



Ansaldo STS

A Finmeccanica Company



About us: Finmeccanica



Finmeccanica is Italy's leading manufacturer in the high technology sector.

Finmeccanica is the largest shareholder in Ansaldo STS with a 40% stake.

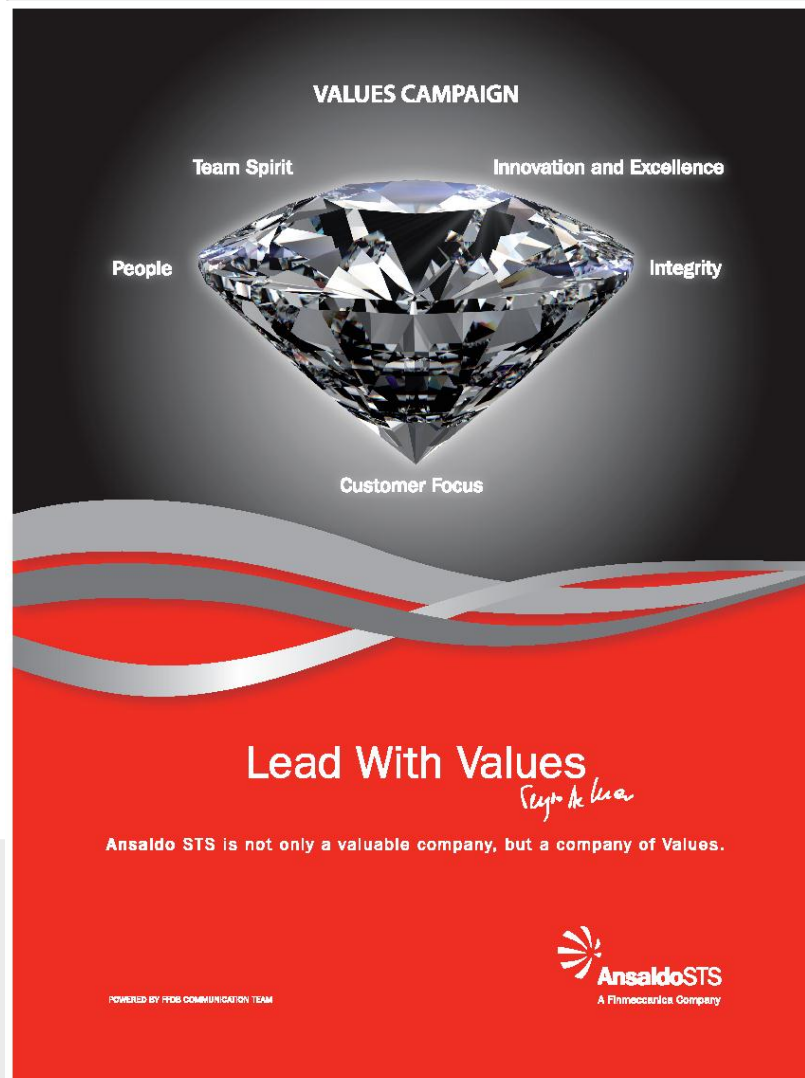
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Finmeccanica our reference shareholder

Finmeccanica Key figures - 2011

Revenues	€ 17.3 Bln
New Orders	€ 17.4 Bln
Backlog	€ 46.0 Bln
R&D	€ 2.0 Bln
Employees	70,474

Ansaldo STS Values



Customer Focus

Innovation and
Excellence

People

Team Spirit

Integrity

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About us: Ansaldo STS



Ansaldo STS, a Finmeccanica Company, is a leading technology company listed on the Milan Stock Exchange.

It operates in the global Railway & Mass Transit industries, providing signalling systems, transportation solutions and services.

It also acts as lead contractor and turnkey provider on major projects worldwide.

