



**URBALIS™ SOLUTIONS**  
**BEYOND CBTC BASICS**

**ALSTOM**

*Shaping the future*



# Alstom, pioneer and expert in advanced signaling solutions

With 60% of the world's population, 5 billion people, slated to live in cities by 2030, rail network operators are hard pressed for urban mass transit solutions. Congestion, lack of adequate mobility, environmental pollution and safety represent some of the most important challenges today. Moreover, **increasing urban transport capacity is at the crux of solving these issues.**

For over 70 years, Alstom has been addressing such urban challenges and thereby is constantly upgrading the most service proven radio Communication Based Train Control (CBTC) signaling solution, **the URBALIS range.**

Notably, the Company's most advanced URBALIS systems ensure highest passenger transport capacity, operational availability, and lowest life cycle cost on the market.

**Case in point:** in Mexico City, one of the world's largest megacities with 22 million residents, URBALIS boosted capacity by up to 30% on its new metro "Gold Line", shortened commute time from 2 hours to 72 minutes—and reduced vehicle traffic which will eliminate 2,300 tons of CO2 emissions per year.





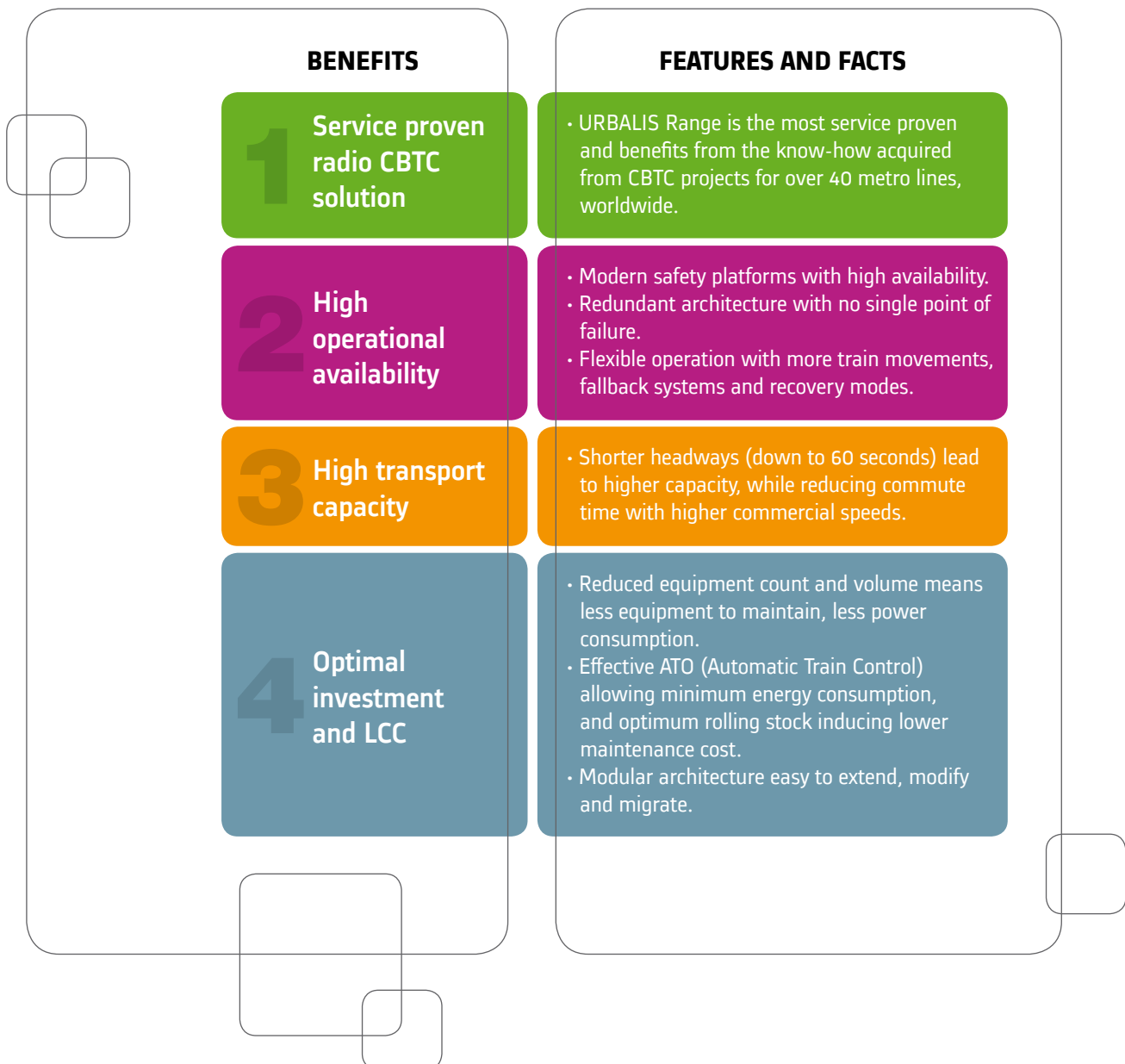
又供参考



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# 4 Top benefits of an enhanced CBTC experience

URBALIS is continuously being perfected to achieve the ultimate train control solution. Key advantages include: flexible and scalable Control System architecture, based on moving block principle, which safely optimizes the maximum of available rail network capacity; reducing the headway between trains down to 60 seconds and consequently ensuring the system's higher efficiency and train frequency with minimal or zero passenger service disruption.



