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BOMBARDIER
the evolution of mobility

MOBILITY SOLUTIONS FOR AUSTRALIA

BOMBARDIER
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Brisbane, Queensland

THE EVOLUTION OF MOBILITY

Bombardier is the world's leading manufacturer of both planes and trains.

We've built an extensive and diverse portfolio of winning mobility solutions, but it's not just our products and services that make us a global leader. The most important success factor is our employees. Together we're focused on making mobility more efficient, sustainable and inviting than ever before. We're changing the way people travel. Looking far ahead while delivering today, we are evolving mobility worldwide by answering the call for more efficient, sustainable, and enjoyable transportation everywhere.

Bombardier Transportation is a world-leading manufacturer of innovative transport solutions. With production and engineering sites, and service centres in 28 countries, we cover the full spectrum of rail solutions, ranging from complete trains to sub-systems, maintenance services, system integration and signalling. Our installed base of rolling stock exceeds 100,000 rail cars and locomotives worldwide.

We are very experienced in delivering turnkey transportation systems and have supplied over 60 systems currently in operation around the globe.

Our 39,400 employees continue a proud tradition of delivering ingenious rail transportation solutions, including:

- **Rail vehicles:** automated people movers, monorails, light rail vehicles, advanced rapid transit, metros, commuter/regional trains, intercity/high-speed trains and locomotives;
- **Rail control solutions:** advanced signalling solutions for mass transit and mainline systems;
- **Propulsion and controls:** complete product portfolio for applications ranging from trolley buses to freight locomotives;
- **Bogies:** product portfolio for the entire range of rail vehicles;
- **Transportation systems:** customised "design-build-operate-maintain" turnkey transport system solutions;
- **Services:** fleet maintenance, operations and maintenance, vehicle refurbishment and modernisation, and material management.

BOMBARDIER IN AUSTRALIA

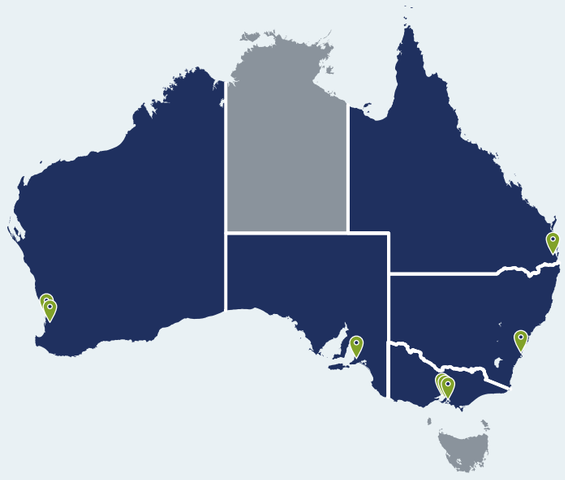
Bombardier Transportation has enjoyed a 60+ year presence in Australia.

During this time we have provided the full spectrum of rail solutions from the manufacture of commuter trains to the supply of complete rail transportation systems and system integration. With local engineering and manufacturing capabilities, we also provide solutions for signalling, propulsion and control technology, asset management, and through-life support.

As a rail technology leader, we have more than 1,000 employees in Australia and operate in 22 locations across the country. Our manufacturing hub is headquartered in the State of Victoria and we have established maintenance facilities in the cities of Melbourne, Perth, Brisbane, Gold Coast and Adelaide.

Our Centre of Excellence for Industrial Design and Engineering is based in both Brisbane and Melbourne, which allows for customised rail solutions to suit local conditions. One of the most exciting examples of this is the Gold Coast Light Rail vehicle, which was the first tram in the world to be custom fitted with surf board racks. This local feature has been well received and proven highly popular among Gold Coast commuters.

Australians place high value on local content, employment and opportunity. We have, as a result, built strong long-term partnerships with more than 1,500 Australian suppliers and we have a commitment to growing this footprint. This healthy supply chain plays a significant role in our ability to contribute towards growing the rail and manufacturing industry across Australia.



Bombardier offices, depot/service centres and manufacturing sites

OUR SUSTAINABLE PRODUCTS

Bombardier offers the broadest portfolio in the rail industry and has a solution for every application and market.

As an industry leader, we have a strong portfolio of attractive, proven transportation technologies and turnkey systems engineered to improve our customers' performance. From mainline to metro, light rail to locomotives, our strategy is one of continuous development that provides the most effective and cost-efficient rail solutions today and in the future.