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About us: Ansaldo STS

Listed on Milan Stock Exchange (STAR Sector) - 2012

STS.MI

Revenues	€ 1,248 Mln
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Orders	€ 1,492 Mln
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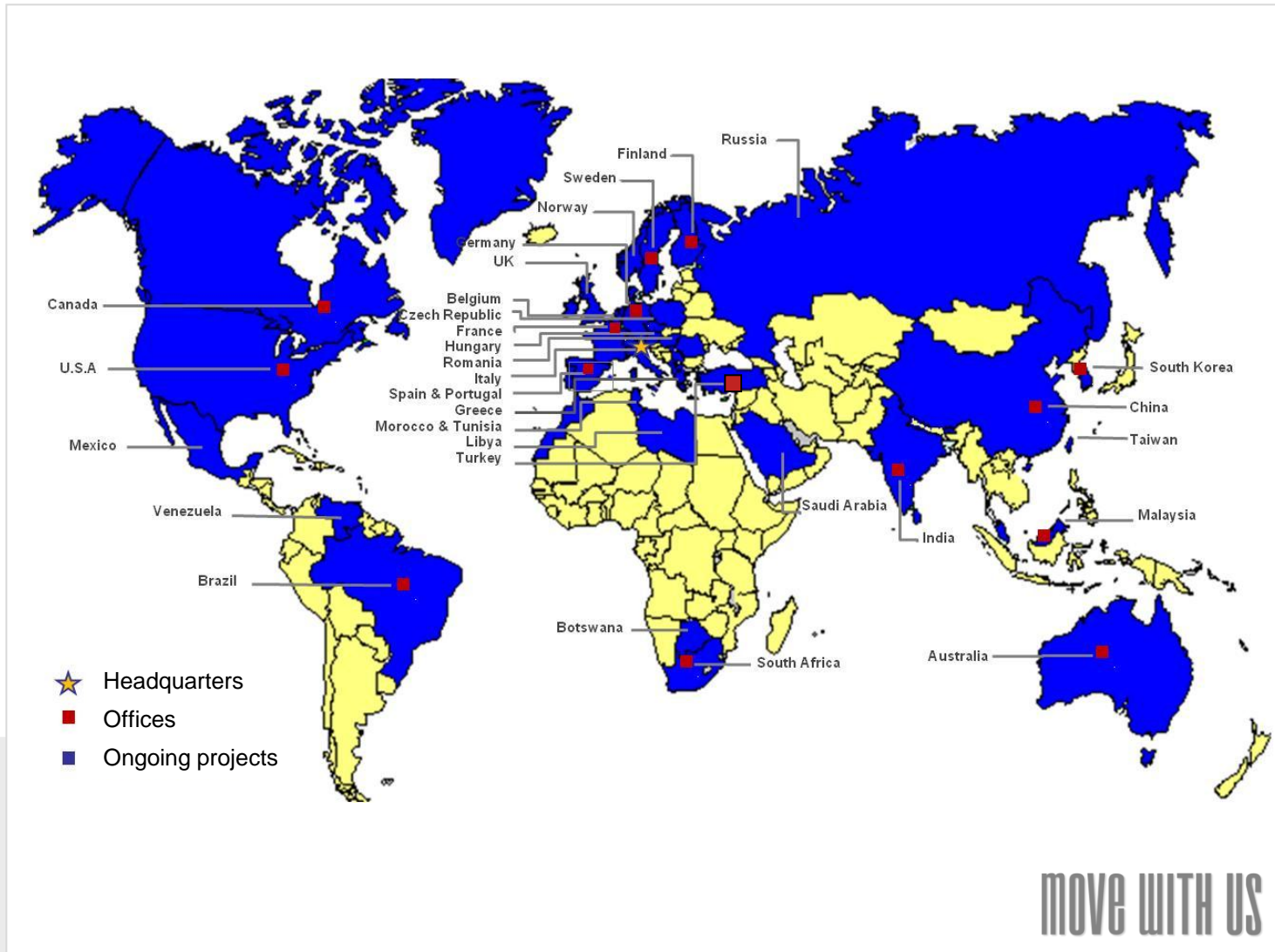
Backlog	€ 5,683 Mln
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EBIT	€ 117 Mln
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NFP	€ (302) Mln
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Employees	~ 4,100
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Worldwide presence