# Global success in busy cities

## Service Proven URBALIS: 25% of radio CBTC

As a local partner with the experience of a global company, Alstom has a signaling track record dating back 30 years to the late 1970s and 1980s when the Company pioneered a number of new systems for Washington, Taipei, Sao Paulo, Marseille and Montreal. In 2003, the Company delivered the world's first radio CBTC in the North East Line of Singapore. It still remains the longest underground and the highest capacity UTO line in commercial service. **Today, URBALIS has been installed on over 50 metro lines around the world**, covering driverless and manned operations on new line and signaling renovation projects.



### MEXICO

L12 : 1<sup>st</sup> CBTC in Mexico, pollution reduction (2,300 t CO2 / year), decrease of commute time (2h => 72min)



### SANTIAGO

L1 : revamping, interface with existing system, short headway below 80s

### TORONTO

Interface with third supplier interlocking

### PANAMA

First metro line in the country

### LILLE

First «UTO to UTO» revamping with headway below 70s, doubling line capacity by doubling train length and keeping headway performances while replacing the legacy analogic system with digital CBTC technology

### LAUSANNE

UTO steepest line (12%) with rubber tires

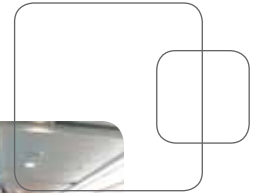
### MALAGA

Deployed on L1 & L2

### SÃO PAULO

Deployed with very high ridership on L1, L2 & L3

# solutions deployed worldwide



**AMSTERDAM**

Revamping of the entire city network (5 interconnected metro lines), complex migration through sectorized switch-over

**MILAN**

Voted most popular L1: full revamping in 4 years'time, very complex migration with mixed traffic & interface with existing system, increase capacity by 40%, headway of 90s, energy saving up to 30%

**WUHAN**

L2 & L4, deployed on 2 heavy ridership lines

**BEIJING**

CBTC revamping in record time for Olympic games (2 years), 6 CBTC lines in Beijing

**SHANGHAI**

4 CBTC lines including one driverless line

**WUXI L1 & L2**

**GUANGZHOU L6**

**KUNMING L1**

**TAICHUNG**

UTO on Green line

**SHENZHEN L2 & L5**

**HONG KONG**

South Island Line : 1<sup>st</sup> UTO and 1<sup>st</sup> CBTC metro line in Hong Kong

**DUBAI**

CBTC system for advanced tramway with Platform Screen Doors

**SINGAPORE**

NEL & CCL lines : First radio CBTC in the world in 2003, highest capacity UTO line in the world, longest underground UTO line

RENOVATION

DRIVERLESS

RENOVATION & DRIVERLESS

# Beyond CBTC Basics

## The URBALIS range has 2 CBTC offers: URBALIS Fluence and URBALIS 400

Alstom expands its service proven URBALIS range by adding a new solution addressing Operator needs for an enhanced CBTC experience. Complementary to URBALIS 400, URBALIS Fluence leverages the current URBALIS solution.

The new URBALIS Fluence integrates innovations that drastically simplify the signaling system by completely merging interlocking functions into a train-centric CBTC. Conversely, URBALIS 400 operates with traditional interlocking. Both solutions capitalize on a common technological base which is constantly being upgraded—and they offer the highest level of safety endorsed by official independent authorities.

