecture, Italy

Martin Nemec
ASFINAG Maut Service GmbH, Austria

Kouji Yamamoto
Central Nippon Expressway Company Limited, Japan

Hayato Shinobu
Shibaura Institute of Technology, Japan

Ryo Furuya
Shibaura Institute of Technology, Japan
AM-SP1895 Intelligent Vehicle Control at Signal-Free Intersection Under Mixed Connected Environment
Hao Yang
TOYOTA InfoTechnology Center, U.S.A., Inc., USA

EU-SP2183 Towards Dynamic Zero Emission Zone Management for Plug-in Hybrid Buses
Marcin Seredynski
E-Bus Competence Center, Luxembourg

AM-SP2335 Cyber-Physical Identification of Connected Vehicles with V2V Shared Sensing Data
Kyungtae Han
Toyota InfoTechnology Center, U.S.A., Inc., USA

AM-SP2342 Traffic Signal Control Systems at Connected Vehicle Corridors: Theories and Implementation
Li Zhang
Mississippi State University, USA

Chris Huijboom
HAN University of Applied Sciences, The Netherlands

AP-SP1730 Arterial incident duration prediction using a bi-level framework of extreme gradient-tree boosting
Adriana-Simona Mihaila
DATA61|CSIRO, Australia

AP-SP1990 Data Driven Next Destination and ETA Prediction for Urban Delivery Fleets
Bing Zhao
Institute for Infocomm Research, Agency for Science, Technology and Research (A*STAR), Singapore

AP-SP1967 A Convolutional Neural Network (CNN) Based Traffic Incident Detection Method for Urban Networks on Microscopic Simulation Platform
Danwei Wang
Nanyang Technological University, Singapore

AP-SP2205 Travel Speed Prediction with a Hierarchical Convolutional Neural Network and Long Short-Term Memory Model Framework
Wei Wang
Atkins, UK

AP-SP2056 Route Choice Behavior Considering Travel Time Reliability of Traveler Groups
Shin-Hyung Cho
Seoul National University, Republic of Korea

AP-SP1857 Using Bayesian Network to Model Incident in Freight Transportation Operation
Thananut Phiboonbanakit
Japan Advanced Institute of Science and Technology, Thailand

EU-SP1734 Big Spatio-Temporal Data Mining for Emergency Management Information Systems
Igor Anikin
Kazan National Research Technical University named after A. N. Tupolev - KAI, Russia

AP-SP2294 Harnessing ITS Data Sources for Big Data Analytics and Structural Equation Modelling to Interpret Public Transport Performance Object detection and tracking in urban street video in Kazan city
Alisa Makhmutova
Kazan National Research Technical University named after A. N. Tupolev - KAI, Russia

AP-SP2339 Collision avoidance trajectory planning for multi vehicle
BaekGyu Kim
Toyota InfoTechnology Center, USA

AP-SP1804 Identification Driving Riskiness of Lane-Changing for Automated Vehicles Applying Spectral Analysis
Chandle Chae
The Korea Transport Institute (KOTI), Republic of Korea

EU-SP1997 Probabilistic Collision Risk Estimation for Autonomous Driving: Validation via Statistical Model Checking
Alessandro Renzaglia
INRIA, France

EU-SP2333 Accidents with Automated Vehicles
Gunnar Jenssen
SINTEF Buildings and infrastructure, Norway

EU-SP2322 Autonomous driving in enclosed car-parks using heterogeneous communication
Oliver Sawade
Fraunhofer FOKUS, Germany

SP 03: COLLISION AVOIDANCE, RISK ESTIMATION AND COMMUNICATION TECHNIQUES TO ENHANCE SAFETY OF AUTONOMOUS DRIVING
Tuesday, 22 October 2019 | 16:00 – 17:30 | Room 320
Moderator: Robert Dingess, Mercer Strategic, USA

AP-SP1804 Identification Driving Riskiness of Lane-Changing for Automated Vehicles Applying Spectral Analysis
Chandle Chae
The Korea Transport Institute (KOTI), Republic of Korea

EU-SP1997 Probabilistic Collision Risk Estimation for Autonomous Driving: Validation via Statistical Model Checking
Alessandro Renzaglia
INRIA, France

EU-SP2333 Accidents with Automated Vehicles
Gunnar Jenssen
SINTEF Buildings and infrastructure, Norway

EU-SP2322 Autonomous driving in enclosed car-parks using heterogeneous communication
Oliver Sawade
Fraunhofer FOKUS, Germany

AP-SP2056 Route Choice Behavior Considering Travel Time Reliability of Traveler Groups
Shin-Hyung Cho
Seoul National University, Republic of Korea

AP-SP1857 Using Bayesian Network to Model Incident in Freight Transportation Operation
Thananut Phiboonbanakit
Japan Advanced Institute of Science and Technology, Thailand

EU-SP1734 Big Spatio-Temporal Data Mining for Emergency Management Information Systems
Igor Anikin
Kazan National Research Technical University named after A. N. Tupolev - KAI, Russia

AP-SP2294 Harnessing ITS Data Sources for Big Data Analytics and Structural Equation Modelling to Interpret Public Transport Performance Object detection and tracking in urban street video in Kazan city
Alisa Makhmutova
Kazan National Research Technical University named after A. N. Tupolev - KAI, Russia
SP 05: CONNECTED VEHICLE DATA FOR OPTIMIZATION OF TRAFFIC MANAGEMENT

Wednesday, 23 October 2019 | 14:00 – 15:30 | Room 320
Moderator: Thanh Nguyen, Highways England, UK

EU-SP2251 Building a Data Management Toolchain for a Level 3 Vehicle Automation Pilot
Francesco Bellotti
DITEN - University of Genova, Italy

AP-SP2280 Sensitivity of autonomous-vehicle adoption to user benefits in travel time and energy productivity
Peter Stasinopoulos
RMIT University, Australia

EU-SP1986 Methodology for Assessment and Optimisation of Traffic Signal Synchronisation with Real-Time Bus Priority and Driver Speed Advisory
Gaetano Fusco
Sapienza Università di Roma, Italy

AP-SP1227 Analysis of Vehicle Information Sharing Performance in terms of the V2V OBU Penetration Rate
Yusuke Takatori
Kanagawa Institute of Technology, Japan

SP 06: V2X DATA FOR IMPROVING AUTONOMOUS VEHICLE NAVIGATION AND PERCEPTION

Wednesday, 23 October 2019 | 16:00 – 17:30 | Room 320
Moderator: Yong Liang Guan, Nanyang Technological University, Singapore

AM-SP2028 Cognition for autonomous vehicles: predicting and correcting the fading of transmissions
Ilham Benyahia
Université du Québec en Outaouais, Canada

AP-SP1833 Queue Length Estimation at Signalized Intersections in a Connected Vehicle Environment Based on Artificial Neural Network
Azadeh Emami
The Department of Infrastructure Engineering, The University of Melbourne, Australia

EU-SP2270 Embedded Context-aware Machine Learning for Autonomous Vehicles
Konstantinos Demestichas
Institute of Communication and Computer Systems, Greece

EU-SP1780 On-board intelligent management functionality for improving the driving of highly automated vehicles
Ilias Panagiotopoulos
Harokopio University of Athens (HUA), Greece

AP-SP2079 Passenger-Freight Demand Responsive Transport Services: A Dynamic Optimisation Approach
Ronny Kutadinata
Deakin University, Australia

AP-SP2117 Evaluating Impacts of Comprehensive Urban and Socio-economic Variables on Bike Sharing Ridership Variability in the City of Seoul Using Revealed Preference GPS Trajectory Data
Christian Kapaku
Seoul National University, Republic of Korea

