

# ALTEN

ENGINEERING AND TECHNOLOGY CONSULTING

**RAIL**  
SECTOR

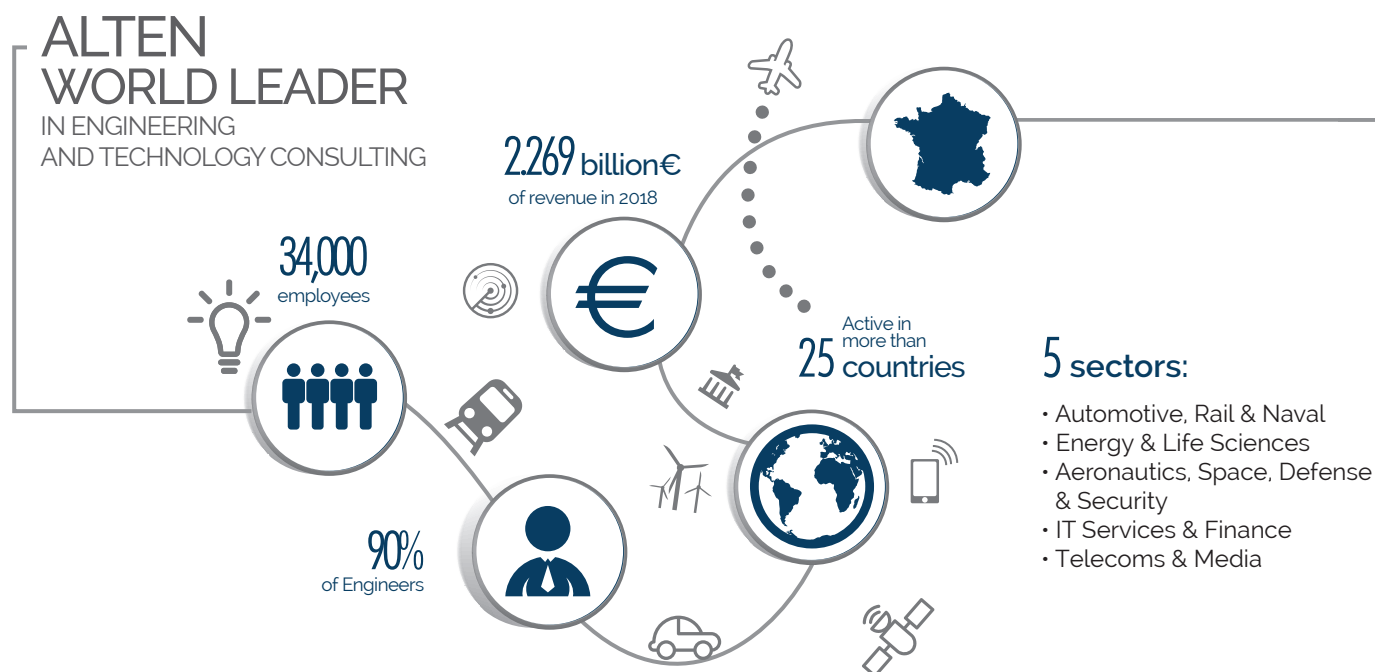


ALTEN

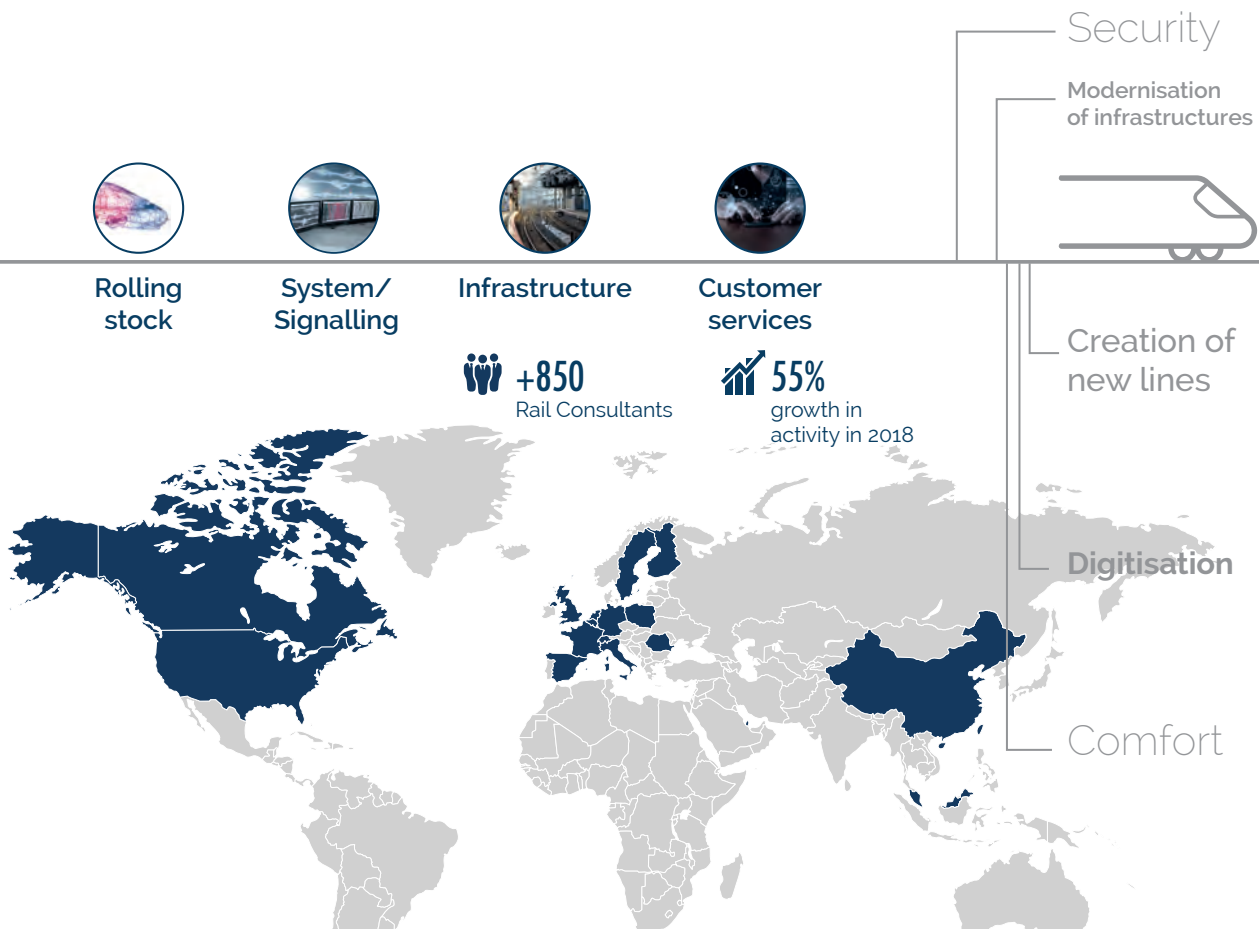
# ALTEN GROUP

## KEY FIGURES

Over the past 30 years, ALTEN has established itself as a leader by supporting its customers' development strategies in the areas of innovation, R&D and information systems.



