

Alstom Transport - MIIT

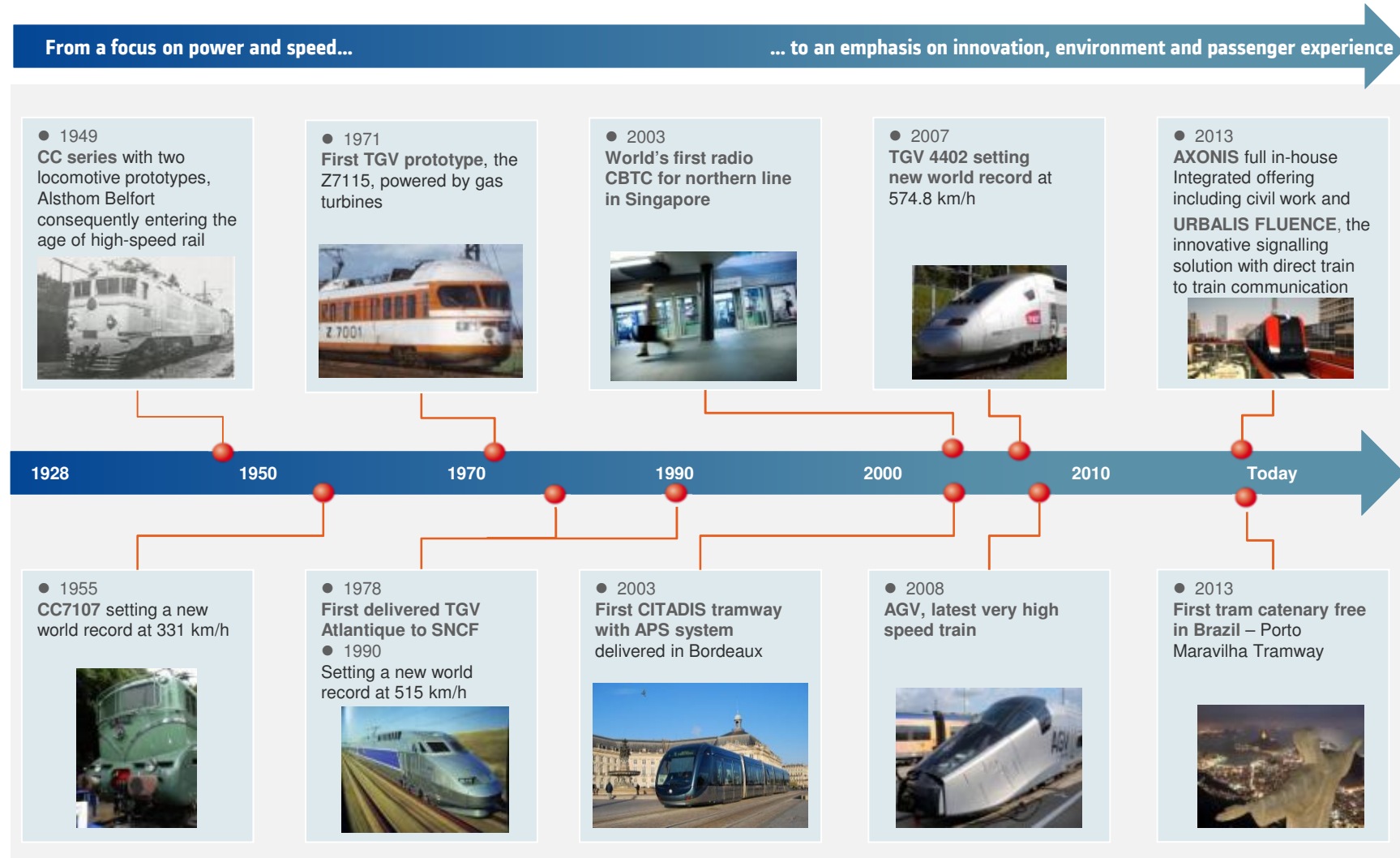
December 16, 2015



1 Overview



100 years of technological breakthroughs...