AP-SP1768 Will the vehicle restriction policy maintain long-term deterrent effect?
Zhiyong Liu
Tsinghua University, China

AP-SP1838 A Station-based Taxi Demand Forecast: using Recurrent Neural Networks
Chung-Yi Lin
Chunghwa Telecom Laboratories, Chinese-Taipei

AP-SP1982 A Three-Step Revised Dynamic Origin-Destination Flows Estimation Method for Signalized Arterials Based on Kalman Filtering
Yi Gang Li
Beijing University of Civil Engineering and Architecture, China

SP 07: PASSENGER AND FREIGHT TRAVEL DEMAND STUDIES AND OPTIMIZATION APPLIED TO ITS APPLICATIONS

Thursday, 24 October 2019 | 09:00 – 10:30 | Room 320
Moderator: Michael Rudge, ITS New Zealand, New Zealand

AP-SP2086 The research on the construction of spatial driving conditions of left-turn vehicles at intersections
Shuyuan Luo
Tongji University, China

AM-SP2098 Vehicle Assisted Connected Eco-driving with Less-Than-Perfect SPaT Information under Adaptive Traffic Signal Control
Hasan M. Moonam
KLD Engineering, P. C., USA

AP-SP1977 Analyzing Bus Trips of the Overlapping O-D Pairs to Enhance Efficiency of Bus Operations
Jeongwook Seo
Seoul National University, Republic of Korea

AP-SP2176 Feasibility and Accuracy Study of Cell Transmission Model for Real Time Traffic Prediction in Signalized Urban Networks
Cherry Ye Aung
Institute for Infocomm Research, Agency for Sciences, Technology and Research (A*STAR), Singapore

EU-SP1758 An Approach to Estimate the Risk of Deer-Vehicle Collision
Kevin Seipel
University of Kassel, Germany

AP-SP1917 Analyzing Bus Trips of the Overlapping O-D Pairs to Enhance Efficiency of Bus Operations
Zhiyong Liu
Tsinghua University, China

AP-SP1982 A Three-Step Revised Dynamic Origin-Destination Flows Estimation Method for Signalized Arterials Based on Kalman Filtering
Yi Gang Li
Beijing University of Civil Engineering and Architecture, China
COMMERCIAL PAPER SESSIONS

**CP 07: SHARED MOBILITY SOLUTIONS ENABLING EFFICIENT MULTIMODAL TRANSPORT OF PEOPLE & GOODS**

**EU-CP2245**
Business and operational aspects of deploying autonomous commercial vehicles in urban mobility
Rodrigo Caetano
Scania, Sweden

**EU-CP2279**
Business Opportunities arising from Automated and Autonomous Vehicles in Public Transportation
Samuel Lyons
RATP Dev, France

**EU-CP1971**
How Demand-Responsive Transit bridges the gap between Public Mass Transit and Individual Mobility in a Mobility as a Service Ecosystem
Lukas Foljanty
Moovel Group GmbH, Germany

**EU-CP2305**
Managing all corporate mobility requirements through a single platform
Kerem Tiryakioğlu
Hexigo, Turkey

**EU-CP1729**
7 steps for public transit operators to win the last mile with new mobility services
Raphael Gindrat
Bestmile, Switzerland

**EU-CP2307**
Autonomous vehicles and fleet management in logistics: the crossing between the worlds of AGV & people movers
Jeremy Rivallo
EasyMile, France

**CP 08: PERSONALISED MOBILITY SERVICES AND SHARED MOBILITY SOLUTIONS**

**AP-CP2163**
Trials of Multi-modal Mobility Service ‘my route’ in Fukuoka City
Hiroshi Majima
Toyota Motor Corporation, Japan

**EU-CP2263**
App based mobility – lifeblood for operators and travellers
Geert Vanbeveren
Siemens Mobility GmbH, Germany

**AP-CP2230**
Tourism Bike Sharing: Behaviour Change Through New Experience In Exploring Cities
I Gede Putu Rahman Desyanta
Indonesia Bike, Indonesia

**EU-CP1803**
Operide: An intelligent fleet management solution applied to e-bike sharing
David Montgomery
Siemens Mobility GmbH, Germany

**AP-CP1844**
Explore the Izu Peninsula with the IZUKO app
Christoph Stadler
Moovel Group GmbH, Germany

**AP-CP2035**
Increased Options for Public Transport within the Sharing Economy: Exploring the concept of Mobility as a Service (MaaS)
Stephen Owens
Intelematics, Australia

SHOWCASES
How does Singapore stay on top of the game amidst rising transportation demands and changing mobility landscape? Register for these back-of-house tours designed to provide delegates with knowledge and new perspectives on Singapore’s best-in-class transportation systems.

**General Guidelines**
- **Dress code**: Smart Casual
- **Departure and arrival**: Technical Tour Assembly Point @ Level 1 pick-up area, Suntec Singapore Convention and Exhibition Centre
- **Pre-registration** required via the Congress Registration System
- **Note**: Please arrive at least 5 minutes before scheduled time.

**INTELLIGENT TRANSPORT SYSTEM (ITS) OPERATIONS CONTROL CENTRE (OCC) AND SINGAPORE MOBILITY GALLERY**

**Brought to you by**: Land Transport Authority

As part of this tour, delegates will visit the Intelligent Transport Systems Operations Control Centre as well as the Singapore Mobility Gallery housed at the Land Transport Authority.

**Intelligent Transport System (ITS) Operations Control Centre (OCC)**

The ITS OCC is the nerve centre that manages traffic in Singapore. It operates 24/7 throughout the year and has an overview of traffic flow along our roads. The OCC readily swings into action to manage road traffic incidents that may impact traffic flow along key corridors to keep Singapore on the move.

Leveraging the ITS systems, ITS OCC has the capability of incident detection, sense making, ground resources deployment, and coordination and information dissemination via an Integrated Platform.

Delegates will also get to understand Singapore’s electronic road pricing (ERP) system and how it is being used as an effective demand management measure, to manage congestions in Singapore. This tour to the Operations Control Centre will allow delegates to appreciate:

a. Concept of road traffic operations
b. ITS systems to manage traffic in Singapore efficiently; as well as
c. Incident management

**Singapore Mobility Gallery**

The gallery offers a glimpse of Singapore’s dynamic and complex land transport system, challenges in balancing efficiency, liveability and inclusivity and how new technologies are harnessed to create a user-centric, future ready land transport system.

Singapore Mobility Gallery provides a behind-the-scenes look at how Land Transport Authority plans, designs and builds our land transport system.

**Tour Schedule**

- **Wednesday, 23 October 2019**: 09:30 – 13:00
- **Wednesday, 23 October 2019**: 14:30 – 18:00
- **Thursday, 24 October 2019**: 09:30 – 13:00
- **Thursday, 24 October 2019**: 14:30 – 18:00

**PREDICTIVE MAINTENANCE FOR NORTH EAST LINE (NEL) MRT**

**Brought to you by**: SBS Transit

This tour takes participants to the MRT depot of Singapore’s North East Line (NEL). Since 2017, NEL remains the most reliable MRT line in Singapore. To sustain high levels of reliability, the focus is on developing predictive maintenance capabilities to pre-empt failures before their occurrence through condition monitoring of equipment and application of data analytics.