Competences

Legitimated by
technological
leadership
in safety

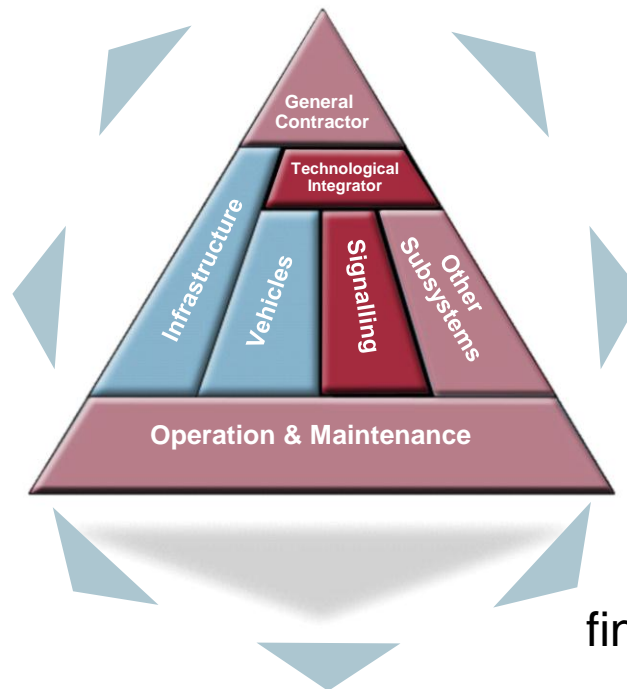
Solid roots
and track
records where
demand is