... and global expansion



Alstom Transport: a global leader in the rail industry

Four activities

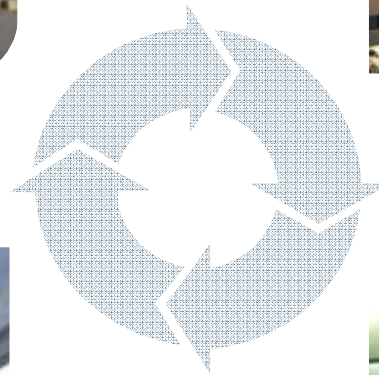
TRAINS



SYSTEMS*



SERVICES



SIGNALLING



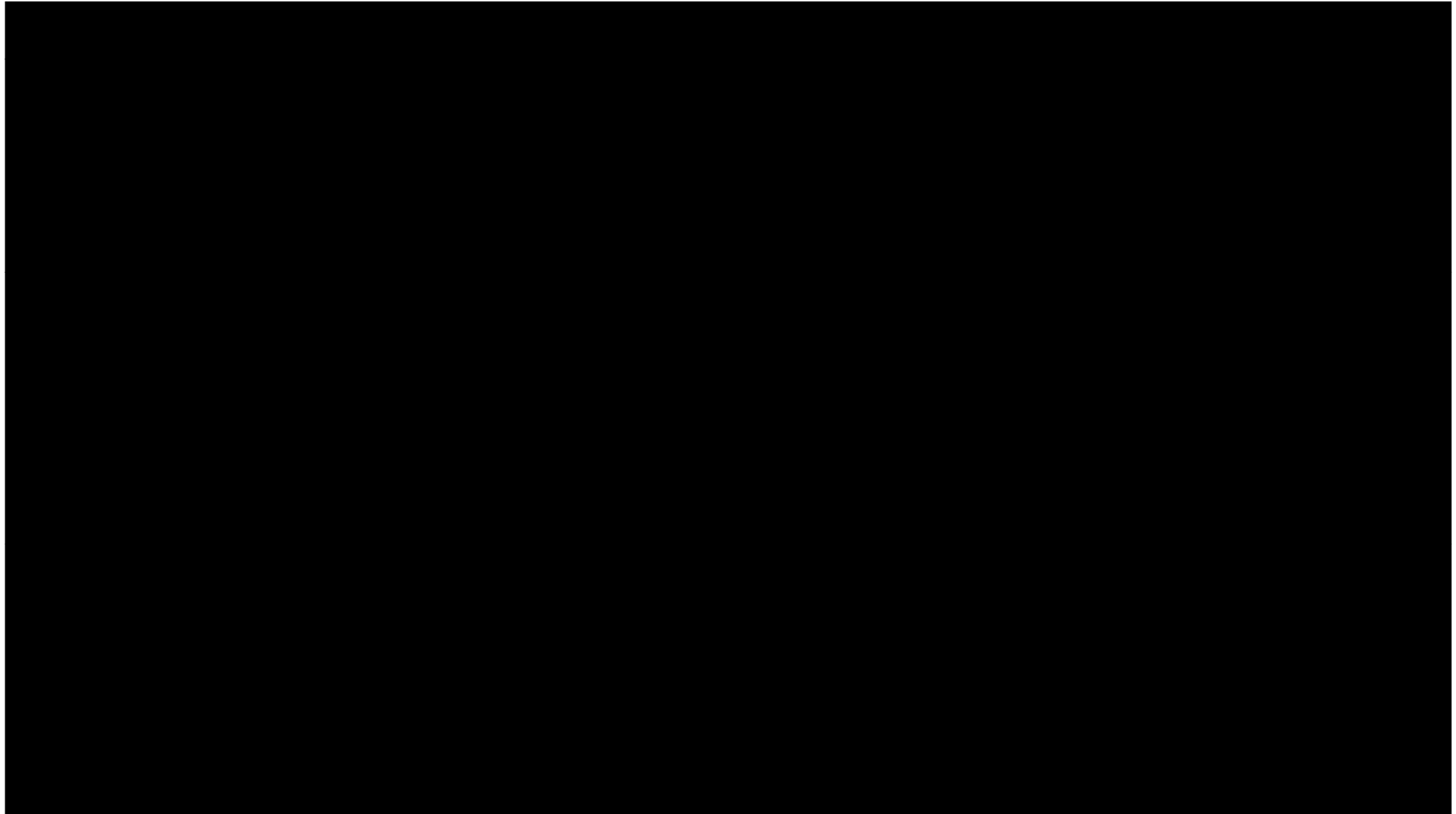
Alstom Transport presentation – 2015 – P 5

**Including Infrastructure*

© ALSTOM 2014. All rights reserved. Information contained in this document is indicative only. No representation or warranty is given or should be relied on that it is complete or correct or will apply to any particular project. This will depend on the technical and commercial circumstances. It is provided without liability and is subject to change without notice. Reproduction, use or disclosure to third parties, without express written authority, is strictly prohibited.

ALSTOM

Video 1 – Designing fluidity



A dynamic market with strong potential

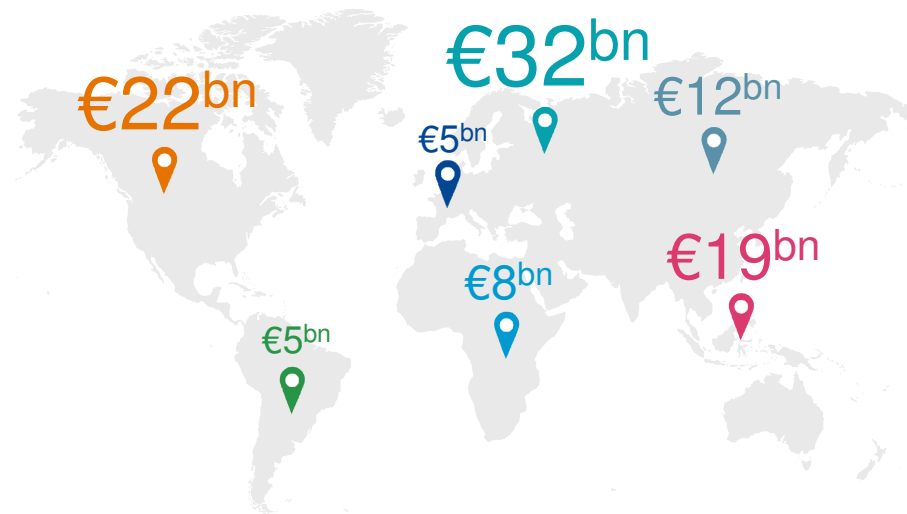
URBANISATION

PUBLIC FUNDING SUPPORT

SUSTAINABLE DEVELOPMENT

ECONOMIC GROWTH

Market size in 2011/13



- Solid growth drivers
- Market worth more than €100 bn
- Market driven by urban & integrated systems
- Dynamic growth in Latin America & Asia Pacific