To this end, the visit will comprise:

a. An introduction to the suite of predictive maintenance capabilities
b. A showcase of selected condition monitoring and data analytics applications
  c. A demonstration at the Integrated Maintenance and Diagnostics Centre (IMDC), the nerve centre for predictive maintenance

**Tour Schedule**

- **Tuesday, 22 October 2019**: 09:30 – 13:00
- **Thursday, 24 October 2019**: 14:00 – 17:30

**UNDERSTANDING THE DYNAMICS OF THE TAXI INDUSTRY IN SINGAPORE**

**Brought to you by**: ComfortDelGro

ComfortDelGro Taxi, a leading point-to-point transport operator for over four decades, manages and maintains the largest fleet of taxis in Singapore. Delegates attending the tour will be given an overview about Singapore’s taxi industry, and a tour of its Driver Recruitment Centre and taxi maintenance workshop.

**Tour Schedule**

- **Tuesday, 22 October 2019**: 14:00 – 17:30
TECHNICAL TOURS

TESTING AND RESEARCH OF AUTONOMOUS AND CONNECTED VEHICLE DEPLOYMENT ON PUBLIC ROADS

Brought to you by: Nanyang Technological University – CETRAN

To ensure safe and seamless integration onto public roads, Autonomous Vehicles (AVs) need to be tested on their communication and interaction with other vehicles, road infrastructure and elements as well as dispatch and routing systems. The CETRAN AV Test Centre is a 2-hectare test facility that was launched on 22 November 2017 to support the testing of AVs navigation controls in a real-world environment. It is designed to replicate the different elements of Singapore’s roads, with common traffic schemes, road infrastructure, and traffic rules. The circuit also features a rain simulator and flood zone to test AVs’ navigation abilities under different weather conditions.

Whilst, the NTU-NXP Smart Mobility Test Bed is a campus-wide V2X (vehicle to everything) communication facility for the ITS community to collaborate in developing and testing next-generation transportation innovations that enhance commuter safety and transportation services. The V2X technology allows vehicles to communicate with each other, pedestrians, personal mobility devices (PMUs) and roadside infrastructure for a safer and more efficient driving experience.

Key highlights of the tour include:

a. A guided tour and introduction to the CETRAN AV Test Centre
b. An overview and demonstration of the tests performed in the Singapore Milestone 1 assessment
c. A demonstration of the interaction between an AV and smart traffic light
d. Use cases of cooperative localisation
e. Live demonstrations of V2X use cases in the real-world scenario within the NTU test bed
f. A demonstration of the use of 60GHz radio for V2X communication applications

Note: Demonstrations are performed outdoor in an open air, unshaded environment.

Tour Schedule:

- Tuesday, 22 October 2019: 09:30 – 12:30
- Wednesday, 23 October 2019: 09:30 – 13:00

VISIT TO BULIM BUS DEPOT

Brought to you by: Tower Transit Singapore Pte Ltd

Tower Transit is a young and innovative transport operator with fresh ideas and a wealth of experience in bus franchising. Established in the UK in 2013, Tower Transit operates some of the busiest bus routes in central London on behalf of Transport for London, and leads the way in new technology trials of zero-emission buses in London. The Group also owns boutique bus and coach operations: Whippet in Cambridge and Impact Group in West London.

In 2015, competing with some of the world’s biggest bus operators, Tower Transit was awarded the Singapore government’s first competitively-tendered bus contract for 26 routes. The Group, together with its sister company Transit Systems in Australia, has completed 20 successful operator transitions and works with governments to bring clean, reliable, efficient and personable bus services to the world’s top cities.

This visit to Tower Transit will cover the following:

a. An introduction to Tower Transit Singapore
b. Bus Contracting Model
c. A guided tour and overview of the Bus Depot operations

tour Schedule:

- Wednesday, 23 October 2019: 14:00 – 18:30

PSA SINGAPORE PORT TOUR

Brought to you by: PSA Corporation Ltd

PSA Singapore is the world’s largest container transhipment hub. It handled 36.31 million Twenty-foot Equivalent units (TEUs) of containers in 2018. It is a fully-owned subsidiary of PSA International, a leading global port group and a trusted partner to cargo stakeholders around the world. With flagship operations in Singapore and Antwerp, PSA’s portfolio comprises a network of over 50 coastal, rail and inland terminals in 17 countries.

PSA is sharpening its competitive edge with extensive development and implementation of port automation technology and intelligent inter-connected systems at its Pasir Panjang terminals and the future Tuas Port.

The tour to Singapore Port includes:

a. A video presentation and panoramic overview of PSA port
b. A visit to the Automated Crane Operations Centre, where the automated rail-mounted gantry crane system is managed
c. A visit to the PSA Living Lab Gallery, where the automated guided vehicle or AGV system is live-tested
d. A tour of the Pasir Panjang Terminal

Tour Schedule:

- Tuesday, 22 October 2019: 09:30 – 12:30
- Tuesday, 22 October 2019: 14:00 – 17:00

SINGAPORE MARITIME GALLERY TOUR

Brought to you by: Maritime and Port Authority of Singapore

Trace the rich maritime heritage and witness the transformation of Singapore from a trading port into a premier Global Hub Port and leading International Maritime Centre, at our Singapore Maritime Gallery.

Find out how the Port of Singapore stays abreast amid global change by remaining technologically-driven and future-ready in the development of the Next Generation Port at Tuas, and discover the vital link between the maritime industry and our daily lives.

Tour Schedule:

- Wednesday, 23 October 2019: 14:00 – 16:00
TECHNICAL TOURS

RESEARCH INTO FUTURE MOBILITY SOLUTIONS

Brought to you by: CREATE – Campus for Research Excellence And Technological Enterprise

The tour will feature on-going research into future mobility carried out in Singapore by TUMCREATE (a research centre at CREATE between the Technical University of Munich and the Nanyang Technological University), SMART Future Urban Mobility (a research centre of the Massachusetts Institute of Technology at CREATE) and SEC-FCL (the Future Cities Laboratory of the ETH Centre at CREATE).

These research centres are funded by the Singapore National Research Foundation under its Campus for Research Excellence and Technological Enterprise (CREATE) programme. The tour will feature research in each of these three centres.

SMART FM will showcase their first-last mile autonomous mobility on demand vehicles; display the autonomous vehicles’ use case in every day from hospitals, tourist attractions to urban environments; and lastly, the autonomous capabilities of their vehicle will be demonstrated on campus in a pedestrian environment.

TUMCREATE will showcase its research into the ultimate public transport system. This will showcase research work into a future autonomous road transit system that features AVs operating in platoons with right-of-way controlled by novel sensor technology. The tour will include simulation and virtual reality experiences of the public transport system and vehicles with demonstrations of vehicle design tools, vehicle charging models and other demonstrations.

ETH-FCL will showcase various systems in its Value Laboratory and other display sites.

Key takeaways of this tour include:

a. The state-of-the-art autonomous vehicle capabilities of SMART’s AVs
b. New concepts in road-based autonomous public transport
c. The infrastructure support for AVs in Singapore
d. The current challenges and potential solutions for large-scale AV deployments

Tour Schedule
- Wednesday, 23 October 2019: 09:00 – 13:30
- Thursday, 24 October 2019: 09:00 – 13:30

NCS CENTRE OF DIGITAL EXCELLENCE (CODE-X)

Brought to you by: NCS Pte Ltd

NCS CODE-X is an innovative co-development lab that combines NCS’ experience and expertise with emerging technologies to help companies reimagine their future, test innovative concepts and unlock new growth opportunities that will help compete in the new economy.

The tour will demonstrate how technology disruptions are changing the next generation transportation eco-system and how we can embrace this imminent disruption. By leveraging emerging technologies such as artificial intelligence, advanced analytics and robotic process automation, we are able to develop and deploy secured future-proof apps to meet the needs of different transportation stakeholders.