Serving future
clients needs

Rolling stock:
no legacy,
but preferred
access

Partnering
along the
whole client
value chain

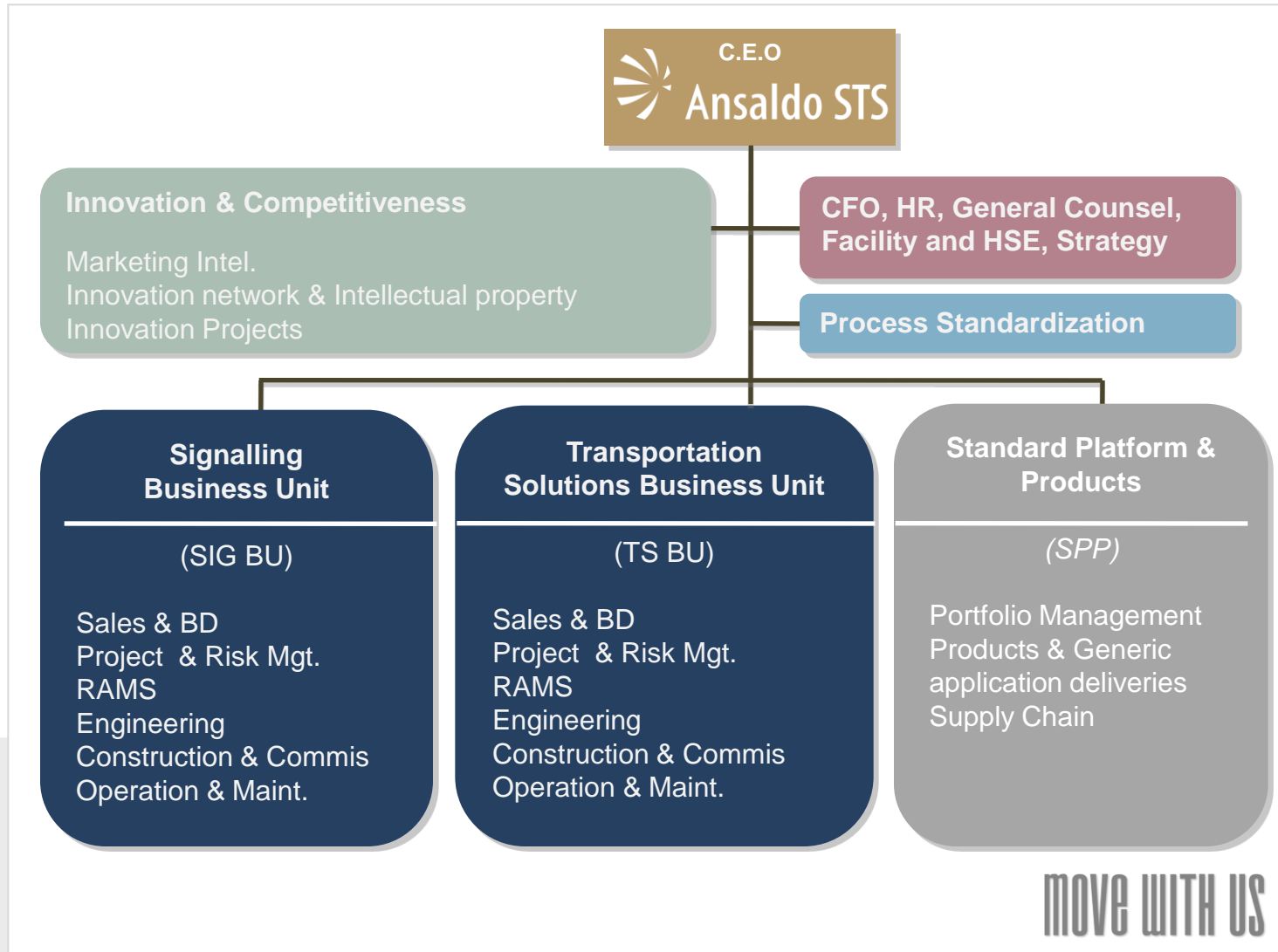
Easing customer
financial constraints



Global organization

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Company Organization



The Signalling Business Unit



The Signalling Business Unit contributes to the development of the railway signalling industry, pioneering the most advanced technologies to answer customers' needs to safely and efficiently operate and manage rail and urban transport networks for passengers and freight.

The Business Unit provides design, verification, installation, commissioning, maintenance and training, for complete rail automation and safety related control systems and equipment.

The Signalling Business Unit



Main Systems & Products

General applications:

- Train control systems on board (ATP/ ATO/ATC)
- Train control systems trackside
- Interlocking
- Centralised traffic control system (CTC)
- Security Management System (SMS)

Mass Transit applications:

- Traditional track circuit based metro systems
- Communications-based signalling systems (CBTC)
- (in both applications train operations can be attended or unattended)

Railway applications:

- Interoperable signalling systems ERTMS
- Positive Train Control
- Optimized Traffic Planner
- Train Conformity Check System (TCCS)