Average annual growth between

ASIA
PACIFIC
+4.2%

CIS
+0.8%

EUROPE
+1.7%

FRANCE
+3.5%

LATIN
AMERICA
+6.2%

MIDDLE EAST
AFRICA
+2.2%

NORTH
AMERICA
+3.5%

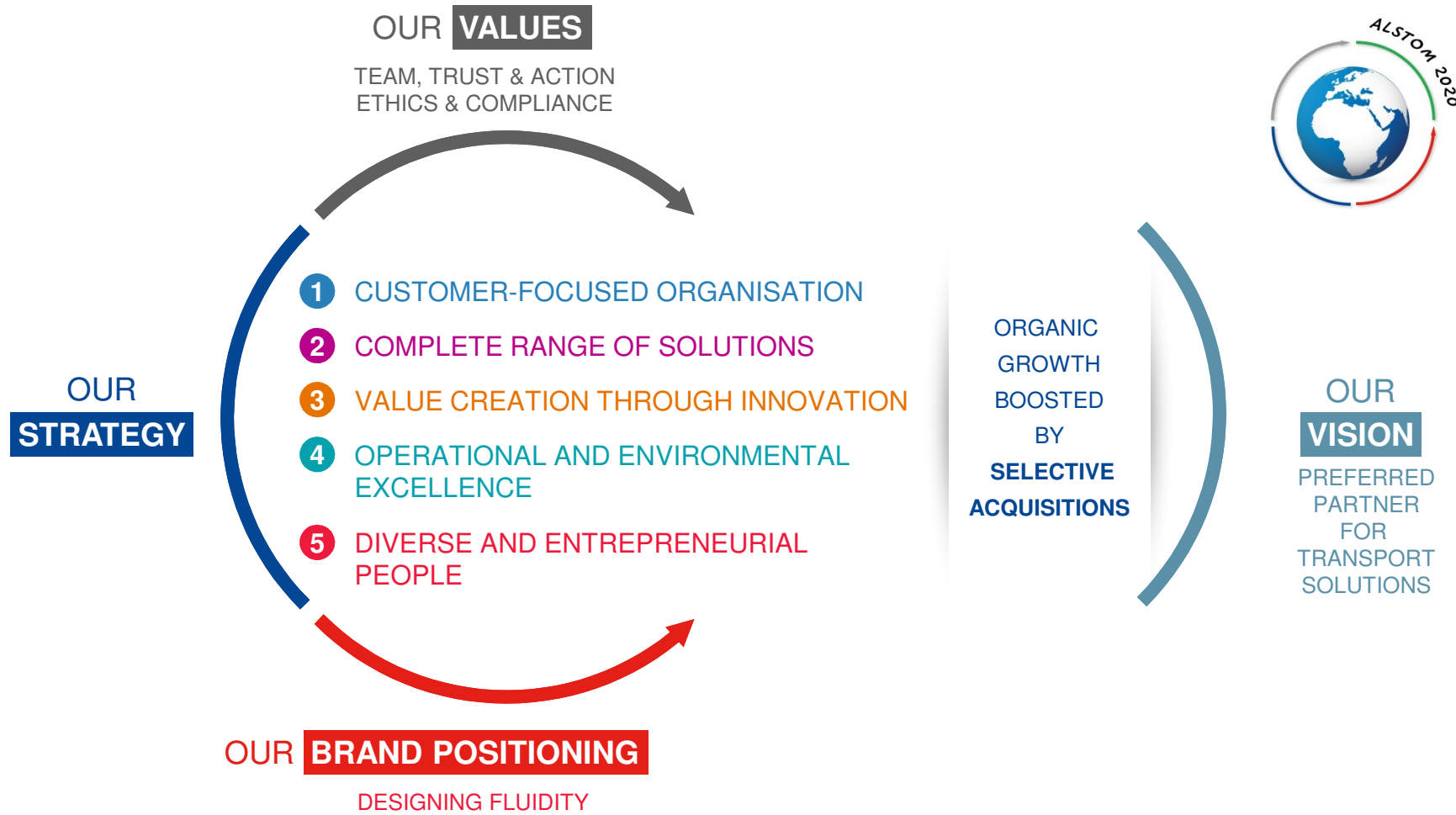
Note: Annual average – Accessible market
Source: UNIFE Market Study 2014

Alstom Transport presentation – 2015 – P 7

© ALSTOM 2014. All rights reserved. Information contained in this document is indicative only. No representation or warranty is given or should be relied on that it is complete or correct or will apply to any particular project. This will depend on the technical and commercial circumstances. It is provided without liability and is subject to change without notice. Reproduction, use or disclosure to third parties, without express written authority, is strictly prohibited.

ALSTOM

An ambitious strategy for 2020



An organisation around 7 Regions

- **32,000 employees** working on **105 sites** in **60 countries** serving **200 customers**



Being a reference player in each Region

Note: all figures including the signalling activity acquired from General Electric

Strategic partnerships around the world



CIS

Russia

- TMH (trains)

Kazakhstan

- EKZ (locomotives)
- KEP (signalling)



MIDDLE EAST
AFRIICA

South Africa

- Gibela (suburban trains)

Algeria

- CITAL (trams)



ASIA
PACIFIC

China

- SATEE (traction)
- XAYEECO (motors)
- CASCO (signalling)
- AQREC (dampers)
- SATCO (metros & trams)



FRANCE

France

- Metrolab (R&D)
- NTL (trams)



EUROPE

United Kingdom

- ABC electrification
- ATC (infrastructure)

Spain

- IRVIA (services)