Tour Schedule
- Friday, 25 October 2019: 09:30 – 12:30

SINGAPORE CITY GALLERY AND URA’S DIGITAL PLANNING LAB

Brought to you by: Urban Redevelopment Authority

Planning a city requires an understanding of how factors such as the economy, environment, built infrastructure and social needs affect and shape the ways in which people live, work and play. As Singapore’s land use planning and conservation authority, the Urban Redevelopment Authority (URA) actively explores and leverages new digital technologies to transform and improve our planning processes. Geospatial and data analytics allow our planners to gain deeper insights into current and future scenarios, helping them to plan in a more precise manner to cater to the needs of the population in both the short and long term.

Our drive to find innovative urban solutions led to the creation of a suite of in-house digital planning tools. It also sparked joint collaboration projects with academic, research and industry partners to further enhance our planning processes.

Discover how our planners apply advanced geospatial simulation and visualisation methods to their work and observe how various datasets over time and space are layered to efficiently guide planners on existing land use and infrastructure developments.

Next, experience a free guided tour of the revamped Singapore City Gallery, which showcases the nation’s dramatic transformation over the past 50 years. Here, discover how various stakeholders have contributed to shaping our city and, through various interactive and immersive exhibits, learn more about Singapore’s planning challenges and the innovative solutions found to tackle them.

Tour Schedule
- Tuesday, 22 October 2019: 14:30 – 18:00
- Wednesday, 23 October 2019: 14:30 – 18:00

SINGAPORE BUS TRAINING AND EVALUATION CENTRE

Brought to you by: SMRT Business

As a leading and premier Public Transport Operator in Singapore, SMRT Roads is focused on delivering the safest, most reliable, caring and comfortable transport service to achieve the highest customer service standards. SMRT Roads is a two-time winner of Land Transport Excellence Awards 2017 and 2019 for Best Service Partner.

Established in 2015 by SMRT Roads, the Singapore Bus Training and Evaluation Centre (SG BTEC) is a state-of-the-art simulation training centre for bus professionals. We aim to hone safe driving skills, develop drivers’ competencies and provide team-based training to enhance bus service reliability.

SMRT leverages on PROLEARN that uses data analytics to monitor driving behaviour and flag out at-risk drivers. The PROLEARN provides an evidence-based approach to develop safe driving habits and proactively reduces accident risk. PROLEARN shapes and improves driving behaviour, resulting in safer (less passenger mishaps) and more comfortable rides. With less accidents, the reliability of bus services is enhanced. PROLEARN system is a modular and flexible system, which can be easily customised to fit other transport operators.

The PROLEARN has won awards over the years:

2019 - Land Transport Excellence Awards - Most Innovative / Effective Safety Programme by PT Operator
2017 - SMRT Buses won Certification of Recognition in the UITP Awards 2017 in the Operational and Technological Excellence category
2016 - Singapore Business Review Listed Companies Award - SMRT Buses won in the Technology category

From this technical tour, you will understand how and why 5G BTEC was set up to conduct simulation training.

Learn how SMRT Buses leverages on Data Analytics to customise preventive training for drivers at risk.

Tour Schedule
- Tuesday, 22 October 2019: 14:30 – 17:30
VISIT INNO SUITE - UNCOVER HOW EMERGING TECHNOLOGIES HELP SOLVE COMPLEX MOBILITY AND SMART CITIES CHALLENGES

Brought to you by: ST Engineering Electronics Ltd

Come on board at InnoSuite as we share and discuss innovative ideas and solutions for smart, safe and sustainable cities. You will experience and learn how technology is making a quiet yet lasting impact for organisations and cities, and its citizens. From Data-driven Traffic Management Platform to Smart Metro Control Centre, from the world’s smallest 2 factor authentication data storage to our suite of in-house developed Cybersecurity products, from enabling district-wide sensing network to lamppost-as-a-platform, and a portfolio of our satellite and public safety and security solutions, the ability to harness technology will advance and effect the change, to make the world a better place.

Tour Schedule
• Friday, 25 October 2019: 09:00 – 12:00

VISIT TO IBM STUDIO SINGAPORE - INNOVATION WITH THE IBM WAY!

Brought to you by: IBM Singapore Pte Ltd

IBM Studios Singapore, a new design center to help clients reinvent their business for the digital age and develop individualised experiences through a combination of cognitive capabilities and experience design.

Located in the Marina Bay Financial Centre, IBM Studios Singapore will serve as the regional hub and will host more than 100 designers and digital experts from IBM iX (Interactive Experience). IBM iX provides next-generation services dedicated to digital reinvention and transformational outcomes. Clients will work side-by-side with teams of IBM creative designers, researchers, digital strategists, analytics and cognitive solution experts to analyse their business challenges and co-create new business models and offerings.

IBM applies the principles of IBM Design Thinking, which takes a rapid prototyping approach to user-centric product development, as well as IBM Design Language, a framework to inspire bold and engaging experiences.

IBM Studios Singapore joins the growing network of 30 IBM Studios across the globe, including locations such as Austin, Atlanta, Bangalore, Boston, Chicago, Dubai, Toronto, Groningen, Melbourne, Mexico City, Hursley, London, New York, Dallas, Prague, Sao Paolo, Madrid and Shanghai.

Delegates will get to learn about digital transformation strategy, cognitive experience design and development, mobile and omni-channel applications, and digitally enhanced customer journeys, and the success stories of some IBM’s transportation industry clients leading from the IBM Studio.

Tour Schedule
• Friday, 25 October 2019: 09:30 – 12:30

POST CONGRESS TECHNICAL VISIT TO JOHOR, MELAKA, PUTRAJAYA AND KUALA LUMPUR, MALAYSIA

Brought to you by: ITS Malaysia

This 3-Day-2-Night Post Congress Tour will bring delegates across the Causeway to Kuala Lumpur via Iskandar Malaysia (Johor) and the UNESCO World Heritage City of Melaka. Delegates will start their journey at the designated pick-up point at the Suntec Singapore Convention & Exhibition Centre, at 8am on 26 Oct 2019. The tour will be by coach to Kuala Lumpur with an overnight stay in Melaka. The return journey to Singapore will be via Malindo Air.

On Day 1 (26 Oct), we will visit Iskandar Malaysia, which is the test bed for smart city deployment in Malaysia. This will be followed by a visit to the Malaysian Institute of Road Safety Research (MIROS) Crash-Safety Engineering Unit for a crash safety demonstration, before adjourning for the evening for an overnight stay in the historic city of Melaka. The more adventurous delegates may wish to take this opportunity to experience the Melaka river cruise, night market at Jonker’s street, the Taming Sari revolving gyro tower, as well as local cuisines, and/or various other attractions.

On Day 2 (27 Oct), we will continue the journey via the North-South Expressway, with a stopover and a tour of the Federal administrative capital of Putrajaya. Some of the highlights include the 24km cable-stayed bridge – the Seri Wawasan bridge, the Putra Mosque constructed with rose-tinted granite, and the majestic Putra Perdana - office of the Malaysian Prime Minister, the flower gardens and the Putrajaya lake. This will be followed by a visit and briefing at the PLUS North-South Expressway Traffic Monitoring Centre in Subang, before checking in for a night stay at a 4-star hotel in the Kuala Lumpur City Centre for a free-and-easy evening. Delegates will be staying in the Golden Triangle area, which features the popular shopping and culinary districts of Bukit Bintang, Kuala Lumpur City Centre and Chinatown.