Our rail vehicles provide sustainable mobility throughout their lifecycle. Combining attractive design and technical innovation, we enable optimal operational performance with the highest levels of reliability, availability, maintainability, safety, environmental performance and cost-efficiency.

Trams and light rail vehicles (LRV)
Our *FLEXITY* light rail systems provide a sound public transport infrastructure around which a city can grow. They are either integrated into urban traffic ('on street') or operate on segregated tracks. The customisable vehicles allow passengers to enter and exit quickly and easily with step-free access. Equally attractive in both their interior and exterior designs, our trams provide spacious and comfortable travel for passengers. These highly flexible trams and light rail vehicles have many customisable options including end cab, livery, configuration and interior features.

Melbourne E-Class trams
Melbourne's tram network is a famous and iconic symbol of the city and one of the largest tram networks in the world. Bombardier is supplying 70 new *FLEXITY* low floor vehicles that were specially designed for excellent performance in Melbourne's climate and operate on its existing rail infrastructure.

FLEXITY E-Class trams in Melbourne

VLocity trains in Victoria

Commuter trains

Our commuter trains provide millions of passengers with stress-free connections between city centres and growing suburban areas every day. These systems are designed to maximise passenger capacity and operational savings. Their attractive appearance and outstanding comfort create a favourable impression with the riding public, too. Our range of vehicle selection includes options for single-deck or double-deck trains and offers benefits to established agencies and start-up operations alike.

Regional trains

From rural locations to city centres in minutes, the growing demand for attractive inter-regional and region-to-city connections has led to the rebirth of many rail lines. Passenger comfort and convenience is paramount and our regional trains offer flexible and robust interiors as well as the technology to achieve minimum journey times. Our customised solutions enable operators to select from a range of configurations with scalable traction power to maximise operational flexibility. Operators also have a choice of diesel, electric or hybrid technology.

Queensland New Generation Rollingstock (NGR)

Facing dramatic population growth in the next 30 years, Queensland is delivering an effective public transportation solution for its residents with its New Generation Rollingstock project. Seventy-five new trains will operate across the entire South East Queensland rail network, which covers more than 800 km. All commuters will experience increased availability, capacity, comfort and safety including enhanced security, wifi, air conditioning and accessible toilet facilities.

V/Line VLocity trains

Serving the State of Victoria since 2005, VLocity 160 diesel multiple units (DMUs) offer passengers a quick, comfortable and proven mobility solution. Built locally in Dandenong, these trains operate at a maximum speed of 160 km/h, and were designed to address emerging passenger trends, safety standards and performance requirements. The VLocity 160 DMUs maintain a high rate of availability, which ensures highly efficient rail service.

New Generation Rollingstock for Queensland

WE ARE A SOLUTION PROVIDER

Bombardier delivered the Gold Coast light rail system as a turnkey transportation project

We take pride in providing integrated solutions, driving innovation and being a long-term partner shaping the evolution of mobility.

Our solutions create substantial benefits for operators, passengers, societies and the environment. From very high speed trains to robust rail control signalling systems, we combine the world's largest product range with decades of in-depth experience to develop innovative solutions that solve the world's toughest mobility challenges.

System integration

In the cost-sensitive world of public transportation, a turnkey supplier is the most efficient choice. Partnering with Bombardier for system integration can add significant value. With a global presence and a local perspective, we work in partnership with civil engineering and construction companies to provide tailored transportation systems that meet the specific needs of each customer. We are the world's foremost supplier of turnkey transportation systems, and have expertise delivering:

- design-build-operate-maintain (DBOM) projects, including project financing;
- public private partnership (PPP) projects; and,
- 45 years of operations and maintenance services.

Gold Coast light rail system

The fast growing city of Gold Coast opened its new modern light rail transit system in July 2014. Expected to carry 50,000 passengers per day, 14 low-floor *FLEXITY* 2 vehicles will meet the needs of local residents as well as the stream of tourists. Connecting 16 stations, the 13 km route passes through many of the city's key activity centres. Designed with Queensland's diverse population in mind, the fleet of electrically powered, low-floor trams are equipped with enhanced air conditioning and surfboards racks.

