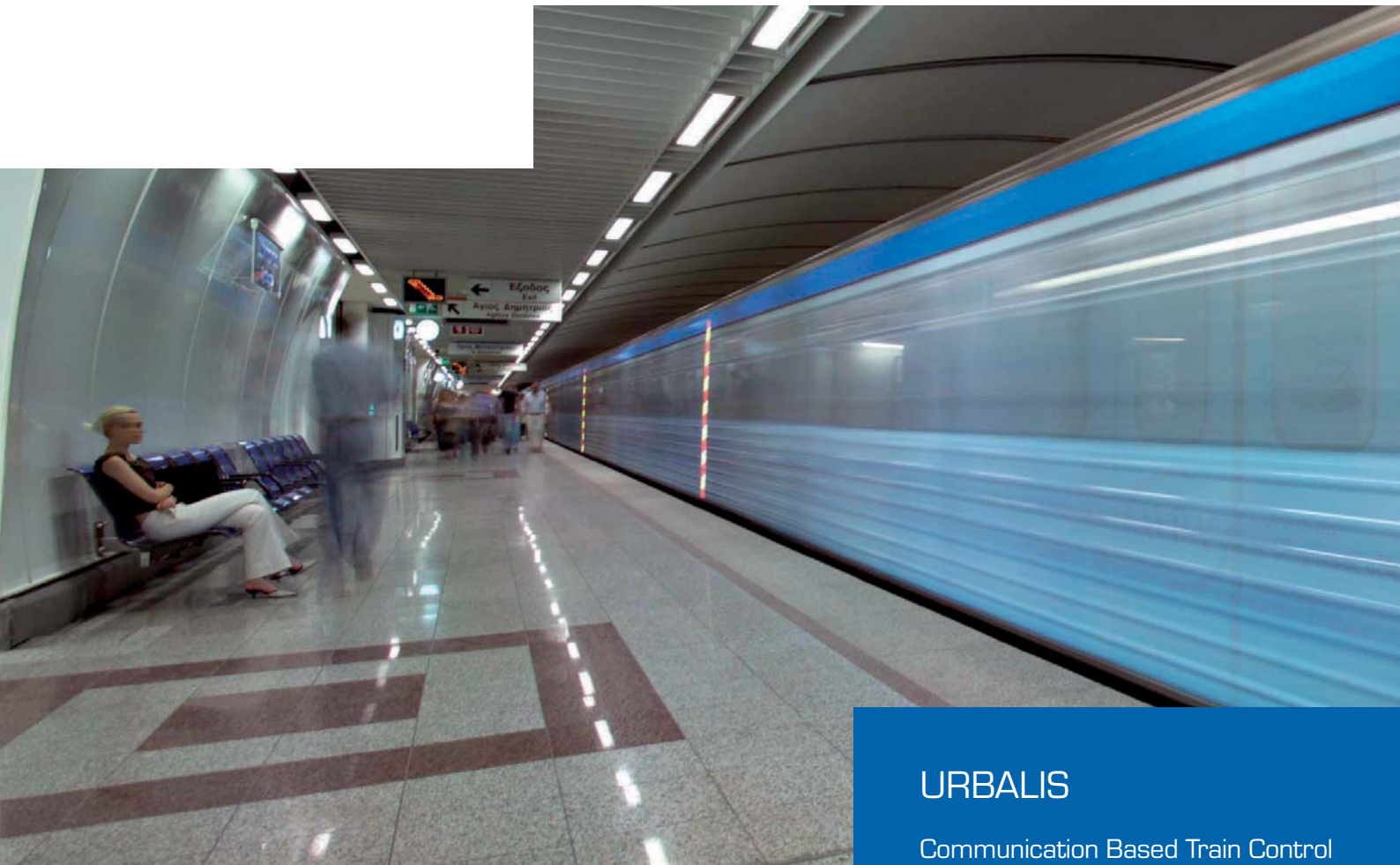


signalling solutions

excellence in train control



URBALIS

Communication Based Train Control
(CBTC)

Delivery Performance
and Flexibility

A new level of
performance
for **Mass Transit
Control Systems**

signalling solutions



MASS TRANSIT OPERATORS strive for higher levels of performance and lower life cycle costs, whilst maintaining passenger safety, comfort and security.

Urban population increase and expansion demands both passenger and environment friendly public transport. A state of the art communication based train control solution is essential to the 21st century mass transit blue print.