On Day 3 (28 Oct), the post congress tour will be completed with a visit to the Stormwater Management and Road Tunnel (SMART) and Control Centre. The 9.7km long, 13m diameter tunnel diverts flood water away from the central Kuala Lumpur with the middle portion of the tunnel of about 3km in length serving as a double deck motorway. In year 2011, the SMART Tunnel won the UN Habitat Scroll of Honour Award, being recognised for its innovative and unique management of stormwater and peak hour traffic. After lunch, delegates will depart for the Kuala Lumpur International Airport (KLIA) for the return flight to Singapore. Scheduled departure from KLIA is at 5pm on 28 Oct 2019.

The tour fee includes coach transportation from Singapore to Kuala Lumpur; a single-room accommodation at 4-star hotels for the scheduled 1-night stay in Melaka and Kuala Lumpur respectively, and a one-way economy flight ticket from Kuala Lumpur to Singapore. The fee excludes meals other than lunches, travel visa to Malaysia, travel insurance and any other expenses not specifically included or described in the final tour itinerary.

Tour Schedule
• Saturday, 26 October 2019: 18:00 – Monday, 28 October 2019: 15:00

www.itsworldcongress2019.com #ITSWC19
Hot activities – Do remember to sign-up early for these demonstrations and be the first to experience new technologies on the road in Singapore, held at the nearby Float @ Marina Bay – the world’s largest floating stage, accompanied by an impressive skyline view of Singapore.

The demonstrations at the ITSWC 2019 will bring together companies and organisations that are showcasing their developmental vehicles, systems and concepts, some of which are already on trial or are being test-bedded in Singapore. They include:

- **Autonomous Vehicles (AV) Demonstrations and Rides** – AV rides on closed circuits within the Demonstration site.
- **ITS Vendor Demonstrations**
  - Infrastructure as a Service (IaaS) solution for cargo deliveries, V2X demonstrations, etc.
- **Static Showcase**
  - Next generation smart bus, passenger drone display and concept mock-ups, etc.

**General Guidelines**

- **Demonstration booking:** via Congress Mobile App (launched closer to the event) or at the Demonstration desk @ Suntec
- **Demonstration hours:** Tuesday, 22 – Thursday, 24 October: 09:00 – 17:30 and Friday, 25 October: 09:00 – 14:00

**AUTONOMOUS SHUTTLE DEMONSTRATION**

*Brought to you by: ComfortDelGro Corporation Limited*

The future is now! Singapore-based ComfortDelGro, one of the world’s largest land transport companies, and its partners Inchcape Singapore and EasyMile, will be showcasing the EasyMile EZ10 Autonomous Shuttle at the 26th Intelligent Transport System World Congress 2019. Visitors will get to board and experience first-hand what it feels like to be ferried around in one of the most widely deployed autonomous vehicles in the world.

**MOOSHUTTLE - MOBILITY SOLUTION FOR THE PEOPLE**

*Brought to you by: Moovita Pte Ltd*

Come and experience Moovita’s MooShuttle, a safe and comfortable self-driving shuttle that is able to ferry people places. The MooShuttle product range is suitable for moving people in urban areas, allowing short distance ferrying tasks to be easily automated.

More demonstrators to be published soon
SOCIAL EVENTS

WELCOME RECEPTION
Date and Time: Monday, 21 October 2019, 17:00 – 19:00
Venue: Exhibition Hall, Level 4, Suntec Singapore Convention and Exhibition Centre
Tickets: Included in Delegate Registration

Following the opening ceremony, join your colleagues at the Welcome Reception held at the exhibition hall. The Welcome Reception is an excellent opportunity to meet with peers from the industry and network with our commercial partners and exhibitors.

GALA DINNER
Date and Time: Wednesday, 23 October 2019, 18:30 – 22:00
Venue: Flower Field Hall, Gardens By the Bay
Tickets: SGD 250 per pax to be purchased at the time of registration

Join us on a truly immersive dinner experience at the World’s Largest Greenhouse (Guinness World Record 2015) – Flower Dome at Singapore’s Gardens by the Bay.

The evening will begin with a cocktail reception at the Waterview room followed by sit down dinner at the Flower Field Hall that is nestled within the Flower Dome of the Gardens and overlooking the periodically changing Flower Field display on one side, and a spectacular view of the Marina Bay skyline on the other. The special LED lights that adorn the ceiling add to the enchanting setting, captivating guests with its picturesque backdrop of perpetual spring.

As the evening unfolds, guests will enjoy good company, captivating performances and great music to dance the night away.

ASSOCIATED EVENTS
NOTE: Participants of the Associated Events (AE 01 – AE 09) must be registered for the ITS World Congress 2019 as a delegate (full congress or one day pass for the given day), speaker, moderator, student or media personnel. If you are registered an exhibition visitor, accompanying person, exhibition stand personnel or demonstrator, you will not be able to access the session rooms.

YOUTH LEADERSHIP DEVELOPMENT PROGRAMME
(By invitation only)

The Youth Leadership Development Programme – a part of the 26th ITS World Congress – is a fully-hosted 8-day programme that will be held from 18 to 25 October 2019.

The programme is designed to arouse the awareness of the tertiary students with respect to advanced intelligent transport technologies and concepts and inspire their creative and innovative ideas that solve real ITS problems.

Participants will get a chance to mingle with entrepreneurs, investors and business leaders from the ITS industry. Idea generation and professional training will also be conducted during the programme, which will provide young leaders with an excellent platform to showcase their creative ideas.

Youth leaders will work together in groups in an ideation on “Grand Challenge” topics and present to a distinguished panel during the 26th ITS World Congress 2019. The best work will be awarded at the ITS World Congress Closing Ceremony.

Organised by: Youth Development Sub-committee, 26th ITS World Congress
Date: 18 – 25 October 2019
Time: 09:00 – 18:00 on all days except Friday, 25 October where the Programme ends at 13:30
Contact Person: Leon Ng (youthleadership@itsworldcongress2019.com)

THE 54TH ISO/TC 204 PLENARY AND WORKING GROUP MEETINGS
(By invitation only)

ISO/TC 204 Intelligent Transport Systems is the technical committee for ITS standardisation within the International Organisation for Standardization (ISO). It has been leading the ITS standardisation globally for over two decades since its inception, and there are currently twelve active working groups. The committee holds two plenaries annually, and the next 54th ISO/TC 204 Plenary and Working Group Meetings will be held in Singapore, 14-18 October 2019. Plenary, working group meetings and technical workshops will be organised throughout the week. All meetings are open to ISO/TC 204 members and invited guests only. National delegates and participants are required to complete their registration through their national standards bodies by 27 September 2019.

Organised by: ISO/TC 204 Intelligent Transport Systems
Date: 14 – 18 October 2019
Time: 09:00 – 18:00 on all days
Contact Person: Adrian Guan, Committee Manager of ISO/TC 204 (adrian.guan@sae.org, +1.202.721.4236)

AE 01: AASHTO INTERNATIONAL DAY

Now in its 16th year as an integral part of the ITS World Congress, AASHTO International Day is presented by the American Association of State Highway and Transportation Officials in partnership with the US Department of Transportation. It brings together transportation officials from around the world to take on topics of consequence addressing the transportation challenges and opportunities facing public agencies.

The 16th Annual AASHTO International Day (AID) will focus on the 2019 ITSWC theme “Smart Mobility, Empowering Cities” and the latest ITS solutions and mobility technologies from around the world. Topics will include:

- MaaS, MoD, Ride Share, Livability and Active Transportations
- AV and CV – Policy, Legislative and Regulatory
- Digital Infrastructure – telecommunications – 5.9 GHZ and 5G
- Digital Infrastructure – Big Data and Infrastructure Readiness for CAV
- Cyber Security

Presentations will be offered by policy experts and practitioners representing each of the three ITS regions (ITS America, ITS Europe (ERTICO), and ITS Asia Pacific) and from Singapore, the host of this year’s World Congress.