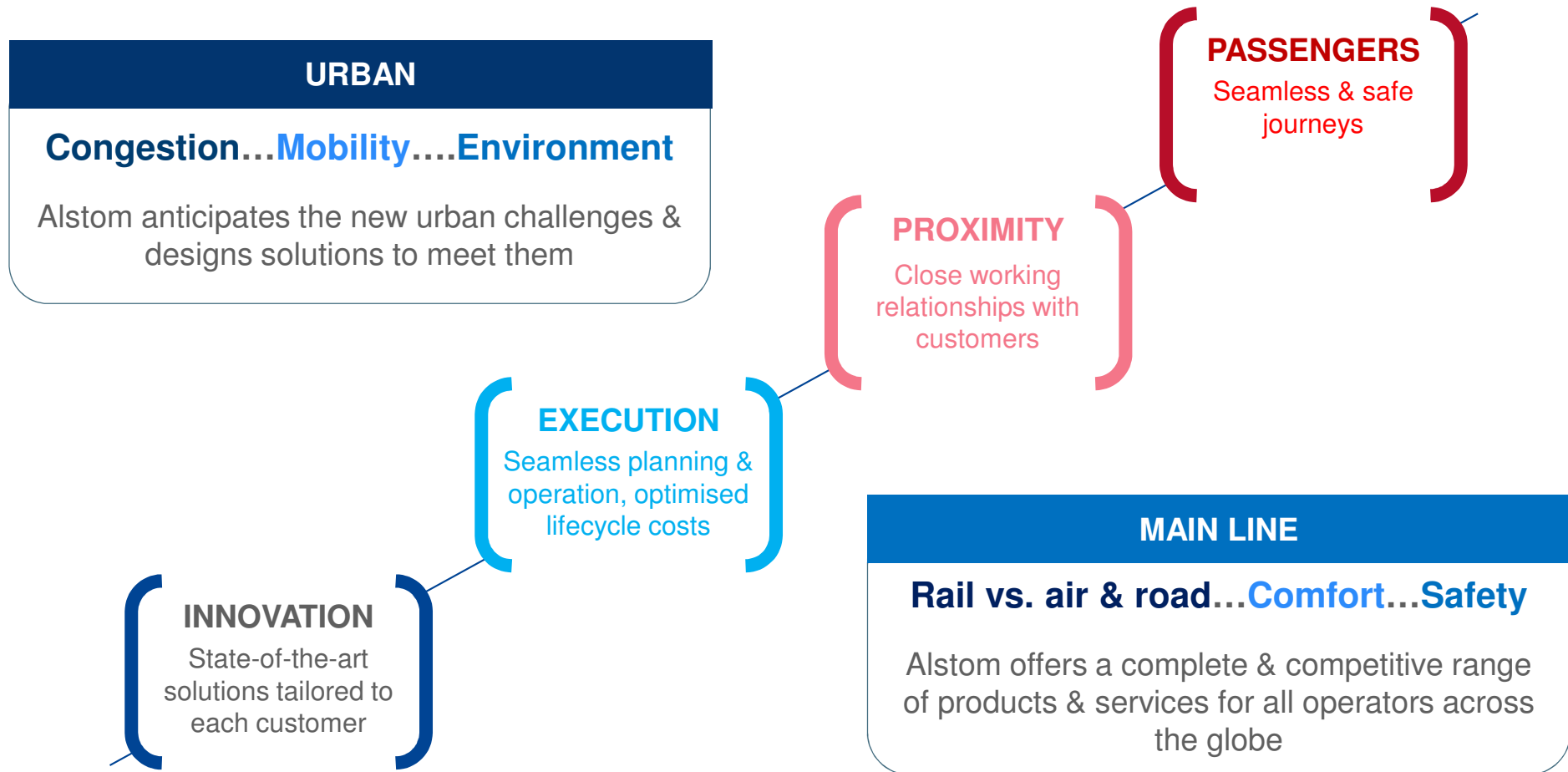


2 Offering



« With Alstom, designing fluidity becomes a reality »

**Four axes drive the promise we make to our customers....
....across two product universes**





Urban

Tramways: to reflect a city's unique identity & suit all passenger needs

- **1,800** Citadis ordered in **over 40** cities
- **1 in 4** low-floor trams in service manufactured by Alstom
- **6 billion** passengers & **500 million km** since 2000
- **1st** catenary-less tramway in service
- **1st** easily accessible tramway



Tram-trains: an alternative means of transport

- **No change** in transit mode between city centre & suburb
- The **only** tram-train with 100% low floor running at 100 km/h
- **200** Citadis Dualis & **34** Citadis Spirit ordered



Rhône-Alpes - Lyon



Pays de la Loire - Nantes



Ottawa

Metros: an innovative model offering a wide range of solutions

- **4000+** Metropolis sold in **40+** cities
- **100,000** passengers per hour & per direction
- **60+ years** expertise

Panama City



Chennai



Barcelona



Lausanne



Paris



Santiago



Singapore



Amsterdam



Santo Domingo



Shanghai

Urban signalling: improving network safety & fluidity

- Urbalis: signalling solution for higher capacity with minimal headway
 - **25%** of all radio CBTC solutions in operation
 - Urbalis Fluence: latest signalling solution with direct train-to-train communication
- Security & control: Iconis, Pacis



Lausanne Metro - Urbalis



Lille Metro - Urbalis Fluence



Hong Kong control centre

Urban systems: unique integrator capabilities

- Complex project management & system engineering
- PPPs & concession
- **1st** in tramway integrated solutions
- Innovative integrated solutions
 - Axonis – the **1st** optimised integrated metro solution, affordable & quick to build
 - Catenary-free range for tramways for **optimum** visual integration into the cityscape



Bordeaux



Orléans



Reims



Axonis



Nottingham



Singapore

Video 2 – URBAN Rolling Stock



40135-ClipUrbanRollingStockVAWMVMPEG2-ALSTOMROLLINGSTOCKVA.mpg

Urban infrastructure: innovative technologies

- Track

- Appitrack holds the world track-laying record: **403 m** of single track in one day
- **630+** single-track kilometres of track installed

- Electro-mechanical (stations & depots)

- Electrification

- **13 million km** travelled with APS catenary-free solution
- **600+** km of lines equipped with overhead contact system and/or power supply solutions
- Hesop reversible substation for urban networks recovers **more than 99%** of traction energy generated by braking



Hesop, La Rochelle



Appitrack, Orleans



APS, Reims

Urban services: a full offering for optimum fleet performance & reliability

- Maintenance
 - **400+** tram & **1,700** metro cars maintained
- Parts & repairs
- Modernisation
- Support services



Reims

Casablanca

Singapore

Bucharest

Paris

Components: key end-product differentiators

- Traction & auxiliary

- Bogies & motors



Components for traction systems



Citadis-Dualis bogie



Element of Citadis bogie



Metropolis bogie



Main Line

Suburban trains: for fluid commuting

- Around **4,600** X'Trapolis cars ordered
 - **3,600** cars of X'Trapolis Mega for South Africa - the world's largest fleet renewal
- Up to **30,000** passengers per hour and per direction
- Double-deck for greater capacity
 - **1,725** passengers per trainset on RER A (Paris) which transports 1 million people/day



Melbourne



Spain



Paris



South Africa

Regional trains: responding to diverse needs

- More than **1,200** Coradia currently operating in **9** European countries and Canada
- **1st 100%** full low-floor bimode regional train – Coradia Polyvalent for Régiolis* (France)

Coradia Polyvalent (France)



Coradia Continental (Germany)



Coradia Lint (Germany)



Coradia Nordic (Sweden)



Coradia Liner (France)