The Alstom developed URBALIS™ Mass Transit Control System is the world's most complete and flexible system to integrate a networked Communication Based Train Control system (CBTC). Users benefit from a wide range of high performing functions needed to operate subways and suburban commuter trains profitably. URBALIS provides higher passenger throughput, better journey times, accurate station stopping and can deliver multimedia content (such as advertising) onboard.

Such service enhancements are already available. Signalling Solutions can configure the URBALIS Control System for different operating environments, integrating proven, modular, robust and reliable components that bring you the best of CBTC technology.

Signalling Solutions utilises worldwide expertise for transit authorities seeking a superior mass transit solution, one that enhances the travel experience of daily commuters, urban populations and visitors. We deliver on-time, taking into account operational constraints without sacrificing system testing, integration, and validation. Furthermore, we can offer alternative contract options, such as a first-class turnkey operation.

The upgrade of an urban transit network may take the form of:

- Addition of a new line
- Extension of an existing line
- Renovation of an existing line
- Interconnecting lines

Whatever the requirements, URBALIS CBTC technology can help run transit business in the most cost effective ways.



URBALIS: The Networked CBTC

CBTC frees data communication between trains and trackside safety computers from the limitations characteristic of traditional equipment such as track circuits or inductive cables. Alstom Transport designed and put into service the world's first radio-based CBTC system on Singapore's North East Line subway. Alstom are taking URBALIS a step further by implementing "networked CBTC" urban transit system projects in Beijing, Milan, Malaga, and Istanbul. The URBALIS "networked CBTC" advantage is one that simplifies and speeds up installation and enhances flexibility, to overcome constraints from existing equipment, infrastructure, or particular operating needs.