All who are participating in the ITS World Congress are welcome to attend this event!

Organised by: American Association of State Highways and Transportation Officials in Partnership with the US Department of Transportation
Date: Monday, 21 October 2019
Time: 08:00 – 12:00
Venue: Room 325, Suntec Singapore Convention and Exhibition Centre
Contact Person: Venkat Nallamothu (nallamothu@aashto.org) or Tom Kern (tkern@transportationops.org).

AE 02: C-LEVEL FORUM ON MOBILITY SOLUTIONS FOR SMART CITIES

In line with the Congress theme “Smart Mobility, Empowering Cities”, this high-level session provides a platform for companies to share solutions that can enable cities to improve the well-being of residents living or working there. Smart transportation solutions are key to making cities function effectively, but these solutions have to be tailored to the unique transport needs of individual cities. The panel of speakers at this session will share their views on what smart mobility means to them and share possible solutions to make this possible.

Date: 21 October 2019
Time: 13:30 – 15:30
Venue: Nicoll 3, Suntec Singapore Convention and Exhibition Centre
Contact Person: Sha Idris (spex.mgt@itsworldcongress2019.com)

AE 03: GLOBAL FORUM ON MAAS

The MaaS Forum is part of the ITS World Congress 2019 which will be held in Singapore. It explores how MaaS can enable greater and more efficient use of public and shared transport in cities with dense public transport landscapes. In this context, this forum intends to delve into three aspects of doing so, from strategy to implementation. These are, namely, the viability of MaaS business models and their potential for integration within and across various sectors; the ways in which MaaS can operate and integrate and the challenges that will be faced in such cities; and the technological challenges and solutions in the implementation of MaaS in these cities. This discussion thus aims to unearth potential benefits and hurdles with regard to whether MaaS products will be transformative additions to the overall transport offerings in such cities.

Organised by: Land Transport Authority, Singapore
Co-organised by: ITS America, ERTICO – ITS Europe and ITS Australia
Date: Tuesday, 22 October 2019
Time: 13:00 – 17:00
Venue: Nicoll 1, Suntec Singapore Convention and Exhibition Centre
Contact Person: Wesen Ong (ONGO_Wesen@lta.gov.sg)
AE 06: C-ITS AND V2X WORKSHOP

The promise of improved safety, network management, and information services, and reduced environmental impact, is driving the rapid development of Connected ITS. In this workshop we will look at what existing V2X services are being deployed, the new services that are close to the market including long- and short-range cellular communications and hybrid solutions, and different approaches to data platforms. As well as the technology aspects we will consider alternative business models and some aspects of security. We will review different approaches to system architectures designed to ensure interoperability of C-ITS services across borders, interoperability testing, and recent developments with the US-Europe collaboration on C-ITS architectures.

Organised by: ERTICO – ITS Europe
Date: Wednesday, 23 October 2019
Time: 09:00 – 10:30
Venue: Room 324, Suntec Singapore Convention and Exhibition Centre
Contact Person: Eric Sampson (eric.sampson1@btinternet.com)

AE 07: INTELLIGENT VEHICLE INTERNATIONAL SYMPOSIUM

(form by invitation only)

Formerly known as the Intelligent Vehicle Testing Symposium, the event will bring together leaders from industry, government and academia from across the globe to discuss collaboration on policy regulations and standards for the development, testing and deployment of intelligent vehicle and transportation technologies.

Organised by: Michigan Economic Development Automotive Office, U.K. Centre for Connected and Autonomous Vehicles and Zenic
Date: Wednesday, 23 October 2019
Time: 11:30 – 16:30
Venue: Nickell 1, Suntec Singapore Convention and Exhibition Centre
Contact Person: Nathan Ferguson (ferguson@micigan.org)

AE08: 5G AND IOT BOOSTING THE DIGITAL TRANSFORMATION OF THE AUTOMOTIVE SECTOR

IoT has contributed tremendously to advancing the Connected and Automated Mobility (CAM) goals of safety, traffic efficiency and comfort. 5G, with its promise of a highly flexible architecture and extended reach of communication, can amplify IoT-CAM use cases in unprecedented ways. There are boundaryless economic benefits of using 5G’s network slicing model for IoT service provision. Harnessing the full potential of IoT and big data solutions powered by 5G requires a collaborative approach towards a global market vision. In this symposium, experts from Europe, Asia and the Americas will present perspectives on how 5G and IoT can bridge the gap to fully automated and on-demand mobility. The discussion will centre on:

1) technological trends and research and innovation strategies,
2) new business models for automated mobility, particularly data sharing along a large value chain involving diverse stakeholders supplying solutions; and
3) policy and regulation approaches across the three regions.

Organised by: ERTICO – ITS Europe
Date: 23 October, Wednesday
Time: 09:00 – 10:30
Venue: Room 324, Suntec Singapore Convention and Exhibition Centre
Contact Person: François Fischer (ffischer@mail.ertico.com) or Rita Bhandari (r.bhandari@mail.ertico.com)

AE 09: AUTONOMOUS MOBILITY SUMMIT

(by invitation only)

As part of the Intelligent Transport Systems World Congress in Singapore, the Land Transport Authority of Singapore will be organising an Autonomous Mobility Summit on 24 October 2019. This full-day Summit will gather global thought leaders from the government, industry and academia to discuss the latest developments in autonomous mobility. Through various panel discussions, Fireside chats and keynotes, the Summit will examine the current state of the art with respect to autonomous driving, assess its potential to shape the future of our cities, explore the key drivers that would accelerate the uptake of autonomous mobility globally as well as consider investor perspectives on the sector.

Organised by: Land Transport Authority, Singapore
Date: Thursday, 24 October 2019
Time: 09:00 – 17:30
Venue: Summit Room, Suntec Singapore Convention and Exhibition Centre
Contact Person: Benjamin Chia (benjamin_chia@lta.gov.sg)
The 2019 ITS World Congress will showcase more than 300 commercial exhibitors, public administrations and other organisations dedicated to ITS technology and services.

The main exhibition hall will be located on level 4, halls 401 – 406 and with additional exhibition showcases on level 3. To view participating exhibitors and exhibition floor plans, visit www.itsworldcongress2019.com/exhibition/
## EXHIBITOR LIST