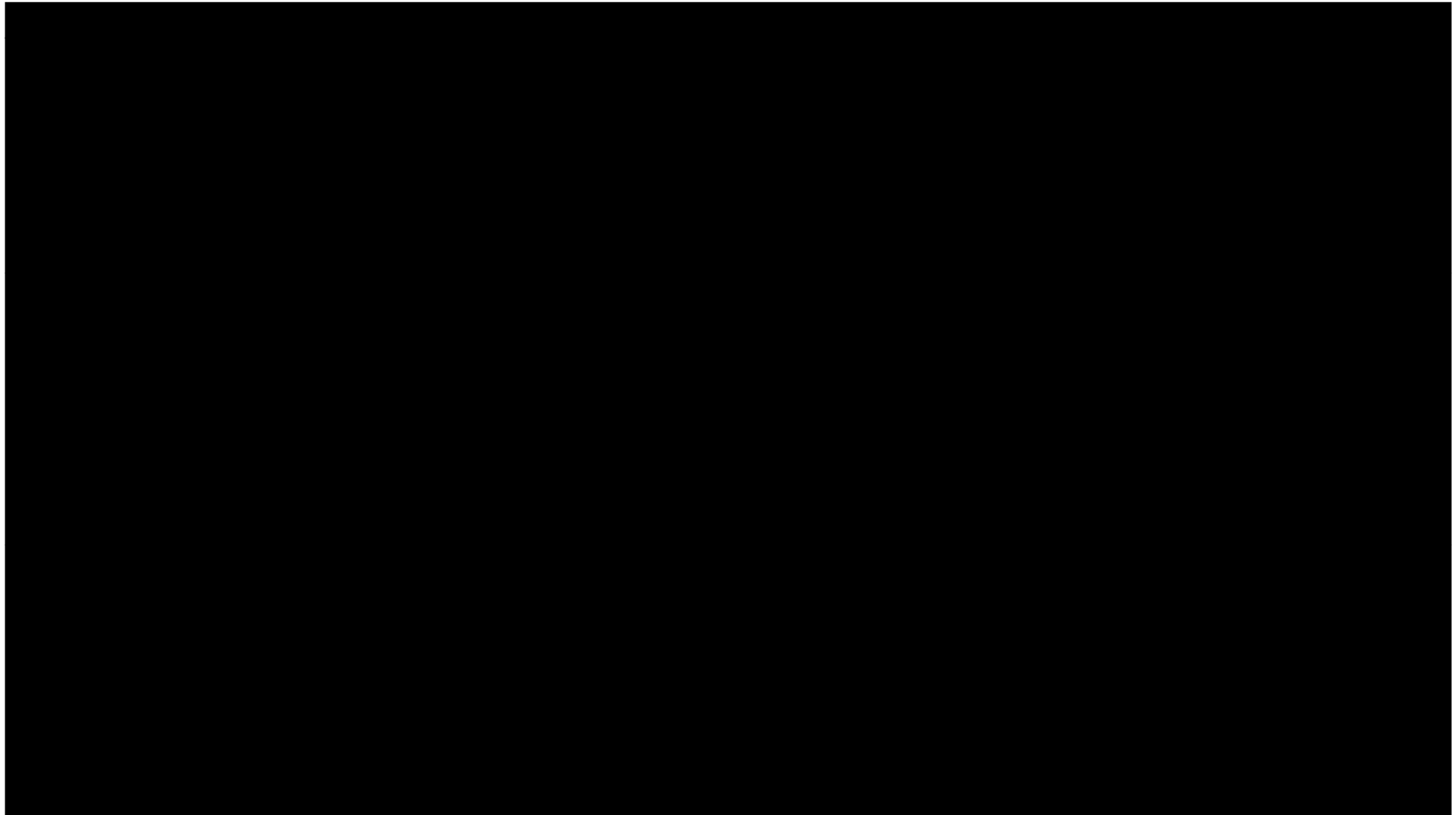


Coradia Meridian (Italy)



Coradia Duplex (France)

Video 3 – 30 years High Speed and Very High Speed



High-speed trains: an incomparable concept

- More than **500** Pendolino ordered
- Cross-border train, certified in **13** countries and soon to be **14**
- **1 out of 3** trains in service worldwide running **at more than 200 km/h** uses Alstom technology



Italy



Switzerland



Russia & Finland



United Kingdom

Very high-speed trains: offering the most proven know-how

Euroduplex

- **Over 700** VHST trains ordered
- **Best** capacity on the market



Euroduplex (France)

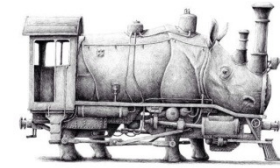
AGV

- **25** sold to NTV, all in commercial service
- **1st** train to combine articulated architecture with distributed power for maximum safety



AGV .italo (Italy)

Passenger & freight locomotives: committing to a sustainable modal shift



- **100 years'** expertise
- **Leader** in installed base
- A **localisation** model
- Co-development with **TMH**, the world leader in locomotives



KZ8A (Kazakhstan)



Prima II (Morocco)



KZ4AT (Kazakhstan)



EP20 (Russia)

Main Line signaling: for optimum efficiency & complete safety

- Atlas

- Proven ERTMS solution for **100%** interoperable trains
- **#1** worldwide for onboard equipment (**70%** of market)

- Iconis

- Scalable & modular control centre solution
- **80** systems in operation worldwide



Atlas &
X'Trapolis,
Melbourne



Betuweroute, freight corridor A,
Netherlands



Bologna control centre

Main Line systems: unique integrator capabilities

- Global system knowledge for whole project optimisation



Republic of Korea - KTX

Main Line infrastructure: minimising track footprint while providing sustainable solutions

- Track
 - Around **600** single-track kilometres installed
- Electrification
 - Over **3,000 km** of lines equipped with 25 kV catenary and/or power supply substations
- Electro-mechanical



KTX infrastructure, Republic of Korea



Athens Suburban Rail, Greece

Main Line services: a full offering for optimum fleet performance & reliability

- Maintenance
 - **7,000** high-speed & regional cars & **300** diesel & hybrid locomotives
- Parts & repairs
- Modernisation
- Support services