# ALSTOM IN THE RAIL SECTOR

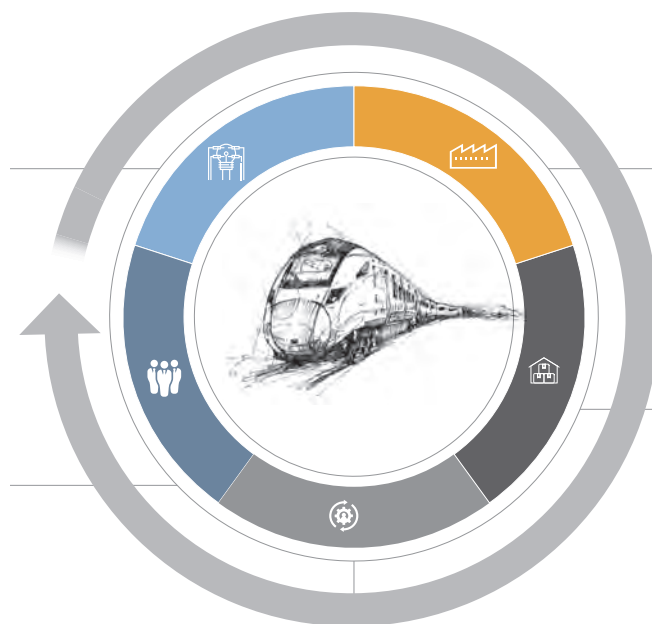


## Study & Design:

- Mechanical design and electrical study
- System engineering/ RAMS study
- Development of embedded software
- Application development/ IT Support
- System Integration and Validation

## Customer Services – SLI:

- Maintenance services
- Training
- Technical documentation



## Production and Methods:

- Industrialisation
- Support for Production activities and Operations
- Qualification process
- Conducting operations
- Tests and entry into service

## Logistics & Supply Chain:

- Performance & Monitoring of suppliers
- Procurement management
- Management of logistics flows

## Operations Support:

- Traveller services
- Fleet management
- Traffic management





# ROLLING STOCK

Carrying more passengers, faster, more reliably and using less energy, new-generation rolling stock must also provide increased protection and comfort services for travellers. Given these challenges, the rail division at the ALTEN Group supports its customers in developing innovative systems, customising solutions for the end customer, industrialising products in a competitive manner, and reducing maintenance costs.



## Definition of the train sub-system architecture

The United Kingdom has launched the biggest rail modernisation programme of the century. A rail manufacturer was awarded several major contracts with its new regional train. ALTEN is supporting it in the various customisation projects requested by the end customers.

An ALTEN multi-disciplinary service centre (mechanics, electrical, etc.) has been set up to conduct the following:

- **Management of specifications:** Analysis of the customer contract, assessment of risks and compliance...
- **The technical specification and design of the architecture:** System engineering in the various phases of development
- **Configuration management**
- **Coordination of the call for tenders**

Conducting the project independently, our team of engineers delivered the design of the vehicle sub-system architecture (traction, regenerative braking, monitoring/surveillance and connectivity).

## Industrialisation and commissioning of an express inter-city train

To speed up the delivery of trains and help this industrial project to success, ALTEN is supporting a worldwide supplier of mobility solutions in several engineering activities in Switzerland.

- **Mechanical design:** Integration, interior trim, etc.
- **Optimisation of industrial methods:** Timing analysis, ongoing improvement, etc.
- **Management of the supply chain:** Logistics flow, procurement, etc.
- **Tests and commissioning:** Statistical and dynamic tests

In order to meet the project deadlines, ALTEN used its international mobility programme internally to support the teams of Swiss engineers in their missions.

Traveller services and comfort  
Transport capacity/Interior fittings  
Performance and speed  
Sustainable development/Energy savings



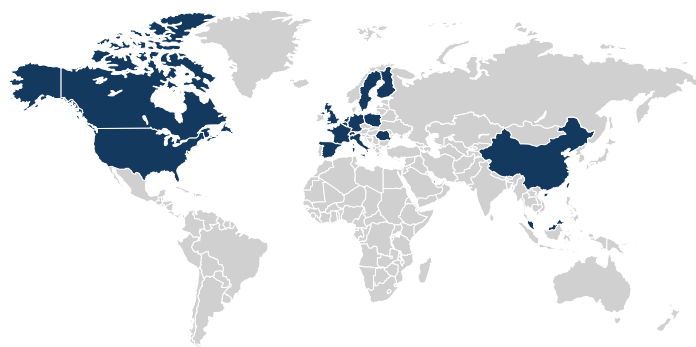
## More comfortable trains: renovation of high-speed trains

With the opening of European rail transport to competition, ALTEN has been asked to take part in the "mid-life" renovation of all high speed train cars for a sector leader.