The Transportation Solutions Business Unit



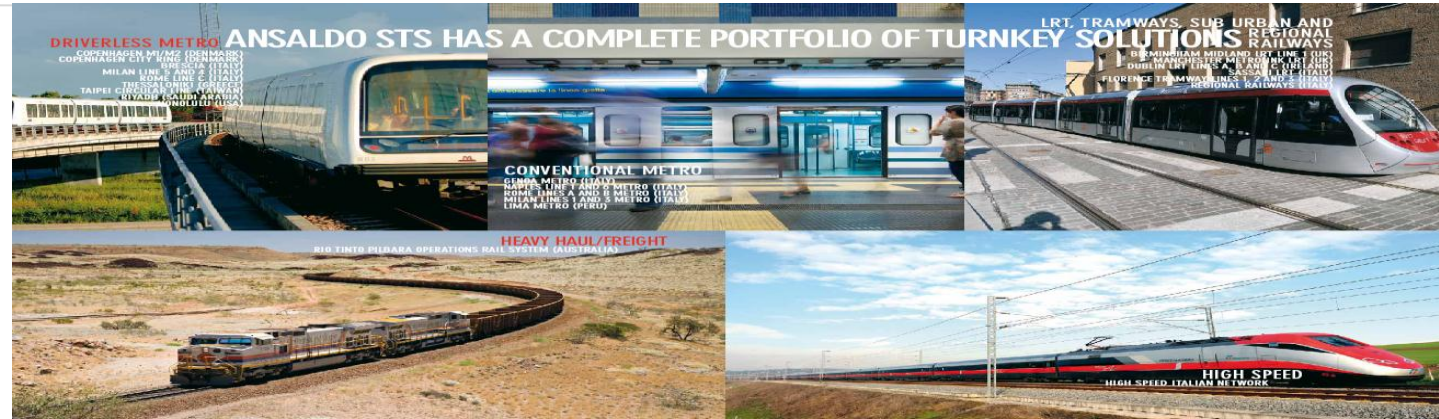
Following its innovative “full system approach” Ansaldo STS optimizes strategies, resources and investments and rationalizes the various types of technology in order to provide a state-of-the-art, viable and integrated transportation solutions within a municipality, region or country.

In this context, the Transportation Solutions Business Unit acts as lead contractor (or consortium partner) and system integrator for major projects around the world, providing end-to-end solutions on time and on budget for projects of any size and complexity, mainly under the following contractual schemes:

- Contracting for Design & Construction
- Project Financing
- Public Private Partnerships (PPP)
- Build, Operate and Transfer (BOT)
- Design, Build, Operate and Maintain (DBOM)

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The Transportation Solutions Business Unit



Core Business

The Transportation Solutions Business Unit operates in the Railway and Mass Transit business delivering:

- System integration
- Traffic Management
- Train Control and Signalling Systems
- Telecommunications
- SCADA
- Power Supply
- Electrification
- Platform Screen Doors
- Fare Collection
- Depot Equipment
- Track Works
- Operation and Maintenance

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Business Lines

Ansaldo STS delivers a full range of Railway and Mass Transit Transportation Solutions and Signalling Systems, such as...



High Speed



Main Lines



Sub-urban



Conventional
Metro



Tramwave
(catenary free)



Driveless UTO
Metro



Tramway



Light Rail

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Expertise and Products



Pioneer and global supplier of ERTMS systems

Ansaldo STS has won contracts to install the equipment for over 3,300 km high-speed and conventional lines, and to supply more than 3000 on-board systems around the world, including:

- First ERTMS level 1 in Italy (SCMT)
- First ERTMS level 2 in Italy (high-speed line)
- ERTMS level 1 & 2 in Spain (high-speed line)
- ERTMS level 2 in the UK (low density line)
- ERTMS level 2 in Sweden (regional line)
- ERTMS adapted to Chinese standards: C3 (DPL)
- ERTMS level 1 in India (TPWS)
- ERTMS equipment level 2 for European cross-border trains (e.g: P-B-K-A Thalys)

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Global ERTMS & High Speed applications



France

High Speed network
LGV EST - lev. 2
Tournan-Marles en Brie - lev. 1-2
On-board - lev. 1/2
On-board - lev. 2

Cross border

Figueres-Perpignan - lev. 1/2
Paris-Brussels-Cologne-
Amsterdam
Channel Tunnel Rail Link

Spain

Madrid-Lleida HSL - lev. 1/2
Madrid-Atocha HSL by-pass
On-board - lev. 1-2

Italy

Rome-Naples HSL - lev. 2
Turin-Milan HSL - lev. 2
Milan-Bologna HSL - lev. 2
SCMT projects
On-board - lev. 1
On-board - lev. 2

