



Association Number A03958 | ABN 64 217 302 489

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# AUSTRALASIAN RAILWAY ASSOCIATION SUBMISSION

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To the  
Standing Committee on Infrastructure,  
Transport and Cities

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On the  
Inquiry into Automated Mass Transit

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## THE ARA

The Australasian Railway Association (ARA) is a not-for-profit member-based association that represents rail throughout Australia and New Zealand. Our members include rail operators, track owners and managers, manufacturers, construction companies and other firms contributing to the rail sector. We contribute to the development of industry and government policies in an effort to ensure Australia's passenger and freight transport systems are well represented and will continue to provide improved services for Australia's growing population.

The ARA thanks the Standing Committee on Infrastructure, Transport and Cities for the opportunity to provide this submission to the Inquiry into Automated Mass Transit. For further information regarding this submission, please contact Emma Woods, General Manager Passenger and Corporate Services via [ewoods@ara.net.au](mailto:ewoods@ara.net.au) or 02 6270 4507.

## INTRODUCTION

Australia's growing, aging and urbanised population is putting increasing pressure on our public transport systems, of which, rail provides the backbone, moving the masses. Governments and rail organisations in Australia and around the globe are increasingly looking to automation to safely increase the capacity of existing infrastructure, improve the customer experience and ensure rail services modernise to meet the needs of Smart Cities of the future. More trains and more services are required today and into the future to meet the needs of our growing population to travel and move freight. Automation will assist to provide the greater capacity required by passenger and freight rail networks.

Automation in the rail industry is not a new concept. It is provided in a myriad of ways and at various levels, from a whole of system approach via driverless metro systems to components of rail systems such as digital signalling systems, automatic train control, smart ticketing, automated infrastructure monitoring for maintenance etc.

Automation is proven to provide many reliable benefits. In rail, automated systems and services reduce the reliance on human operation and therefore reduce the risk of human error whilst allowing trains to be safely run faster and closer together, increasing the capacity of the network using existing

infrastructure and delivering a service that is more accurately timed and efficiently operated for improved customer satisfaction.

Outside of rail, the possibilities for automated cars are creating excitement globally. Autonomous vehicles should be embraced but they will not remove the need for mass transport. Whilst in theory, automated vehicles should allow cars and trucks to safely travel closer together and at faster speeds, automated cars will still require and utilise finite valuable road space to travel and as a result, will still create road congestion. Removing drivers from cars will not remove congestion from our roads or the need for mass transport. Rather, automated cars, like on demand services should be explored as the solution to the 'first and last mile' connections required with mass transit.

The average passenger train removes 800 cars from our roads and a light rail vehicle can move 20,000 people an hour in a single corridor. In 2017-18, the Sydney Trains network provided 359.2 million customer journeys, a 30 per cent increase in five years.<sup>i</sup> Automated cars have a place in our cities of the future, but they will not replace the need for mass transit heavy and light rail to move the masses.

## Metro systems

Driverless trains or metros have been in operation since 1983. In May 2018, the International Association of Public Transport (UITP) announced that 1003km of automated rail metros were in operation around the globe.<sup>ii</sup> Growth in automated metros has been exponential and is expected to expand faster in the next decade.

According to the UITP, no city that has built an automated metro line has at a later stage removed the automation. The UITP sites the benefits of metro automation as "safety, flexibility of operations, larger capacity, cost efficiency and more fulfilling jobs for staff, which lead to an enhanced customer service".<sup>iii</sup>

The name 'metro' arises from a metronome to signify the lack of timetable but consistent, regular 'turn-up-and-go' service. Sydney Metro will be the first fully automated, driverless metro in Australia. Driverless trains will arrive every four minutes in the peak with an ability to increase to two-minute headways. Automated platform-screen doors, another first in Australia, will allow customers to safely board and disembark faster, increasing the capacity and safety of the system.

Sydney Metro should illustrate what is possible for automated mass transit systems in Australia and pave the way for additional automated, driverless rail lines in Australia. Projects such as the Melbourne Airport Link are also considering driverless automated trains.

The benefits of driverless metros are extensive; they remove the risk of human error, increase service punctuality and reliability, reduce energy usage, reduce staff operating costs and the reliance on labour to increase or amend service provisions, etc.

## Digital Signalling Systems / Automatic Train Control

Historically, railways have relied on track-side signals or signalling systems to visually notify train drivers whether it is safe to proceed along the track. As a reflection of Australia's State-based settlement, Australian rail operators run on different signalling systems in different states.

Modern digital signalling systems or automatic train control safely removes the reliance on track-side signalling, using automated systems that allow passenger and freight operators to provide more services using existing infrastructure as trains can be run closer together. Digital signalling systems increase the network capacity and improve the customer service offering by reducing wait times for customers and helping to manage station crowding. The removal of the reliance on track-side signalling systems also improves reliability by reducing the likelihood of signalling faults and therefore unplanned service disruptions which in turn reduces maintenance costs.

Multiple digital signalling systems or automatic train control systems are in operation around the globe. The key locally is to ensure interoperability is achieved and that another break of 'gauge' is not introduced.