As part of this project, a team of multi-disciplinary engineers (mechanics, electrical, etc.) is deployed to carry out in-depth studies of a variety of improvements (such as weight, electrical and pneumatic installation and rail compliance). These studies aim to improve the comfort of travellers and offer more services:

- The addition of various comfort equipment: Electrical sockets, ovens, beverage vending machines, etc.
- Integration of security systems: Surveillance camera connected to the driver's cabin
- Modification of interior equipment: Seat covers, armrests, magazine holders...

As an historic partner to the rail operator, ALTEN is known for its expertise with several representatives experienced in the design of interior fittings of trains and for its ability to support rapid ramp-up.



# SYSTEM/SIGNALLING

Automation, increased frequency of trains at peak times, real-time customer information, predictive maintenance... Digital technology is revolutionising the reliability and flexibility of signalling systems and network management.

ALTEN supports manufacturers and rail operators in developing signalling systems (CBTC, ETCS, etc.), monitoring/surveillance systems (TCMS) and traveller information systems.



## Development of the CBTC system for automation of metro lines

A worldwide player in the rail sector has won several metro line automation contracts through out the world. To support the development of CBTC signalling systems dedicated to end customers, ALTEN has set up a service centre to work on:

- The technical specification: Checking functional applications and security
- Software development
- The development of simulation tools
- Performance of compliance tests

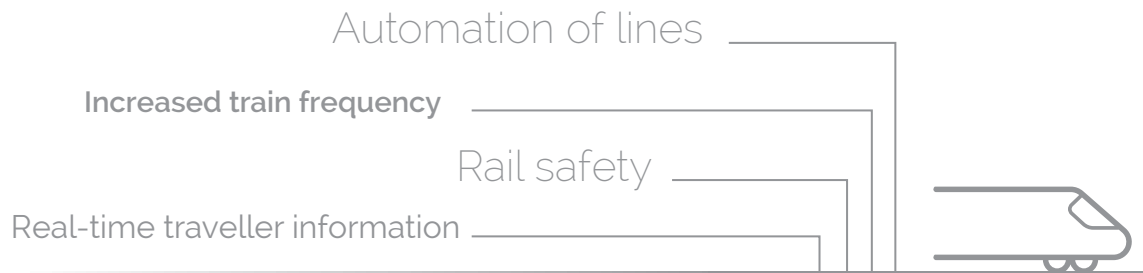
Aside from its proven experience in the application of traditional working methods, ALTEN has also been able to work using the Agile method (Scrum Master, sprints, daily meeting) to adapt to the customer's needs.

## Development and industrialisation of the ERTMS system

To support the centre of excellence ERTMS for our customer in Belgium, ALTEN has implemented a dedicated rail signalling skills centre. The engineers work mainly on designing ETCS signalling systems, monitoring interoperability of signalling systems in Europe, and checking compliance with European standards (TSI and CENELEC).

- RAMS(Reliability, Availability, Maintainability and Safety)
- Architecture and design of systems
- Development of applications and embedded software
- Test and Validation
- Industrialisation of the system (SIL0 to SIL3)





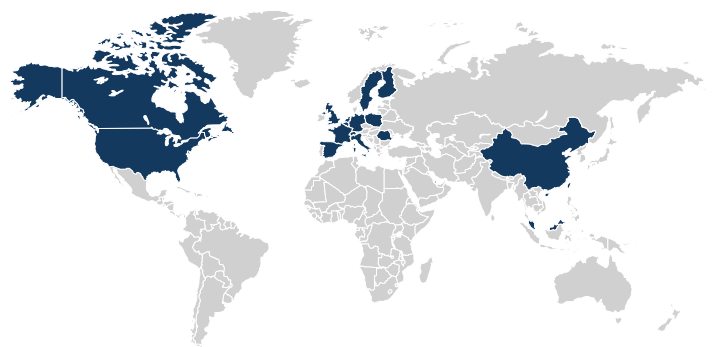
## Development of equipment for testing electrical systems