Services

We offer services, skills and expertise to optimise the performance of your vehicles once they enter service. We help our customers minimise operational costs and maximise revenue over an extended asset lifetime, while ensuring the highest levels of passenger safety and comfort. Our service offerings range from complete 24-hour operation and maintenance, to fleet or asset life management, and component re-engineering and overhaul.
We ensure the reliable performance of your vehicle fleet and systems, and provide cost-effective solutions that ensure they last longer. We strive continuously to improve reliability, availability, maintainability and safety while supporting and strengthening sustainable rail transport.

Adelaide DMU vehicle in maintenance facility

Fleet maintenance

We know how important the performance and reliability of all rollingstock fleets are. By working closely with our customers, we provide a range of solutions that keep a fleet optimal. We can provide total fleet maintenance and take responsibility for all of your fleet requirements, from refuelling and cleaning to depot management and routine maintenance, such as provision of trains to operators' service diagrams. You can leave everything to us, safe in the knowledge that your fleet's in capable hands.

Adelaide DMU and EMU Fleet Maintenance
We are providing full fleet maintenance of 70 DMU cars, 22 x 3 Adelaide A-City EMUs, as well as cleaning and facility maintenance. We designed and performed a midlife refurbishment of the passenger environment, including a digital communications system. These rail cars are mature, and, despite obsolescence, challenges, reliability has more than doubled since the start of our contract in 2005.

Our total fleet maintenance packages can include:

- Full depot and warehouse management
- Maintenance and vehicle scheduling across one / multiple fleets
- Monitoring and optimizing vehicle and material performance
- Provision of personnel for preventative and corrective maintenance
- Component repair and overhaul
- Crash damage repair and heavy maintenance
- Round the clock servicing for vehicle optimization
- 24/7 help desks
- Condition based maintenance
- Failure and reliability reporting tools

Dynamic monitoring for maximum performance

Bombardier uses a balanced and planned preventative maintenance strategy towards its projects. This approach provides an all-encompassing, whole-of-life program that integrates all maintenance activities to achieve consistent and planned preventative maintenance while ensuring balanced utilization of the fleet.

We proactively manage fleet performance via the Automated Vehicle Inspection System (AVIS). AVIS utilises the latest technology and is installed at depots for remote monitoring of rail cars using our innovative on-board diagnostic system, as well as condition based monitoring algorithms that identify early component degradation. This provides our maintenance team with automated data which enables proactive rectification of faults reducing the severity, impact and cost of repairs.

Additionally, our innovative *ORBITA* diagnostic system assesses developing faults in real time and instigates corrective maintenance intervention by automatically generating work orders for the maintainers through Maximo to permit immediate maintenance intervention once vehicles return to the Depot.

VLine Classic Fleet Maintenance

An easy to maintain vehicle minimises downtime and maximises availability. We apply our proven Design for Maintenance (DfM) philosophy, which identifies opportunities during the design period to maximise whole of life outcomes by reducing the duration and frequency of maintenance.

Balanced maintenance

Balanced maintenance forms the basis of our maintenance solutions and is considered standard practice. We have been actively carrying out balanced maintenance for over 20 years, in Australia and overseas. All balanced maintenance schedules are designed to be carried out during off-peak periods. Our national and international rollingstock maintenance experience has been used to develop the balanced maintenance regimes currently in place.

ORBITA diagnostic system

OUR WORLD CLASS SIGNALLING

Ensuring signalling systems are well designed and maintained is critical to efficient and competitive rail operations.

Our Rail Control Solutions (RCS) division offers expert turnkey, in-house, innovative rail signalling solutions for the Australia market.

As the signalling arm of Bombardier Transportation, our RCS division is a world leader in rail control equipment and services.

From high density, advanced, rapid mass transit systems to long distance and cross-country, high-speed passenger or freight operations, our rail control solutions are adaptable to suit every need. Our proven signalling solutions have been deployed in more than 50 countries over five continents.

We combine over 100 years of rail signalling experience with an implicit understanding of our customer base and its challenges. Matching global experience with local knowledge and expertise, RCS has a network of more than 30 offices and project sites worldwide, including a dedicated signalling team in Australia.

Established Partner for Australia

Our team in Australia has extensive experience in turnkey signalling project delivery, from design, manufacturing, installation testing and commissioning through to updating as in service drawings and other support works.

Improving safety, flexibility and availability on high-capacity mainline and mass transit lines as well as for remote and rural areas is at the core of RCS. Our solutions can be used to build new rail infrastructures, or overlaid on existing networks for upgrading to new standards such as the European Rail Traffic Management System (ERTMS).