## Automated asset monitoring for maintenance

New infrastructure projects are vital to meet the needs of our growing population but so too is the maintenance of existing and new infrastructure and rollingstock. Predictive maintenance monitoring systems can be utilised to monitor and report against faults and asset condition, allowing operators to undertake preventative maintenance or even automated self-correction rather than traditional distance or travel-time scheduled maintenance. Automation and data monitoring systems allow predictive maintenance of assets reducing down-time and improving maintenance efficiencies.

Automated asset management is utilised to inform and automate maintenance decision making to maximise the use of high cost assets by reducing the impact and lost revenue of unavailable rollingstock or infrastructure. This smarter approach to monitoring and asset maintenance can also extend the lifecycle of parts with decision-making based on data analytics and insights.

## Smart Ticketing

Smart ticketing systems provide many benefits including streamlined customer travel experience; negating the need for single, weekly or monthly use paper tickets; providing extensive customer travel insights for operators and Government alike, ensuring customers pay correct travel fares etc.

The Opal Card in Sydney, Myki Card in Melbourne, Go Card in Brisbane and Metrocard in Adelaide will be superseded by mobile phone or credit card ticketing systems. These systems have been in operation in Japan for years and allow national integration. New South Wales has recently expanded a trial of credit card and mobile phone ticketing to its regional and metro rail services.

The opportunity to use mobile phones and credit cards for transport ticketing systems nationally across Australia will improve the accessibility of and integration of our transport systems. Seamless integration between all modes is vital.

## Key Industry initiatives - Smart Rail and iTrace

### Smart Rail

The ARA acknowledges the importance of achieving a whole-of-industry direction for the rail industry's adoption and deployment of telecommunications and technology-based systems. This underscores the recent development and release of the Smart Rail Route Map, which reflects the rail industry's shared desire to identify a long-term vision for technology in the rail sector through the establishment of a common view of priorities, themes, timelines and actions for the next 30 years.

The Smart Rail Route Map Interim Report, released at AusRAIL 2018, focuses heavily on the opportunities and challenges associated with ever increasing levels of automation in the Australasian railway industry. The report highlights:

- New technologies will require a shift in the skill-sets in the rail sector towards automation, and that people management skills will move towards the interface of between human and digital workplaces.
- Automation will pave the way for greater simplification of journey planning, allowing greater access to a reliable, multimodal transport service, with improved last mile connections
- Potential opportunities exist to for greater integration of cloud-based computing, analytics and other systems to enable automation of traffic and network management systems
- Complex systems will be simplified through automation, balancing capacity and flexibility, while humans will maintain supervisory control of technology.
- An industry development platform needs to be developed to monitor where the industry is heading with regards to automation, why the direction is important and the priority tasks, helping the workforce visualise the opportunities and potential pathways to the future.
- New systems, based on automation, will allow traffic management to progress to a role of train service optimisation and significantly improve track capacity and train safety

More information on Smart Rail is available here: [www.smartrail.net.au/](http://www.smartrail.net.au/)

## **iTRACE**

ARA's iTRACE initiative is implementing global data standards (GS1) in the rail industry to standardise the way all assets and materials in the rail industry are identified, barcoded and tagged. Standardising the capture of data relating will help to improve efficiency, lower costs and deliver better customer service and bring industry-wide efficiencies by setting the foundation for automation.

In particular, iTRACE is:

- Providing a critical building block upon which digital capabilities and automation of operational processes can be built
- Reduced ongoing costs by automating basic operational processes
- Achieving greater levels of consistency of object identification to support greater automation initiatives as the industry moves towards greater digitalisation through the SmartRAIL project.

## Energy management

Fuel on average equates to 30 percent of a rail operator's operating costs. Some operators utilise train driver optimisation systems to improve the efficiency of train drivers and minimise fuel usage and thereby operating costs.

## National Technology Strategy

The Freight on Rail Group has proposed that an important priority for both interoperability and investment should be the development of an appropriate national technology strategy for rail transport. The strategy should provide the basis for a consistent approach to the further development and implementation of in-cab signalling, new radio technology and systems and other technology systems relating to train monitoring, protection and warning systems.

## CONCLUSION

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Whilst automation is not a new concept in the rail industry, greater use of automation will assist passenger and freight rail operators to increase their capacity and therefore ability to meet the needs of Australia's growing population.

Interoperability between automated systems, particularly across State borders is integral to ensure the rail industry does not end up with another 'break of gauge'

Whilst automated, driverless cars provide an exciting revolution in transport and are a clear potential to provide the 'first and last mile' for public transport, mass transport such as heavy and light rail will still be vital to provide the spines for seamless integrated mass transit systems.

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<sup>i</sup> Sydney Trains Annual Report 2017-18

<sup>ii</sup> [www.uitp.org/news/uitp-celebrates-rail-achievement-automated-metro-reaches-1000-km-milestone](http://www.uitp.org/news/uitp-celebrates-rail-achievement-automated-metro-reaches-1000-km-milestone)

<sup>iii</sup> [www.uitp.org/sites/default/files/1000kmMetro\\_pressrelease\\_FINAL.pdf](http://www.uitp.org/sites/default/files/1000kmMetro_pressrelease_FINAL.pdf)