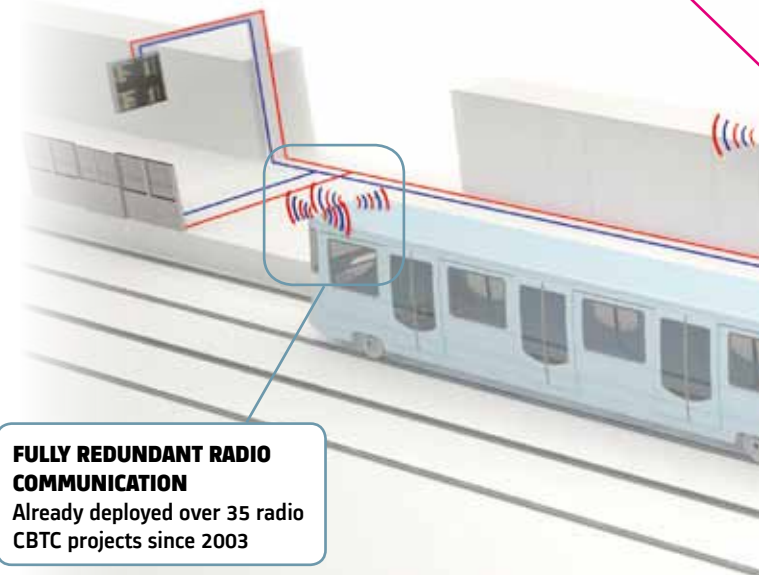
## URBALIS 400

URBALIS 400 represents the ideal CBTC solution for urban transit operators aiming to maximize performance and capacity, while requiring standard interlocking systems for operational needs.

- High transport capacity and high availability for interlocking based systems
- Management of mixed traffic and interfacing signaling systems

### REDUNDANT NETWORK ARCHITECTURE

For highest availability, using standard technology (TCP/IP, Ethernet)



### FULLY REDUNDANT RADIO COMMUNICATION

Already deployed over 35 radio CBTC projects since 2003

### PRIMARY TRAIN DETECTION

Using standard Eurobalise

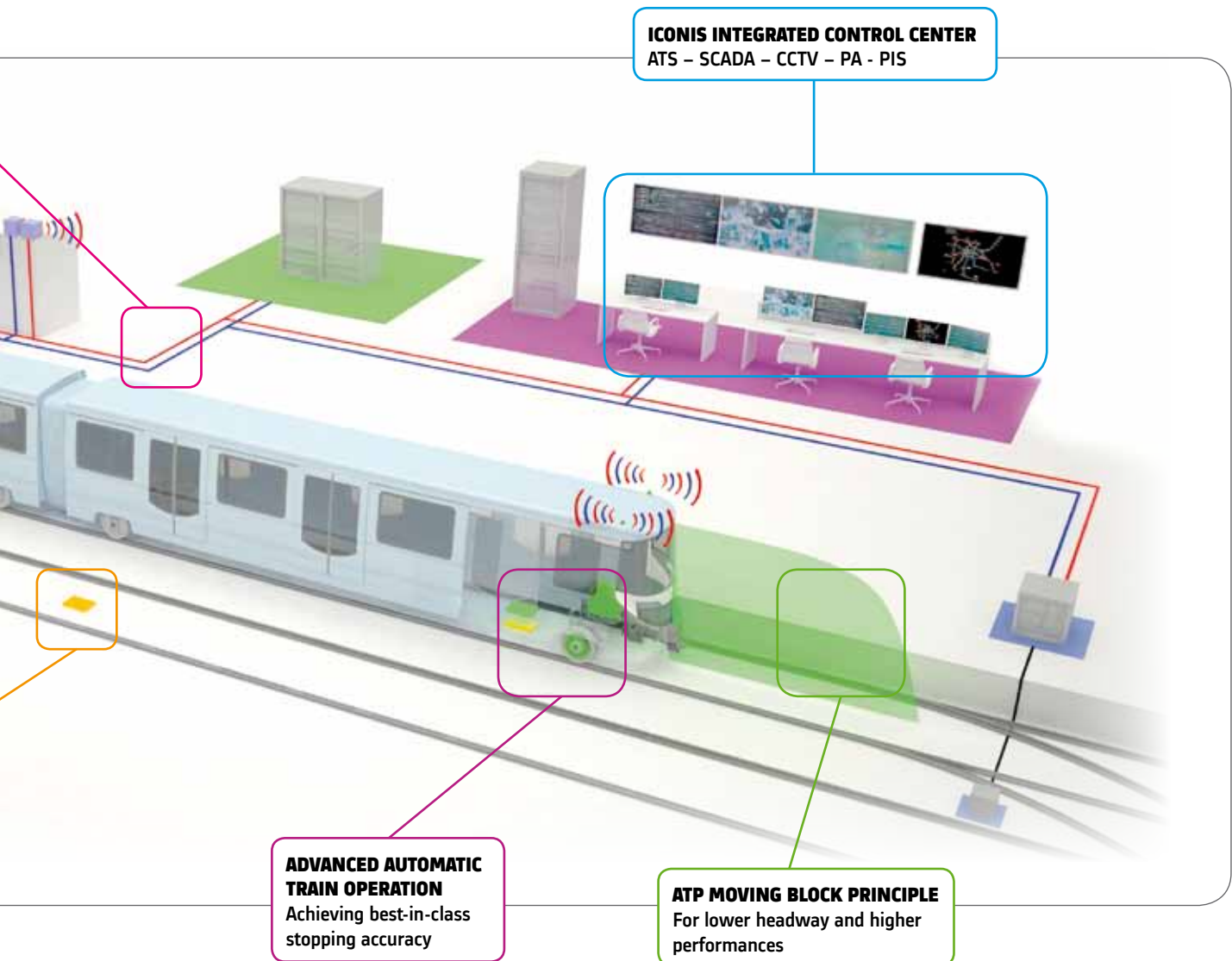
URBALIS Overview



## URBALIS Fluence

The new URBALIS Fluence is the first train centric CBTC. It innovates by simplifying the complex route setting and interlocking functions, and completely merges these functions into CBTC.