RCS Australia has a thorough knowledge of the local markets and prides itself on delivering only the best. Bombardier is evolving mobility worldwide by answering the call for more efficient, sustainable and enjoyable transportation everywhere.

INTERFLO for Mainline

Our *INTERFLO* offers comprehensive mainline solutions, from conventional to ERTMS Level 3. Based on proven technology, *INTERFLO* provides major enhancements to capacity flexibility and availability. Our systems encompass integrated operation control and computerised interlocking systems, plus Automatic Train Protection (ATP) and wayside equipment. In addition, our solutions can be applied in mining and industrial applications.

INTERFLO rail control solution

All products are interoperable, easily modified with no disruption to services, and are suitable for new or existing applications. Systems include *BOMBARDIER EBI* Track train detection and *EBI* Screen control room technology as well as cutting-edge *EBI* Lock Computer-Based Interlocking (CBI), *EBI* Gate level crossing systems and *EBI* Switch point machines.

Signalling upgrade in Western Australia

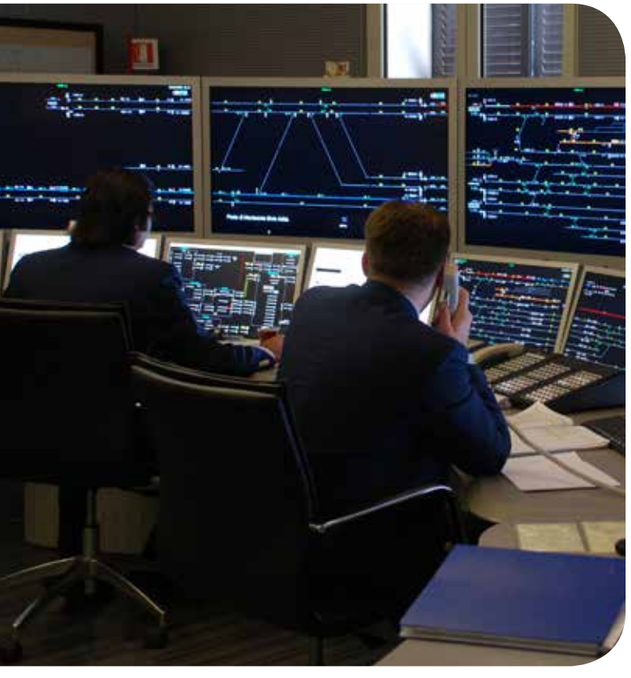
Global resource company BHP Billiton selected the *INTERFLO* 150 solution as its next generation control system for its rail network in the Pilbara region of Western Australia. This mine-to-port mainline project involves optimizing the movement of iron ore from six different mines to Port Hedland in the remote region. The network comprises 450 km of track and carries 280 million tons of iron ore per year. The upgrade will enhance worker safety and system maintainability, and raise the capacity of BHP's operations, with full operation planned in 2018.

INTERFLO will be used on the BHP Billiton rail network

CITYFLO for Mass Transit

Our *CITYFLO* mass transit signalling portfolio offers a wide range of solutions, from high capacity metro to tram and automated people mover systems. Our systems, *CITYFLO* 150 to *CITYFLO* 650, encompass requirements from cab signalling to Communications-Based Train Control (CBTC), and manual to fully automatic and Driverless Train Operation (DTO).

We deploy the most advanced technology on the most heavily used metros in the world. Our signalling technologies enable shorter headways and more frequent services. Customers around the world are choosing the *CITYFLO* 650 CBTC moving block solution; we have more than 30 systems implemented or in delivery, including upgrading several conventional lines to driverless operation.



Control Centre

Fully automated and driverless operation

Driverless transit systems combine reliable performance and overall operating flexibility with highly efficient passenger capacity, exceptional safety, energy consumption and land use. We believe driverless operation is the key to a smart and sustainable transit network. By considering the bigger picture, we developed our versatile portfolio of driverless technologies to address the challenges of cities today and to shape effective urban flow. Our sleek and modern driverless metro, monorail and people mover systems fit seamlessly in new and existing infrastructure, and meet the most stringent urban transit, environmental and safety standards.