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<td>Rodano (co-exhibitor at its Nordic Pavilion)</td>
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<tr>
<td>Roadcloud (co-exhibitor at its Nordic Pavilion)</td>
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<td>RTyle GmbH (RTyle Asia Pacific Pte Ltd)</td>
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<td>SAMS (co-exhibitor at its Nordic Pavilion)</td>
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<td>Sensors (co-exhibitor at Ertico its Europe)</td>
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<td>Sensys Gatso Group (co-exhibitor at its Nordic Park)</td>
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<td>Shenzhen Genvec Technologies Pte. Ltd.</td>
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<td>Siemens Mobility Singapore</td>
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<td>Silicon Billabong (co-exhibitor at its Australia)</td>
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<td>Smartmicro</td>
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<td>Sumitomo Electric Industries, Ltd. (co-exhibitor at Japan Pavilion)</td>
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<td>Syntony</td>
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<td>Tallinn City (co-exhibitor at its Nordic Pavilion)</td>
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<td>The University of Tokyo (co-exhibitor at Japan Pavilion)</td>
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<tr>
<td>TRAFFIC DATA SYSTEMS GMBH</td>
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<td>Toshiba Infrastructure Systems &amp; Solutions Corporation (co-exhibitor at its Japan Pavilion)</td>
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<td>Toyota Motor Corporation</td>
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<td>Toyota Tsusho Corporation</td>
<td>#B05</td>
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<td>Traffic Data Systems GMBH (co-exhibitor at its Deutschland &amp; City of Hamburg)</td>
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<td>TRAFFIC MANAGEMENT FINLAND GROUP (co-exhibitor at its Nordic Pavilion)</td>
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<td>Transatel (co-exhibitor at its France)</td>
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<td>Transport for New South Wales (co-exhibitor at CSIRO/Data 61)</td>
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<td>Traveller Information Services Association - TISA (co-exhibitor at Ertico its Europe)</td>
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<td>Triple Sign System AB (co-exhibitor at its Nordic Pavilion)</td>
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<td>UnderstandAI</td>
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<td>UTMS Society of Japan (co-exhibitor at Japan Pavilion)</td>
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<td>Valeo (co-exhibitor at its France)</td>
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<td>Vector Informatik GmbH</td>
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<td>Vehicle Information and Communication System Center (co-exhibitor at Japan Pavilion)</td>
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<td>VIRT (co-exhibitor at its Nordic Pavilion)</td>
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<td>VPT (co-exhibitor at its Nordic Pavilion)</td>
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<td>Vizualy, LLC/Matsuri &amp; Co., Ltd</td>
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<td>Wavertonix</td>
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<td>West Nippon Expressway Company Limited (co-exhibitor to its Japan)</td>
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<td>Workplace Solutions GMBH (co-exhibitor at its Deutschland &amp; City of Hamburg)</td>
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<td>XEE (co-exhibitor at its France)</td>
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<td>Yaham Optoelectronics Co., Ltd.</td>
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<tr>
<td>Zenzin Co., Ltd. (co-exhibitor to its Japan)</td>
<td>#207</td>
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</tbody>
</table>

## EXHIBITION OPENING HOURS

- **Monday, 21 October 2019**: 17:00 – 19:00
- **Tuesday, 22 October 2019**: 08:30 – 18:00
- **Wednesday, 23 October 2019**: 08:30 – 18:00
- **Thursday, 24 October 2019**: 08:30 – 18:00
- **Friday, 25 October 2019**: 08:30 – 15:00

## REGISTRATION & ACCOMMODATION
REGISTRATION
REGISTER BY 19 AUGUST 2019 TO ENJOY
EARLY BIRD RATES!

Click here to Register Today

REGISTRATION RATES

<table>
<thead>
<tr>
<th>Registration Category</th>
<th>1 Apr – 19 Aug (Early Bird)</th>
<th>20 Aug – 13 Sep</th>
<th>From 14 Sep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Congress (5-day) Pass</td>
<td>SGD1,795</td>
<td>SGD1,995</td>
<td>SGD2,195</td>
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<tr>
<td>Congress Delegate</td>
<td>SGD1,250</td>
<td>SGD1,350</td>
<td>SGD1,450</td>
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<tr>
<td>Developing Countries</td>
<td>Flat rate of SGD1,450</td>
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<tr>
<td>Speaker / Moderator</td>
<td>Flat rate of SGD1,450</td>
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<tr>
<td>Student</td>
<td>SGD450</td>
<td>SGD500</td>
<td>SGD550</td>
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<tr>
<td>One Day Pass</td>
<td>SGD1,000</td>
<td>SGD1,100</td>
<td>SGD1,200</td>
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<tr>
<td>One Day Speaker / Moderator</td>
<td>Flat rate of SGD870</td>
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<tr>
<td>One Day Student</td>
<td>SGD150</td>
<td>SGD175</td>
<td>SGD190</td>
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<tr>
<td>Exhibition Pass</td>
<td>Flat rate of SGD350</td>
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<tr>
<td>Exhibition Stand Personnel / Demonstrators (inclusive of Lunch)</td>
<td>Flat rate of SGD350</td>
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<tr>
<td>Accompanying Person (Access to Exhibition Only)</td>
<td>No charge</td>
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</table>

ADD-ON SELECTIONS
Limited slots available. Registrations are based on a first-come, first-served basis.

Social Events
<table>
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<tr>
<th>Social Events</th>
<th>Location</th>
<th>Rate</th>
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<tbody>
<tr>
<td>Gala Dinner (23 Oct, Evening)</td>
<td>Flower Field Hall, Gardens by the Bay</td>
<td>SGD250</td>
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</tbody>
</table>

Technical Tours
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<thead>
<tr>
<th>Technical Tours</th>
<th>Location</th>
<th>Rate</th>
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</table>

All rates quoted are in Singapore Dollars (SGD), and inclusive of 7% Goods and Services Tax (GST).

For more information, please visit the website: www.itsworldcongress2019.com

ACCOMMODATION

MC1 Group Asia Pacific is the appointed Housing Partner for the Congress, and is offering an extensive range of accommodation options for both groups and individuals. All hotels are located within close proximity to the main Congress venue, Suntec Singapore. All reservations made will be on a first-come, first-served basis.

For special Congress hotel rates, please make your reservation at ITS WC 2019 website or click here to make your booking: https://itsworldcongress2019.com/congress-hotels/.

5 Stars
1. Carlton Hotel Singapore
2. Fairmont Singapore
3. Grand Park City Hall
4. Hotel Grand Pacific
5. Hotel Mi
6. JW Marriott Singapore South Beach
7. Mandarin Oriental
8. Marina Mandarin
9. Pan Pacific Singapore
10. PARKROYAL on Beach Road
11. Peninsula Excelsior Hotel
12. Swissôtel The Stamford
13. The Ritz-Carlton, Millenia Singapore

4 Stars
1. 1 Carlton Hotel Singapore
2. Hotel Grand Pacific
3. PARKROYAL on Beach Road
4. Peninsula Excelsior Hotel

3 Stars
1. Hotel Mi
2. V Hotel Bencoolen
Most people arrive in Singapore by air. Its status as a major airline hub in Asia makes Singapore a natural starting or ending point for a multi-country tour of Southeast Asia. Most large international airlines have routes to Singapore, in addition to the island’s own highly regarded airline, Singapore Airlines.

VISAS

Most foreigners coming into Singapore do not require visas for entry and may be given social visit passes for up to 30 days upon their arrival in Singapore. However, it is best to consult your local consular office for the latest information. Please note that visa processing may take up to four weeks. We recommend you to apply as early as possible before the World Congress.

GETTING TO THE CITY

City Shuttle

The City Shuttle will bring passengers to most downtown hotels at a rate of SGD9 per adult or SGD6 per child (below 12 years of age). The City Shuttle departs every 15 minutes during peak hours, and up to 30 minutes during non-peak hours. The Shuttle can be booked via the 24-hour Ground Transport Concierge at the Arrival Halls or online at www.cityshuttle.com.sg/cityshuttlepublic/.

Airport Transfer

Choose from the two vehicle options below based on your needs:

- 4-seater limousine: SGD55.00* per departure from the airport
- 7-seater large taxi: SGD60.00* per departure from the airport

Airport transfers can be booked via the 24-hour Ground Transport Concierges at the Arrival Halls.

Train

To get to the City, take the train from Changi Airport MRT Station (CG2) to Tanah Merah MRT Station (EW4), then transfer to the East West Line towards Tuas Link MRT Station (EW33). Alternatively, take the train from Changi Airport MRT Station to Expo MRT Station (CL1/DT35), then transfer to the Downtown Line towards Bukit Panjang MRT Station (DT1).