As an historic partner to a worldwide leader in rail transport systems, ALTEN assists its customer in testing electronics systems (signalling, control command, traveller information) in various fields:

- Specification and development of test software
- Specification for test benches and supplier monitoring
- Integration and validation of test systems
- Maintaining testing equipment in operational condition (MCO)

## Deployment of signalling systems in North America

With a strong presence in the United States and Canada, the ALTEN Group has appointed teams of engineers to support deployment of the signalling systems of a European rail manufacturer. In particular for configuration management (analysis and synthesis of variances between the system deployed and the system designed).



# INFRASTRUCTURE

Urbanisation and demographic growth have led the authorities to step up the creation or modernisation of transport networks. Stations and tracks are safer, easier to maintain and connected, and are better able to meet the needs of future mobility.

ALTEN positions itself as an essential interface in managing infrastructure assets, optimising regeneration of equipment (IoT, predictive maintenance, etc.) and design of certain structures (urban track installation).



## Electrification of lines: engineering of IFTE infrastructures

ALTEN is assisting a major European rail operator with the design of new electrified lines to anticipate the increase in traffic and development of the rolling stock.

ALTEN engineering teams work particularly on electrical sizing, design, operation assistance and maintenance of IFTE.

As the customer's leading supplier of engineering with regard to electrical sizing studies, ALTEN is implementing its expertise during the project's critical phases:

- **Digital simulation of the traction current quality:** analysis of operating conditions and disruptions caused by the electrical supply architecture, geometry of the line, current and future traffic...
- **Electrification studies:** definitions of equipment and its installation, taking into account all other installations
- **Project management,** coordination of the various trades and preparation of the work.
- **Operating support**

## Deployment and modernisation of infrastructures in the Middle East

Thanks to its presence in the Middle East, the ALTEN Group supports a worldwide leader in signalling systems, telecommunications, security, supervision and ticketing in conducting several contracts.

More than 90 engineers are working in the field on the following:

- **Deployment/installation engineering**
- **Tests & commissioning**
- **Management of projects and QHSE**

In order to meet strict deadlines, the ALTEN Group was able to mobilize a first multi-disciplinary team of 30 consultants in less than a month, experts in various fields: CCTV system, access control gate, ticketing system, etc.



Urban infrastructure integration

**Safety of structures**

Optimisation of operation and maintenance

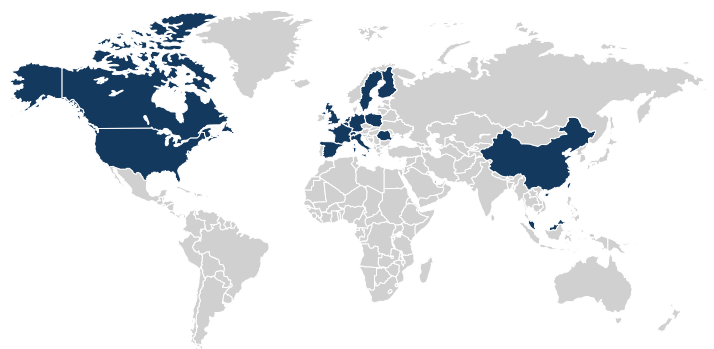
Integration of the industrial IoT



## Test and validation of the static ground recharge system

ALTEN is assisting the design department of a rail manufacturer in implementing a world-first technology, used to charge the tram when it is stopped in the station, in an automated and secure manner.