Driverless operation has many benefits to operators and passengers:

- **Increased safety:** reduces risk of human error, separate right-of-way, automatic train operation, smoother acceleration and braking, platform screen doors;
- **High frequency:** reduced headways, higher speeds with shorter wait times, easy to insert additional trains to meet peak demands;
- **Reliable service:** faster travel times and shorter wait times, shorter and more frequent trains provide better connections to other lines or other transport modes;
- **Reduced energy consumption:** automated train control systems optimise energy usage, eliminating excessive energy use from manual driving techniques;
- **Economic and efficiency improvements:** fewer operational staff, no dependence on drivers, and high throughput attracts passengers through good service. Shorter platforms reduce station sizes and land intake, smoother acceleration/braking reduces wear and maintenance.

OUR INNOVATIVE SOLUTIONS

Wayside Equipment

To date we have delivered hundreds of level crossings, resignalling and passing loop projects across the Victorian, New South Wales, South Australian and Western Australian rail networks. Our signalling portfolio of the whole range of *CITYFLO* mass transit and *INTERFLO* mainline encompasses a complete palette of sub-systems as well as wayside and on-board products.

Our products and services

EBI Track Train Detection
EBI Track 200 audio frequency joint less track circuits allow rapid setup and commissioning. The *EBI* Track 2000 axle counter system detects track occupancy using axle counter heads connected to the rails and the central system.

EBI Screen Control Systems
Optimise line operation and traffic capacity. *EBI* Screen 2000 encompasses traction control, passenger information and station automation.

EBI Lock Computer-Based Interlocking (CBI) systems
Establish the lock and release of train routes and are designed for quick installation and flexibility.

EBI Gate 2000 level crossing systems Automatically or manually controlled, these can be located on open lines or at stations or passenger stops, and on electrified or non-electrified, single or multiple track.

EBI Switch point machines
A robust, durable modular design also enables maintenance without disturbing traffic. The range includes sleeper-integrated, conventional end of sleeper and rail-mounted systems.

EBI Com Radio Block Centres (RBC)
Transfer data on the train position to and from the interlocking system, enabling safe and efficient issue of movement authorities.

EBI Cab
Flexible modular Automatic Train Control (ATC) system providing cost effective and user-friendly safety solutions; operating at varying levels of automation.

Our full range of wayside equipment also include signals, detectors and balises. We also delivers Automatic Train Protection (ATP) and Operation (ATO) solutions, which supervise train speeds.

REFERENCE PROJECTS

State	Project	Fleet Size	Contract Type	Awarded
Victoria	Melbourne FLEXITY Swift (E-Class)	70 LRVs	Fleet maintainer, designer, manufacturer	2010, 2015
Victoria	VLocity DMU	198 cars	Fleet maintainer, designer, manufacturer	2001, 2015
Victoria	VLine Classic Fleet	196 cars	Fleet maintainer	2010
South Australia	Adelaide LRV	15 LRVs	Fleet manufacturer	2004
South Australia	Adelaide DMU 2000 and 3000 Class	99 cars	Fleet maintainer	2005
South Australia	Adelaide A-City EMUs	66 cars	Fleet maintainer, designer, manufacturer	2011
South Australia	SMU 260 and IMU 16	202 cars	Fleet manufacturer in JV with Downer	2004, 2006, 2008
Western Australia	Perth A Series EMUs	96 cars	Fleet maintainer, manufacturer in JV with Downer	2011
Western Australia	Perth B Series EMUs	204 cars	Fleet maintainer, manufacturer in JV with Downer	2011
Queensland	Gold Coast Light Rail (FLEXITY 2)	18 LRVs	System designer, manufacturer, fleet maintainer	2011, 2016
Queensland	Queensland New Generation Rollingstock (NGR)	450 cars	Fleet maintainer, designer, manufacturer	2014

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West Melbourne – Depot
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West Melbourne VIC 3003

Victoria
Ballarat East Depot
1 Corbett Street
Ballarat East 3350

Perth – EDI-BT
Maintenance Facility
201 Hester Avenue
Nowergup WA 6032

Perth
122 Kensington Street
East Perth WA 6004

Adelaide – Services
Dry Creek RailCar Depot
9 -13 Dean Harvey Drive
Dry Creek SA 5094

Adelaide
Seaford Railway Depot
Gate 161, Railways Road, Seaford
Meadows, SA 5169

Sydney – Bid Office
Goldfields House
Level 3, 1 Alfred Street
Sydney NSW 2000

Brisbane – Project
and Engineering Office
Level 5, 11 Finchley Street
Milton QLD 4064

Wulkuraka Maintenance Facility
155 Toongarra Road
Wulkuraka QLD 4305