UK

Cambrian Coast - lev. 2
High Speed One

Sweden / Finland / Norway

Haparandabanan - lev. 2
STM Nordic

Germany

Saarbrücken-Mannheim - lev. 2
Berlin-Rostock - lev.2
Velaro on-board - lev.2

Czech Republic

Poříčany-Kolín - lev. 2

Austria - Hungary

Vienna-Budapest - lev. 1

Turkey

Bogazkopru-Yenice
Mersin-Toprakkale - lev. 1
On-board - lev 1

South Korea

On-board - lev. 1
Seoul-Busan HSL

Greece

On-board - lev. 1

Romania

Campina - Predeal - lev. 1

Libya

Ras Ajdir - Sirt - lev. 1/2
Al-Hisha - Sabha - lev. 2

UAE

Shah Habshan Ruwais - lev. 2

China

Zhengzhuang-Xi'an - lev. 2
Shijiazhuang-Taiyuan - lev. 1
Qinhuangdao-Shenyang DPL
On-board - lev. 1-2

India

Chennai-Gummudipundi - lev.1
Delhi-Agra - lev. 1

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High Speed



High Speed technology around the world

A pioneer in High Speed technology as early as 1981 with the Paris-Lyon line (indeed, the first HS line in Europe) Ansaldo STS is now global leader in the sector and supplies over 50% of world's High Speed technology nowadays.

High Speed Technologies

TVM
ERTMS L1
ERTMS L2

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Mass Transit & Light Rail

Ansaldo STS Mass Transit solutions satisfy every type of need for the urban mobility



Conventional Metro

Transport system running on dedicated and protected track
Capacity between 8,000 - 50,000 (and more) passengers per hour per direction (pphpd).



Driverless Unattended Metro

Same features as Conventional Metro without personnel on board.
Full operational flexibility with headway down to 75 seconds.



Tramway

Ordinary urban mobility with capacity between 2,000 and 8,000 pphpd.
Minimum headway depends on traffic priority
Distance between two stops 500m or less (in the citycentre).

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Worldwide Mass Transit references and contracts on execution

**Ansaldo STS has successfully delivered on time and on budget
turnkey mass transit solutions all over the world**

● **AF TC (ATC)**

- Shanghai Line 2 (China) - 2002 & Extension - 2011
- Shanghai Line 2 East Extension (China) - 2011
- Shanghai Line 2 West Extension (China) - 2009
- Tanjin-Binhai (China) - 2006
- Washington DC Red Line & Blue Lines (USA) - 2012 & 2013
- Pittsburgh North Shore Corridor (USA) - 2012
- Pittsburgh South West Corridor LRT (USA) - 2008
- Chicago Blue Line (USA) - 2010
- Charlotte South Corridor LRT (USA) - 2007
- Los Angeles Green Line (USA) - 2005
- Portland West Side Corridor LRT (USA) - 1998
- Dallas DART LRT (USA) - 1997
- Genova Line 1 (Italy) - 2011
- Napoli Alifana Line (Italy) - 2009
- Sao Paulo Lines 7, 9 (Brazil) - 2011
- Seoul Lines 5, 7, 8 (Korea) - 1996

AF: Audio Frequency
RF: Radio Frequency
TC: Track Circuit

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Worldwide Mass Transit references and contracts on execution

AF TC (STO)

- Lisbon Line B (Portugal) - 2003
- Paris RER A (France) - 1995

AF TC (UTO)

- Copenhagen lines M1/M2 (Denmark) - 2002
- Riyadh (Saudi Arabia) - 2011
- Brescia (Italy) - 2012
- Milan line 5 (Italy) - 2012
- Rome line C (Italy) - 2013
- Thessaloniki (Greece) - 2013
- UI-Shinseol (Korea) - 2014
- Honolulu (USA) - 2015

RF CBTC (STO)

- Paris Line 3 (France) - 2010
- Shenyang lines 1, 2 (China) - 2011-2012
- Chengdu lines 1, 2 (China) - 2011- 2012
- X'ian line 2 (China) - 2012
- Hangzhou line 1 (China) - 2012
- Zhengzhou line 1 (China) - 2013
- Ankara line M1, M2, M3, M4 (Turkey)

RF CBTC (UTO)

- Taipei Circular line (Taiwan) - 2013
- Copenhagen City ring M3/M4 (Denmark) - 2018

AF: Audio Frequency
RF: Radio Frequency
TC: Track Circuit

CBTC solution for Mass Transit systems

Today, CBTC solution are the technology that many urban transit systems around the world choose, because it allows the highest level of performance, reliability, flexibility and system capacity...