WCML, UK

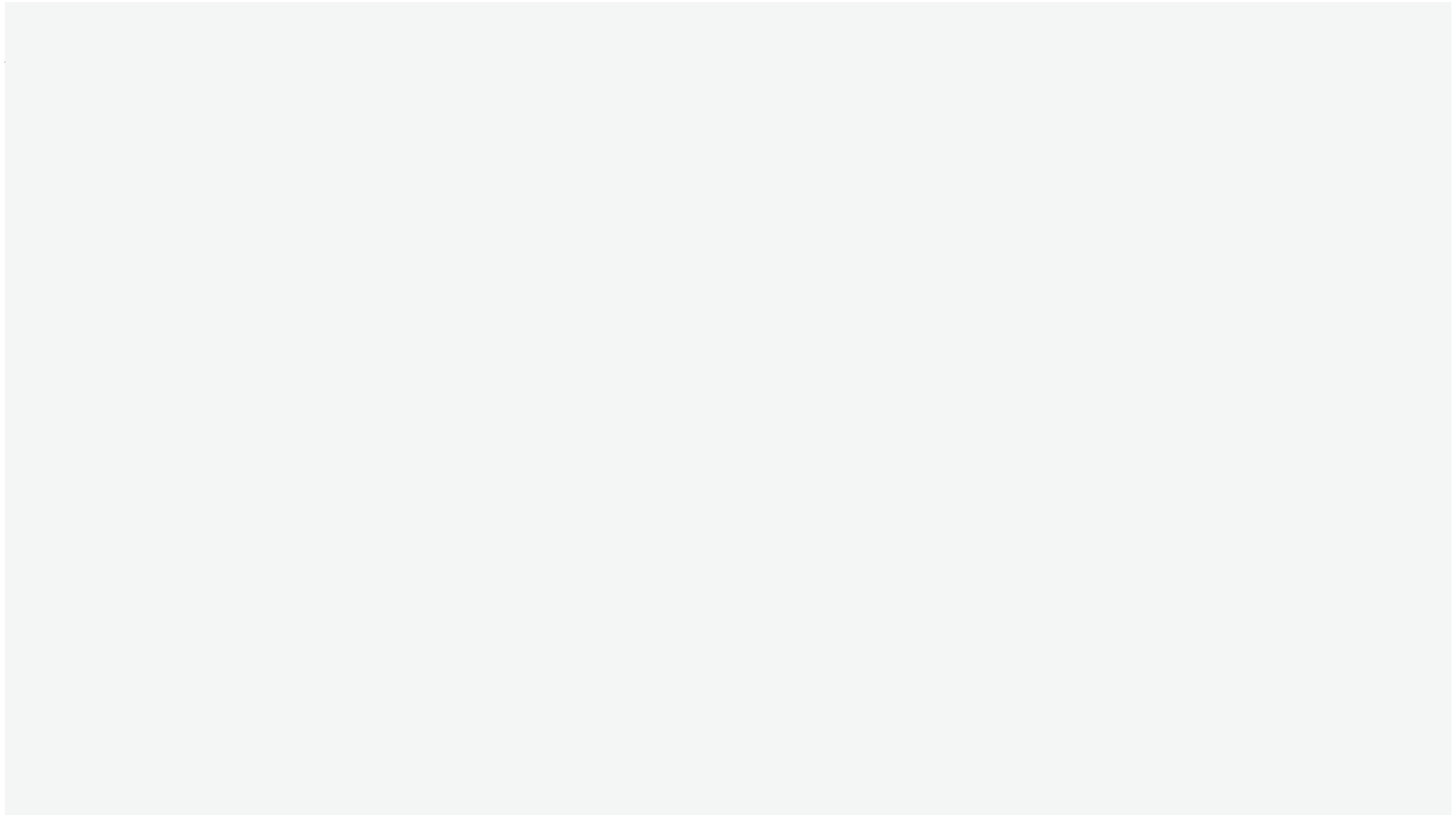


Locomotive maintenance,
France



AVE, Spain

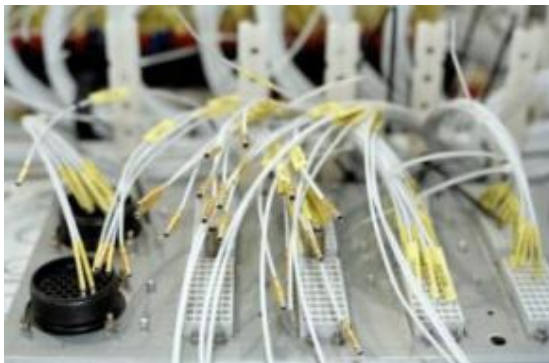
Video 4 – HealthHub



Components: key end-product differentiators

- Traction & auxiliary

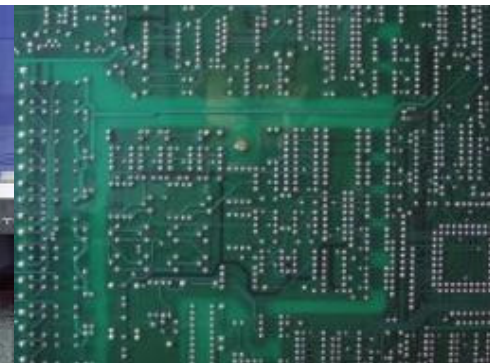
- Bogies & motors



Components for traction systems



TGV* bogie



Electronic component

*TGV is a SNCF trademark

Alstom Transport presentation – 2015 – P 35

© ALSTOM 2014. All rights reserved. Information contained in this document is indicative only. No representation or warranty is given or should be relied on that it is complete or correct or will apply to any particular project. This will depend on the technical and commercial circumstances. It is provided without liability and is subject to change without notice. Reproduction, use or disclosure to third parties, without express written authority, is strictly prohibited.

3 Alstom Transport strategy



Alstom Transport customers

- Governments or public entities (regions, municipalities,..), eg:



Passenger Rail Agency of South Africa (PRASA)



Arriyadh Development Authority



Chennai Metro Rail Limited



Nottingham City Council

- State-owned entities, national railway operators, eg:



- Fleet owners and operators, eg:

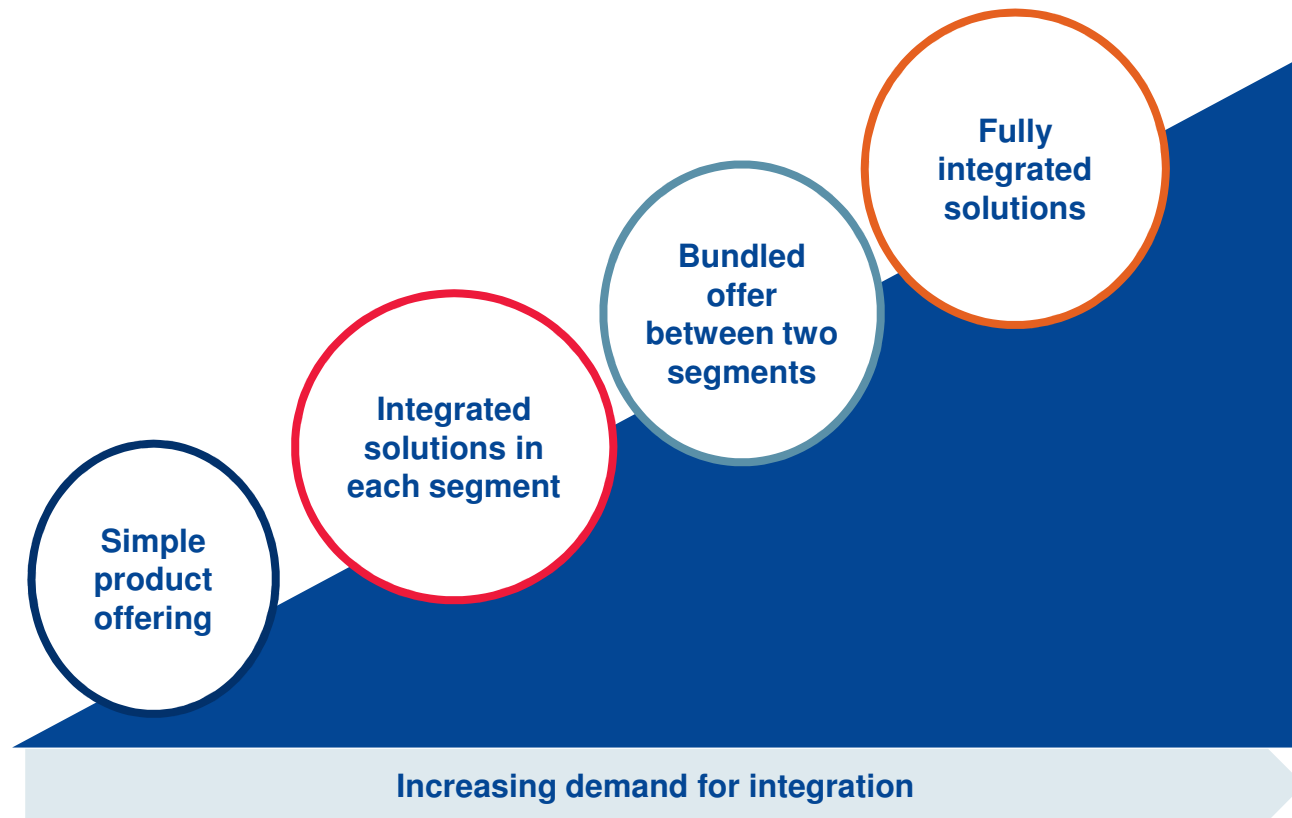


- High level of **flexibility** essential to adapt to requirements of various customer profiles & to the need for local content

Video 5 – TMH & Alstom



Integrated rail solutions strategy



- A **complete** portfolio of activities to meet **all** customer needs

A strategy based on continuous innovation

- Propose **best-in-class technology**
 - Safety & performance
 - Innovation for sustainable mobility
- Strengthen **our offer**
 - Reduced total cost of ownership for customers
- Enter **new markets**



Lille metro (France) including Urbalis
Fluence signalling solution : €250 M



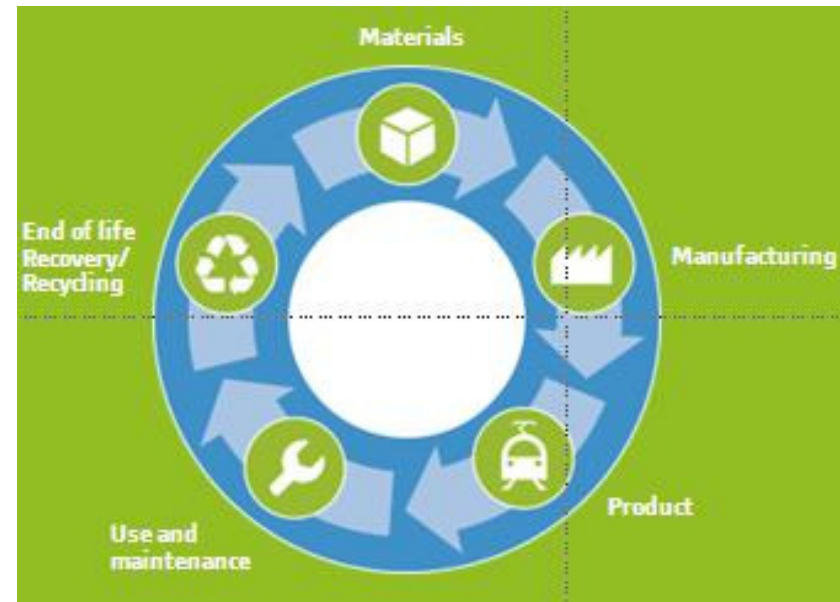
Axonis metro system



Citadis Spirit (Canada): €400 M

Designing sustainable mobility through a lifecycle approach

- Apply **eco-design** principles
 - Improve energy efficiency
 - Reduce noise & vibrations
 - Reduce air emissions
 - Use clean, recyclable & natural materials
 - Facilitate end-of-life product management



Designing sustainable mobility through a passenger-centric approach

- Increase **passenger comfort**
 - Larger windows
 - Spacious interiors
 - Reduced noise
 - Multimedia amenities
- Encourage **behaviour change** in favour of **sustainable mobility**
 - Double doors for easier access
 - Signage in Braille
 - Flexible interior layouts for bicycles, pushchairs,....



Designing sustainable mobility through our operations

- Reduce Alstom Transport's own **environmental footprint**
 - 100% sites with ISO 14001 certification
 - 80% waste recovered by 2015



Sri City site, India – awarded IGBC* Silver Level certificate

**Indian Green Building Council*

Alstom Transport presentation – 2015 – P 43

© ALSTOM 2014. All rights reserved. Information contained in this document is indicative only. No representation or warranty is given or should be relied on that it is complete or correct or will apply to any particular project. This will depend on the technical and commercial circumstances. It is provided without liability and is subject to change without notice. Reproduction, use or disclosure to third parties, without express written authority, is strictly prohibited.

ALSTOM

4

Alstom Transport people and culture



A committed workforce with shared values & approach...

- **Shared values:** trust, team & action
- Large scale **human resources policy** for: recruitment, integration, training
- **Motivated & committed** workforce
 - 91% of employees feel proud to work for Alstom Transport*
- **Social dialogue**
- A “**safety first**” approach for the best working conditions for employees & contractors

Trust
Team
Action



**Alstom Transport Teams Opinion Survey 2012*

Alstom Transport presentation – 2015 – P 45

© ALSTOM 2014. All rights reserved. Information contained in this document is indicative only. No representation or warranty is given or should be relied on that it is complete or correct or will apply to any particular project. This will depend on the technical and commercial circumstances. It is provided without liability and is subject to change without notice. Reproduction, use or disclosure to third parties, without express written authority, is strictly prohibited.

ALSTOM

...who work ethically and collaboratively...

- **Business ethics & human rights** are fundamental operating principles enshrined in Alstom's Integrity Programme



- **Strategic collaboration** with partners & stakeholders



...and innovate to “re-think its ways of working”

- **Collaborative tools** to:

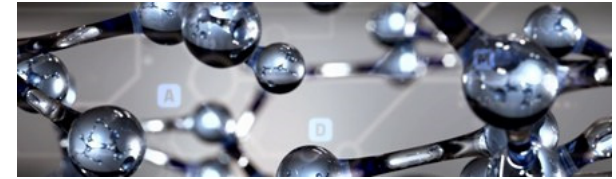
- Improve relationships with customers

wall·C

- Boost innovation



Proximity, Lifecycle and passenger experience



ALSTOM launches Atlas 400 and 500 to offer scalable ETCS for traffic density from 6 to 600 trains per day, whether on passenger, freight or mixed traffic lines.