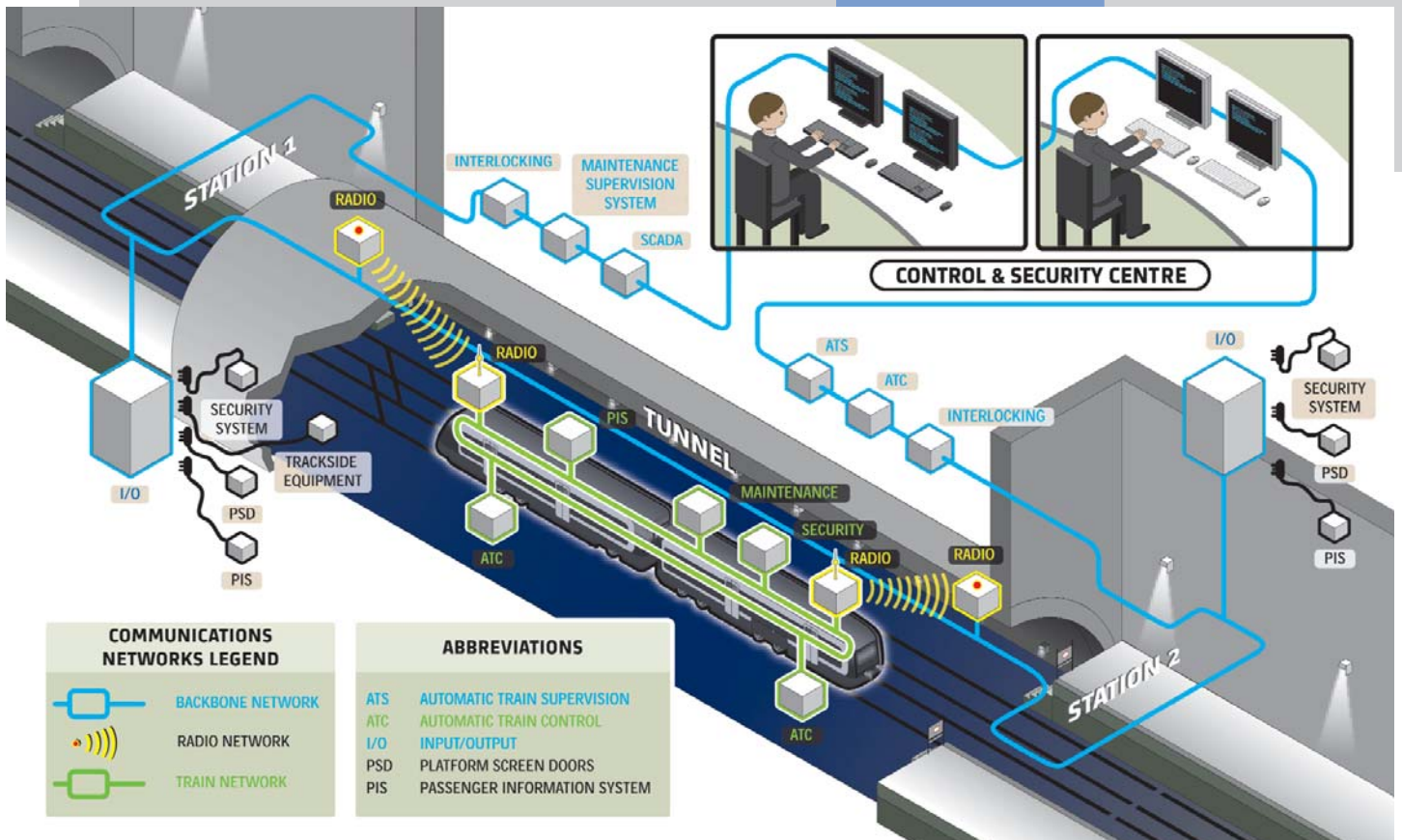
Three Integrated Networks

URBALIS "networked CBTC" consists of three integrated networks:

- Backbone Network (SDH Multi-Service Network)
- Radio Network (IEEE 802.11 g/a with OFDM carrier at 2.4 GHz or 5.8 GHz)
- Train Network (ETHERNET)

These standards allow integration of proven components to achieve a very high level of system availability and each of the three networks is fully redundant.

URBALIS delivers improved commercial speeds. As a result, journey times and the number of trains needed are reduced. Moreover, significant energy savings come from a system that optimises train running and station stops.



Outstanding Performance

URBALIS Moving Block is a superior solution offering optimum performance. In a safe and proven way, the shortest possible headway between trains is permitted, resulting in maximised line capacity.

ENHANCED FUNCTIONALITY: Driverless operation provides cost saving and allows transit authorities to realise significant gains in operational flexibility. URBALIS driverless function can also be a straightforward upgrade.

ADDED VALUE SERVICES: The high data capacity of URBALIS networks translates into add-on real-time multimedia capabilities and CCTV¹ for passenger security.

SMOOTHER MIGRATION: URBALIS networked CBTC can be installed within an existing transit infrastructure, and in readily available trains, without problem. This greatly facilitates migration and minimises service disruption.

LINKING LINES AND SHARING TRACKS: With URBALIS in the urban transit market and with ATLAS™ in the ERTMS/ETCS² mainline applications, Signalling Solutions can provide an integrated CBTC/ETCS operation when a suburban commuter line is interconnected to an urban transit line. This is the essence of the Marmaray Rail Link project awarded to an Alstom Transport-led consortium in Istanbul, Turkey.

MEETING IMMEDIATE NEEDS: Without change to the infrastructure, and based on their regulations, the customer can benefit from a lower cost, higher performance CBTC solution. Open systems architecture allows centralised or distributed network solutions for different environments and makes provision for future obsolescence management. A simple solution can be installed today with an easy upgrade to full driverless operation.

1. CCTV = Closed Circuit Television
2. ERTMS/ETCS = European Rail Traffic Management System/ European Train Control System

Subway driver in Delhi, India



Networked CBTC computer



URBALIS Global Success

The Alstom Transport URBALIS technology has been delivered worldwide, providing measurable cost-effective performance.

SINGAPORE

The city operates the world's first high capacity driverless subway

In operation since 2003, Singapore's North East Line is the first in the world to be installed with a fully automatic Radio CBTC solution. URBALIS was chosen for the city's driverless subway, boasting a 90 seconds headway on a 20km tunnel route. The line comprises 25 six-car subway trains serving 16 stations. A proprietary radio solution and a wave-guide propagation medium were installed. This allows Singapore's Land Transport Authority to install other radios and WiFi devices without any risk of interference with the train control system. The Land Transport Authority awarded Alstom Transport a further turnkey contract for a new "Circle Line" subway system.