With a complete portfolio, from green-field to brown-field projects, from STO to UTO, from light to heavy rail and from signalling systems to complete turnkey solutions, Ansaldo STS is a leading provider of CBTC technology with proven success worldwide including:

Main signalling project referring to ATO

Shenyang line 1	Shenyang line 2	Chengdu Line 1	Chengdu Line 2	Xian Line 2	Hangzhou Line 1	Ankara Line 1	Ankara Line 2	Ankara Line 3	Ankara Line 4	Alifana Railway	Stockholm Red Line	Paris Line 3
29 km	25 km	15 km	41 km	26.6 km	53.6 km	32 km	18 km	8 km	5 km	11 km	41 km	12 km

Main turnkey projects referring to UTO technology

Taipei Circular line	Copenhagen City ring
15,5 km	16 km

Driverless Unattended Metros main features

The Driverless Unattended metro assures high performances, both in terms of technology and transportation.. Here following the main features of Ansaldo STS driverless unattended metro solutions around the world (*Copenhagen M1/M2 operated by Ansaldo STS since 2002, Milan line 5, Brescia, Rome line C, Thessaloniki, Taipei, Riyadh, Copenhagen Cityringen M3/M4, Honolulu,etc...*)

Service around the clock (24h / day - 7days / week)	
Min service headway	75 s
2 cars train length	29 m to 38.5 m
3 cars train length	39 m to 55 m
4 cars train length	50 m to 78 m
6 cars train length	80 m to 108 m
Train width	2.65 m / 2.85 m
2 to 4 doors per car per side	
Aluminum body - shell	
IGBT traction inverter	
under body equipment => easy maintenance	
Min curve radius	50 m
Max speed	100 km/h
Train Capacity (6p/m ² – train 3 to 6 cars)	434 to 1.200 pass
Max system transport capacity (6p/m ² - train 3 to 6 cars)	20,832 to 57,600 pphpd

Unattended Metro around the world

Ansaldo STS has more than **150 km** of Unattended Metros projects all over the world

Copenhagen M1/M2	Brescia	Thessaloniki	Rome line C	Milan line 5	Taipei (CBTC)	Riyadh	Copenhagen Cityringen (CBTC)	Honolulu
21 km double track double tunnel	13.7 km double track single tunnel	9.5 km double track double tunnel	25 km (+17) double track double tunnel	12.6 km double track single tunnel	15.4 km double track viaduct	11.3 km double track viaduct	16 km double track double tunnel	32 km double track viaduct
22 stations	17 stations	13 stations	30 stations (+12)	19 stations	14 stations	14 stations	17 stations	21 stations
min headway 90 s	min headway 90 s	min headway 90 s	min headway 120 s	min headway 75 s	min headway 90 s	min headway 90 s	min headway 100 s	min headway 159 s
12,000 pphpd (4p/m ²)	17,000 pphpd (6p/m ²)	21,000 pphpd (6p/m ²)	36,000 pphpd (6p/m ²)	28,000 pphpd (6p/m ²)	26,000 pphpd (6p/m ²)	4,400 pphpd (2,5p/m ²)	12,000 pphpd (4 p/m ²)	7,200 pphpd (3.2 p/m ²)
34 trains 3 cars per train (39m)	21 trains 3 cars per train (39m)	18 trains 4 cars per train (50m)	30 (+13) trains 6 cars per train (108m)	21 trains, 4 cars per train (50m)	17 trains 4 cars per train (70m)	22 trains 2 cars per train (29m)	28 trains 3 cars per train (39m)	40 trains 2 cars per train (38.5m)
13 + 3 years O&M In operation since 2002	2 years of operation 7 years of maintenance	3 years of service assistance		27 years of Operation & Maintenance	Future system extension: 52 km, 56 stations, 64 trains		5 + 3 years O&M	15 years O&M