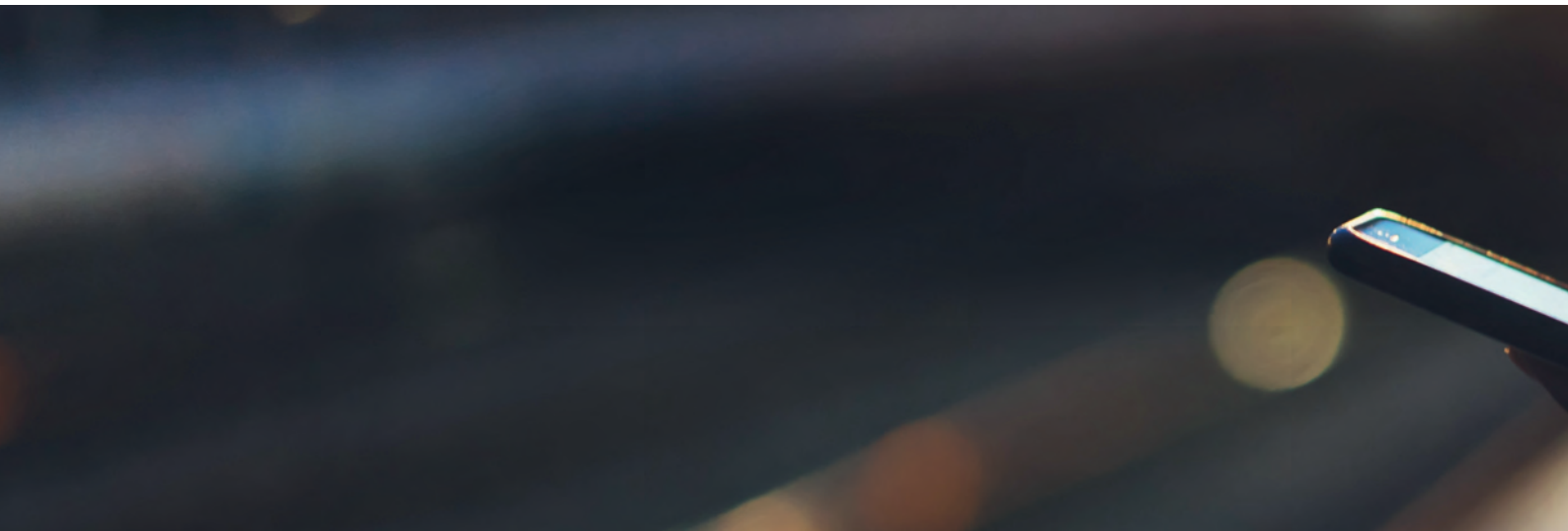
ALTEN engineers conducted a series of tests (CEM, ground resistivity, etc.) to confirm that the recharge system and the related equipment were working properly (transformer, command control system, wiring, etc.).



# CUSTOMER INTERFACE

Through Digital Transformation, the rail sector is leaning towards a global shift in its value chain, in order to increase the mobility power of users, and offer a tailor-made travel experience. In this vein, connectivity and data are vital tools to serve users.

ALTEN supports operators and manufacturers as they implement digital technologies (Big Data, Cloud computing, Cybersecurity, IoT, API, etc.) and assists its customers in developing new features & interfaces (Chatbot, Phygital, etc.).



## Building a "digital station"

Digital services are now an integral part of the traveller experience (free, unlimited Wifi, inter-modality, etc.) and this has an impact on all services related to the station and the connection process (connected service agent, predictive maintenance of installations, etc.).

ALTEN supports a European leader in mobility in deploying IT networks in rail infrastructure construction or modernisation projects. With its expertise in digital services and networks, and its understanding of the rail transport business, ALTEN works in the following areas:

- **Deployment of fibre optic technology along high-speed lines:** Design and validation of architecture, coordination of deployments
- **Deployment of networks (LAN, WAN and MAN) and business applications in stations:** Architecture design and project management

## Big Data for a smarter mobility service app

The ALTEN Group has developed algorithms for Big Data and integration into a mobile application for a world leader in rail transport and mobility.

Based on the current instant geolocation of the user and the history of his/her movements, they can be used to predict the person's movements and thus enable them to more quickly find itineraries on the application.



Multi-modal travel assistance

Customisation of travel routes

Access to high data speed network

Aggregation of digital resources