First train from Changi Airport MRT Station to Tanah Merah MRT Station:
- Monday to Saturday: 05:31
- Sunday and public holidays: 05:59

Last train:
- Connecting to Tuas Link: 23:18, daily
- Connecting to Pasir Ris: 00:06, daily

Single-ride tickets and EZ-link cards can be purchased at all train stations. Other than buying a travel card, you can also tap your contactless credit/debit card* (MasterCard®, Visa and mobile wallets) at the MRT fare gates as you would usually do with a travel card.

Public Bus

Terminals 1, 2 and 3: Bus stops are located at the basement bus bays. You can take buses 24, 27, 34, 36, 53, 110 and 858 from there.

Terminal 4: At the bus stop next to Car Park 4B, you can take buses 24, 34, 36 and 110. At the bus stop near the SATS Inflight Catering Centre 1, you can take buses 27, 53 and 858.

Please prepare the exact fare for your trip as no change will be given.

You can also tap your contactless credit/debit card** (MasterCard®, Visa and mobile wallets) at card readers on board buses at the point of boarding/alighting and you are good to go!

^For foreign-issued credit/debit cards, administrative charges and other fees may apply. Visit simplygo.com.sg for more information.

Taxi

Taxis are available for hire at the taxi stands in the Arrival areas of each Terminal. A ride to the City takes about 30 minutes and costs between S$20 and S$40. All fares are metered. There is an additional Airport Surcharge for all trips originating from the Airport:

- Fri–Sun (17:00 - 00:00): S$5 Airport Surcharge
- All other times: S$3 Airport Surcharge
- Midnight surcharge (00:00 - 06:00): 50% of final metered fare
- Peak-hour surcharge (06:00 - 09:30, Mon–Fri and 06:00 - 00:00, Mon–Sun): 25% of final metered fare
TRAVEL

CONGRESS AND EXHIBITION VENUE

Suntec Singapore Convention & Exhibition Centre is the world’s leading meetings and conference centre, located at the heart of Asia’s most integrated meetings, conventions and exhibitions hub.

With great versatility featuring 42,000m² of flexible customisable space, free WiFi, digital signage, an excellent range of culinary choices and a dedicated team of service experts, this award-winning facility can cater to events from 10 to 10,000 persons.

Only 20 minutes from Changi International Airport, Suntec Singapore is conveniently located in the Central Business District and just minutes from the city’s entertainment and cultural attractions. Suntec Singapore offers direct access to 5,400 hotel rooms, 1,000 retail outlets, 300 restaurants, 6 museums and Esplanade – Theatres on the Bay.

Suntec Singapore Convention and Exhibition Centre
1 Raffles Boulevard, Suntec City
Singapore 039593

www.suntecsingapore.com

GETTING TO THE CONGRESS CENTRE

Train

Suntec Singapore is easily accessible by three MRT stations - Esplanade or Promenade via the Circle Line, and City Hall via the East West Line.

- From CC3 Esplanade MRT Station (3 minutes): Take Exit A and follow the signage to the Centre
- From CC4 Promenade MRT Station (5 minutes): Take Exit C, walk through Suntec City Mall and follow the signage to the Centre
- From EW13 City Hall MRT Station (8 - 10 minutes): Walk through City Link Mall and then Esplanade Exchange to get to the Congress Centre

Bus

Depending on which bus service you are taking, you may choose to board or alight at the following stops around the Centre:

- Suntec Singapore:
- Opposite Suntec Singapore:
  36, 36A, 36B, 97, 97E
- Suntec Tower Two:
  107M
- Suntec Tower Three:
  36, 36A, 36B
- Nicoll Highway next to Suntec City Mall:
  10, 10E, 14, 14A, 14E, 16, 70, 70A, 70M, 196, 196A

Taxi

If you’re taking a taxi to Suntec Singapore, alight at the driveway of the Centre in front of The Big Picture on Level 1.

For taxi or private car bookings:
- Comfort and CityCab: 6552 1111
- TransCab: 6555 3333
- Prime Taxi: 6778 0808
- Premier Taxi: 6363 6888
- Grab (downloadable via App Store or Play Store)
- GOJEK (downloadable via App Store or Play Store)

Car

If you’re driving to Suntec Singapore, choose from the following routes for access to the carpark:

- Nicoll Highway
- Raffles Boulevard (from Bras Basah Road)
- Temasek Avenue (from Raffles Boulevard)
- Rochor Road exit from East Coast Expressway (ECP)

GENERAL GUIDELINES

LANGUAGES

English is the official language of the Congress. All presentations, printed material and online information will be available in English only.

INTERNET ACCESS

Free WiFi will be available in all areas of the Congress centre. Participants can connect to: FREE_WiFi@SuntecSingapore.com. No password is required.

LIABILITY AND INSURANCE

The Conference Secretariat and Organisers will not be liable for personal accidents, loss of or damage to private property of participants and accompanying persons. Participants are advised to subscribe to their own personal travel and health insurance.

IMPORTANT NOTE

Programme is correct at time of publishing. Any changes will be updated periodically.

Notably, Singapore prides herself to be among the potential early adopters of Autonomous Mobility solutions in an urban environment. Visiting the Demonstrations is a must for anyone who wants to see, touch or ride on some of the vehicles. Registrations for demonstrations shall be made via Congress mobile app.

Unlock exclusive fares on Singapore Airlines & SilkAir when you apply promo code: ME17014

www.singaporeair.com

REGISTRATION DESK HOURS

The Registration Desk will be situated at Concourse 4 on Level 3 of the Suntec Singapore Convention & Exhibition Centre.

The opening hours are as follows:

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<tr>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td>Sunday, 20 October</td>
<td>14:00 – 18:00</td>
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<tr>
<td>Monday, 21 October</td>
<td>08:30 – 19:00</td>
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<tr>
<td>Tuesday, 22 October</td>
<td>08:30 – 18:00</td>
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<tr>
<td>Wednesday, 23 October</td>
<td>08:30 – 18:00</td>
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<tr>
<td>Thursday, 24 October</td>
<td>08:30 – 18:00</td>
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<tr>
<td>Friday, 25 October</td>
<td>08:30 – 18:00</td>
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</tbody>
</table>
Zipster, ITSWC 2019’s official MaaS App, enables you to move around Singapore with much convenience and to explore the many mobility options at your fingertips. Here is what you can expect when you download the Zipster App and register yourself as a conference delegate.

Event-exclusive offerings
1. A limited edition Z card for travels on public transport (bus and MRT), sponsored by mobilityX, EZlink and Transitlink.
2. Complimentary 8 SGD in-app credits, so that you can try out mobility services available on Zipster.
3. Destination planner for landmarks and attractions in Singapore

App-exclusive features you should look out for
1. Real-time arrival information for nearby bus and MRT
2. Shuttle bus services booking to ease your busy conference schedules
3. Real-time availability for nearby shared bikes
4. Purchase of promotional rider Grab and GOJEK

Get up-to-date congress information, book your demonstration rides, connect with fellow participants and capture business leads from the convenience of your smartphone.

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Contact Information
www.itsworldcongress2019.com

Technical Tours and Demonstrations
Aries Low
Tel: +65 3163 4064
Email: info@itsworldcongress2019.com

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Email: info@itsworldcongress2019.com

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Gayathri De Silva
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Email: media@itsworldcongress2019.com

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Jerome Buchanan
Danny Perry
Zhixin Teo
Cizlie Sunto
Tel: +65 6411 6682
Email: spex.sales@itsworldcongress2019.com

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