New ATAS 400 and 500 are applicable for a retraining upgrade or new-build project. The scalability or configurable deployment in accordance with customer needs is achieved with modular software applications to the same onboard and trackside computer equipment.

Atlas 400 for low density lines. Transition to is performed by the train itself, which reduces the need for trackside equipment. Original trains equipped with CANALIS platform and various radio hardware.

Atlas 500 for high density lines. Transition is performed by the train itself, which reduces the need for trackside equipment. Original trains equipped with CANALIS platform and various radio hardware.

Complies ATP (1) and moving block functionalities without adding extra equipment and it does not increase the cost of ownership. Uses EPIS which allow communication with other trains operating on the same track.

Delivering dedicated lines on-time

How to reduce deployment time of High Speed Rail

System integration

System integration on site is essential, benefiting from previous experience.

Time can be shortened by using multiple parallel projects, reducing project overlap.

ALSTOM addresses experience in delivering boundary infrastructure systems, notably in VHS lines:

- Shanghai - Beijing HSR Line
- 2011-2014: PPP project
- 2011-2014: 280 km/h
- Calgary Substation, Telecom, Signaling, Full Level 2 ATP
- UK Channel Tunnel Rail Link - Station 1
- 2007-2009: Delivery ahead of schedule
- 2007-2009: 300 km/h, 300 km/h
- Beijing Shijiazhuang
- Full infrastructure availability reaching 99.9%
- South Korea - KTX Seoul - Pusan HSR
- 2004-2009: First HSR tender award
- 2004-2009: 300 km/h
- Beijing Shijiazhuang, Signaling, High speed infrastructure, Full technology transfer

ALSTOM



ЖЕЛЕЗНОДОРОЖНОЕ МАШИНОСТРОЕНИЕ: ПАРТНЕРСТВО ПРОИЗВОДИТЕЛЕЙ 1500 И 1435

RAILWAY ENGINEERING

НИКОЛЯ КАСТРЕ СЕН МАРТАН

Инженерские компетенции мирового уровня для проектов 1500 и 1435. Успехи для высокоэффективной командной работы.

NICOLAS CASTRES SAINT MARTIN

World-class engineering at 1500 and 1435. Conditions for highly effective cooperation.



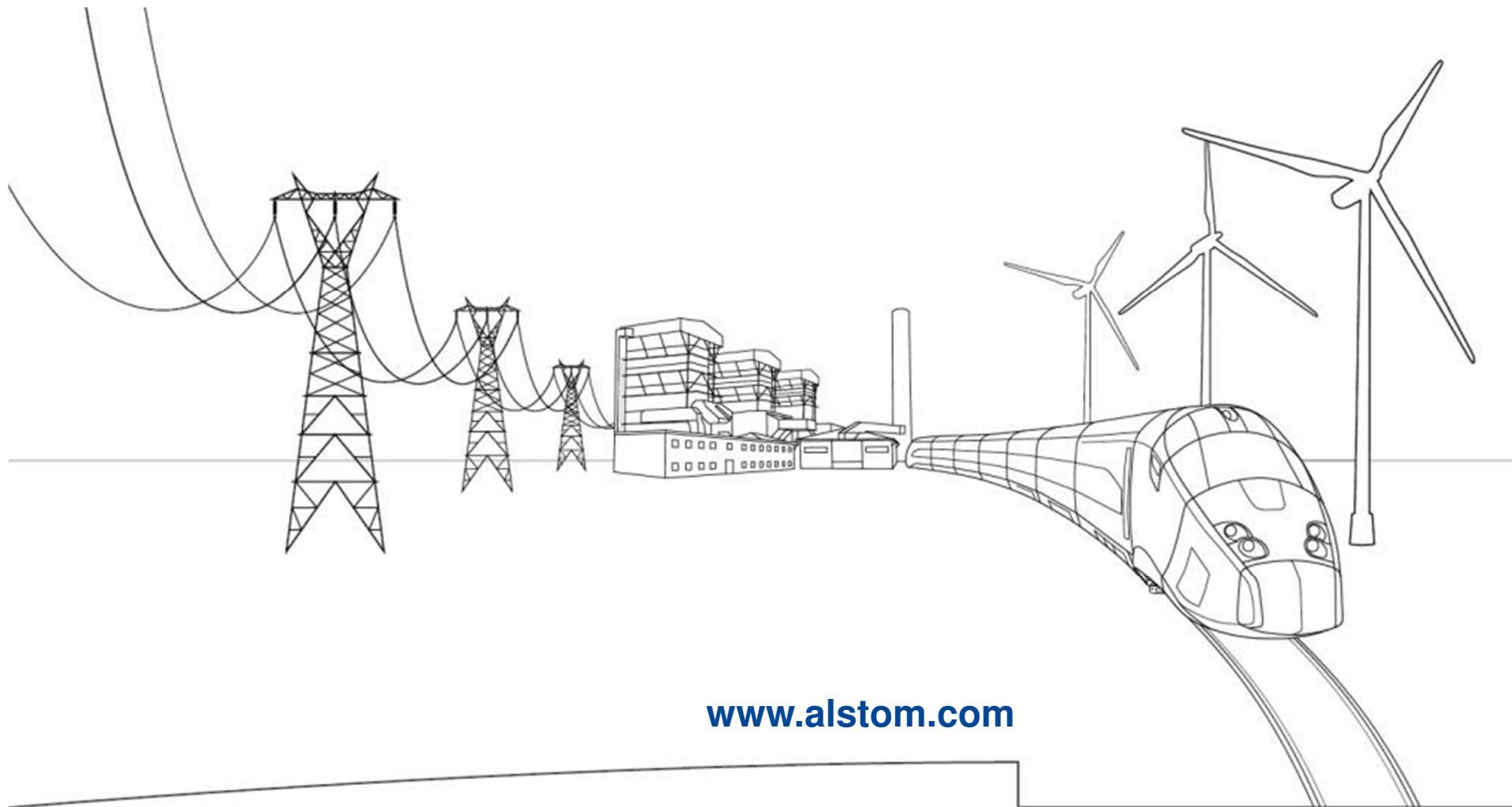
Expert - News

September 17, 2014 - <http://theexpert.ru/2014/09/17/alstom-otkaz/>

Waiting VHS For a While

В ожидании VHS





www.alstom.com



МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ
УНИВЕРСИТЕТ ПУТЕЙ СООБЩЕНИЯ
(МИИТ)



ALSTOM

Designing fluidity