- Optimum Train Centric architecture leading to less equipment (20% reduction) and better performances
- Higher transport capacity with minimal headway (down to 60 seconds)
- Higher operational availability (24 hour) with extreme flexibility of train movements
- Optimal investment and LCC for all types of line configuration



# 12 more reasons to choose URBALIS

- **High level of safety** – Use of formal software development methods
- **Energy saving** – Up to 30 % by maximizing use of train coasting
- **Standard Interfaces** – TCP/IP and Ethernet, IEEE 802.11
- **Robust and proven radio technology** – In service on major lines over 10 years (since 2003)
- **Line renovation with zero service disruption** – Beijing L2, Milan L1
- **Flexible operations** – Bi-directional operation, partial services
- **Best in class Automatic Train Operation** – Up to +/- 15cm stopping accuracy
- **Functionality tailored to user requirements** – Preserve operating rules
- **Continuous technology upgrade for long term visibility**
- **Demonstrated scalability** – Up to Grade of Automation 4
- **Easy expansion and integration** – Extensive use of Factory Integration and Validation Platform
- **System operated by a significant Urbalis user community**



With a 70 year history, Alstom is the only company to master the complete scope of high-performance products: rolling stock, infrastructures, information systems, signaling, services and turnkey solutions.

The integration of solutions from Alstom's product lines and its partners, is coordinated by a dedicated team that guarantees a global project vision and specific expertise. Alstom therefore possess all the know-how and resources needed to implement best-in-class signaling systems.

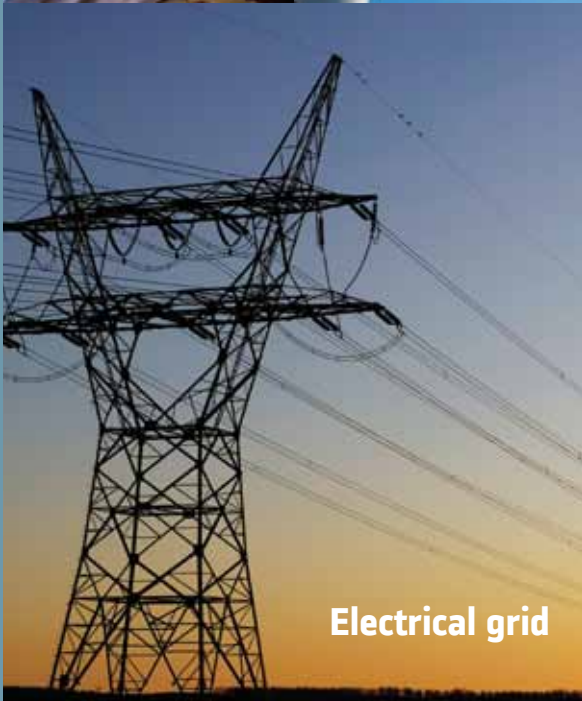


**Power generation**

## Alstom

Alstom is a global leader in the world of power generation, power transmission and rail infrastructure and sets the benchmark for innovative and environmentally friendly technologies.

Alstom builds the fastest train and the highest capacity automated metro in the world, provides turnkey integrated power plant solutions and associated services for a wide variety of energy sources, including hydro, nuclear, gas, coal, wind, solar thermal, geothermal and ocean energies. Alstom offers a wide range of solutions for power transmission, with a focus on smart grids.



**Electrical grid**

## Rail transport

Providing a transport system requires a comprehensive approach that begins with careful attention to the customer's needs and culminates in the delivery of efficient, harmonious services. For **Alstom Transport**, this approach can be summarised in one word: Fluidity. We develop sustainable and global railway solutions tailored to each operator and public authorities they serve. We create smarter mobility, building and maintaining solutions that operate more safely, comfortably and efficiently. From trains to signalling, infrastructure, services to complete turnkey systems, we offer the widest range of high-tech rail solutions.

**Alstom Transport** is the global leader in the urban metro and tramway market. It is also a major player in the regional trains sector as well as in high and very-high speed market with more than 1,000 trainsets in commercial service throughout the world.

Operating in a transport market viewed as the most environmentally-friendly, Alstom designs equipment which is increasingly energy efficient and recyclable, accessible to the largest number of people and which can be integrated easily within the environment.



**Rail transport**

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