Standard Products & Platforms Unit



SPP supports the Business Units activities providing the following services:

- Products portfolio management
- Product development
- Supply chain
- Supplier Performance Management
- Procurement
- Planning & Logistic
- Manufacturing & Industrialization
- Product and generic application safety case

SPP main systems & equipments



Computer - based interlocking (CBI) systems tailored to our customers' requirements

For small stations
For medium-sized / large stations
For an entire line ("Multistations")

Other trackside equipment:

Automatic block systems
Track circuits
Eurobalises
Hot box and hot wheel detectors
Point machines

Vital relays
Level crossings
Data transmission equipment
Power supply equipment
Diagnostic System (TCCS)

Planning, Supervision & Traffic Control



From basic command/control functions to large-scale systems:

Centralized Traffic Control (CTC) for High Speed lines and conventional lines

Management of main stations

Centralized electrification control

Automatic systems for switching stations

Supervisory control and data acquisition (SCADA)

Optimizing Traffic Planner (OTP)

Operation Control Centre (OCC) for metro transport

Innovation & Competitiveness Unit



The Innovation and Competitiveness Unit of Ansaldo STS is dedicated to developing new and alternative products, materials, technologies and services that contribute to keeping Ansaldo STS in a competitive and advanced technological leading position.

Company competitiveness is supported by the Market Intelligence staff as well as close Customer Satisfaction monitoring.

The I&C unit activities encompass the followings:

- Market Intelligence and Customer Satisfaction
- Product Innovations (eg. Technologies for Security application)
- Intellectual property management

Security



Ansaldo STS is a pioneer in the development and implementation of fully integrated security systems for Railways and Mass Transit.

References:

MetroCampania NordEst, Naples

Circumvesuviana suburban network, Naples

Security for Copenhagen's Cityringen

Security Control Center for Italian Railways

Security for Sicily Rail Network

Security system for Libyan Railways

TCCS™



TCCS™, Train Conformity Check System is Ansaldo STS's Wayside Train Monitoring System.

TCCS automatically acquires and processes measurement data for all trains with the scope of detecting a series of rolling stock defects, which:

may be a cause of an accident
indicate the need of corrective maintenance of rolling stock
would cause infrastructure damage or abnormal wear.

Acquired data may also be used for predictive maintenance modeling both on rolling stock and infrastructure.

The system has been successfully tested by RFI on the line between Rome & Naples.

Tramwave Catenary - free Solution



Tramwave® is an innovative traction power supply system without overhead catenaries.

With Tramwave® power is provided safely and efficiently through a ground contact line that energizes a small section of the line only when the vehicle is on top of it.

Tramwave® was conceived, designed and developed to:

Eliminate the visual impact of traditional overhead catenaries

Enable easy insertion of the power line between the rail tracks

Ensure safety, operability and availability in all working and environmental conditions

Eliminate the need for on-board power storage systems

Be configured for different types of vehicles (trams or electrical vehicles on tires)

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Operation & Maintenance



Ansaldo STS can operate 24/7 transportation systems and provides the complete maintenance to ensure full service availability.

Since 2002 Ansaldo STS has operated and maintained the Copenhagen Driverless Unattended Metro.

Ansaldo STS provides maintenance services for numerous railway networks and metro lines around the world, including:

- Channel Tunnel Rail Link (UK)
- Madrid-Lerida High Speed Line (Spain)
- Union Pacific, CSX and Kansas City (USA)
- Northwest and Perth TCS (Australia)
- Gaborone (Botswana)
- Metros (Paris, Lyon, Lisbon, Caracas)

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