Metro station in Singapore

CHINA

Beijing Line 2 Subway CBTC Renovation

Beijing, China's capital, needed to boost passenger capacity on their 23 km circular Line 2 subway in time for the 2008 Olympic games. They chose URBALIS technology, to ensure a smooth and swift migration to a Networked CBTC system. This installation is being carried out in 4-hour night shifts. The innovative migration strategy consists of a 2-step switched-and-reversible approach for the change to the new train control operations.

Alstom Transport carried out this project in parallel with the installation of an URBALIS Networked CBTC System on a new driverless express rail link to Beijing's airport.



Metro station in Beijing

SPAIN

Madrid and Malaga light rail lines

Madrid chose Alstom-built CITADIS™ vehicles for its T-1 light rail line. To enhance performance, this line required a fixed block ATO (Automatic Train Operation) for a significant central section in a tunnel. Beyond the tunnel section, the vehicles run at street level in a mixed traffic environment; the drivers then operate "on-sight". The URBALIS fixed block system was able to address this dual operating mode.

More recently, the Spanish city of Malaga chose URBALIS because their needs were very similar. However, they opted for a Networked CBTC version of URBALIS to reduce trackside equipment and to enhance the capacity for added-value services on the network.



Madrid Light Rail

SWITZERLAND

Lausanne M2

To serve the northern suburbs, Lausanne decided to build a modern metro line from the lakeside up through the city centre and beyond. The solution, involving a number of sections with very steep gradients, one of which is 12%, had to be carefully planned. The Lausanne Transport Authority needed an advanced train control solution to operate their driverless system in a safe and reliable way. They chose URBALIS for its proven train control functions. The full metro system was put into revenue service in 2008.



Lausanne Metro

URBALIS Modular Subsystems and Products

The seamless communications system comprising three networks (backbone, radio, and train) acts as an integrating framework for the following URBALIS modules and subsystems.

URBALIS Automatic Train Control (ATC)

Optimum train operating performance is determined by URBALIS ATC intelligence, the most advanced and proven technology available today. Designed for manned or fully automatic operation, it is composed of two main entities:

A ZONE CONTROLLER: monitors train positions and controls a line section up to 20 km long based on a Moving Block principle. Several modes of Line Operation using secondary train detection and protection support mixed traffic with equipped and non-equipped trains.

AN ONBOARD CONTROLLER: implements vital functions and automatic operation. It uses train location information read from the standard EUROBALISE beacons on tracks. Controlling the speed and position of trains is assured, within an envelop, by an Emergency Brake Control. Furthermore, URBALIS provides driver machine interfaces, logging, and maintenance monitoring functions.

SMARTLOCK™ Interlocking

With SMARTLOCK control technology, infrastructure operators can manage their track equipment in a coherent and sustainable manner. SMARTLOCK is compatible with centralised or distributed architectures. It delivers ergonomic and high-performance interlocking functions that decrease downtime and maintenance operations.



SMARTLOCK



Onboard ATC

ICONIS™ Network Control

ICONIS is an integrated control and information system based on a common and highly configurable core technology. It supervises all aspects of a network. It monitors entire urban arrangements, thereby giving operators the most reliable way to anticipate situations and enhance efficiency.

ICONIS delivers:

- Automatic Train Supervision (ATS)
- Centralised Traffic Control (CTC)
- Supervisory Control and Data Acquisition (SCADA)
- Passenger Information System (PIS)
- Supervision and Control of Telecommunications

Passenger Information and Security

Behind the move to customer-oriented transportation services is the need to assure the positive experience of city dwellers, commuters and tourists.

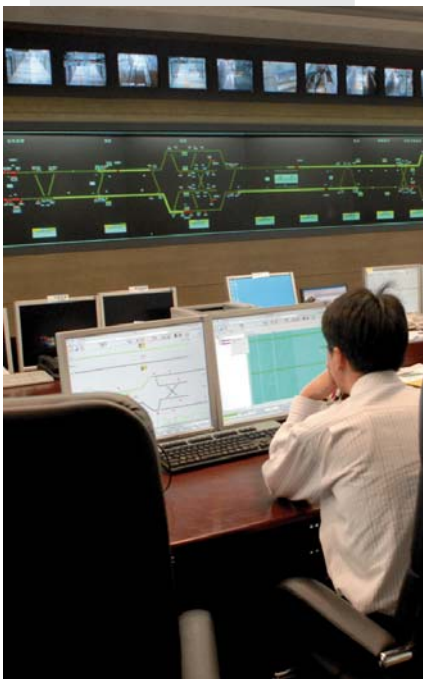
Transit authorities know that passengers want timely information: in the ticket purchase area, on the platform and subway. When there is a delay or a prolonged stop, they want to know when the train will start rolling again. They also want reliable information about journey times and train connections.

By using new multimedia software and hardware that plug into smart Input/output devices, Signalling Solutions offers a range of system solutions that provide passenger information in real time. The media content can include weather forecasts, sports results, and stock market information.

For example, the transit authority in Montreal, Canada has fitted their subways with rich content that includes delivery services via its metro traffic control systems. This not only enhances the ride but also generates revenue from advertisements.

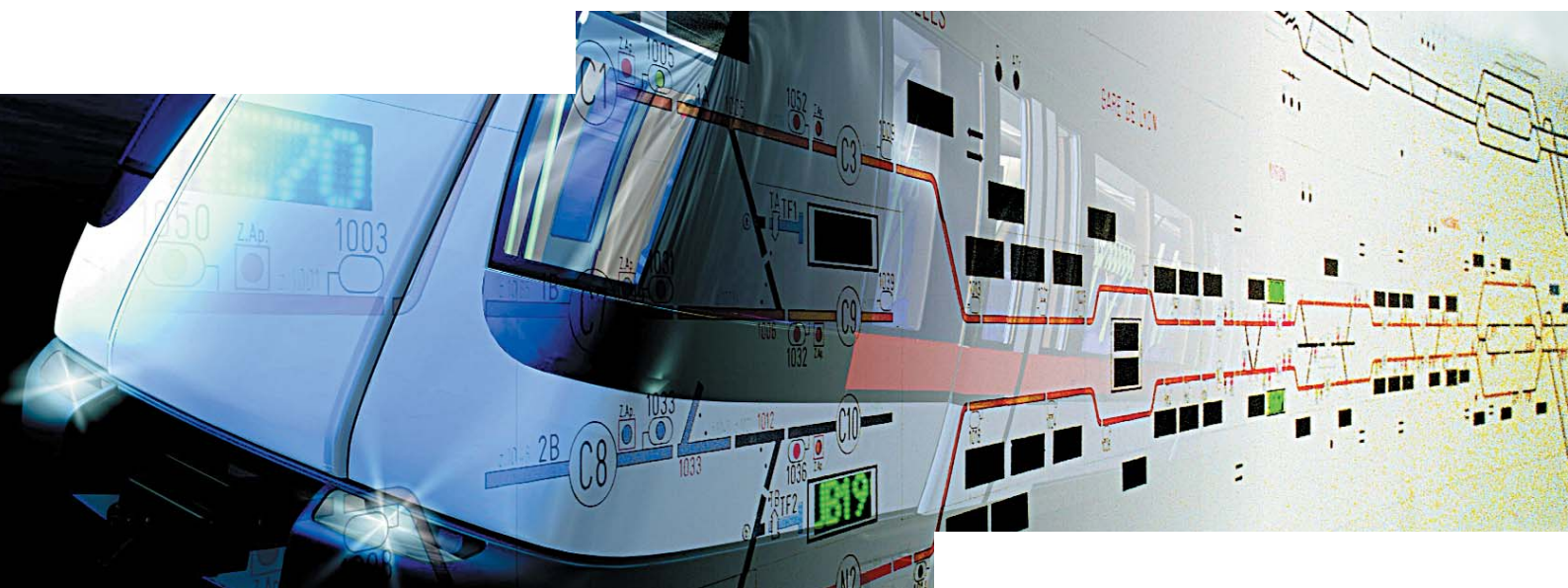
Today, transit authorities on every continent seek effective solutions for passenger security. They want equipment that provides the best security functions that can be integrated, to operate in the train-borne and station environments.

Signalling Solutions security solutions permit transit security teams to intervene rapidly. We supply CCTV equipment that transmits raw data analysed by smart software that can signal potential incidents on trains or in stations on a “management-by-exception” basis.



Signalling Solutions offers Alstom URBALIS Technology, the most reliable transit control system with a wide range of state of the art transit system configurations already delivered.

These solutions integrate validated technology, provide lower maintenance requirements and are backed up by continuous customer support.



signalling solutions

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Prices are correct at the time of publication. Signalling Solutions Limited reserve the right to change specifications and prices.

March 2009