



ETCS

On-Board Solutions



**COMPAGNIE
DES SIGNAUX**



In a journey everything is a sign

Signalling is related to the needs of safety and coordination in the mobility field.

Urbanization, sustainable and harmonious territory development imply a need of optimised mobility for work, transport of goods, exchanges and leisure.

In this megatrend, train is a major leverage and brings a lot of benefits, low environmental impact and safety.

Travelers and operators are expecting more fluidity, reliability, savings, passing frequencies, and most of the time speed. A precise signal, to the right person, at the right time, is a strategic issue and contributes to all these purposes.

Tomorrow, autonomous train will rely on systems bringing even more capacity. Trains will link cities more frequently and signalling will be a key success factor with a relatively low investment and no need to build new infrastructure. Compagnie des Signaux is already designing the way forward.

This document is before your eyes. It's a sign to meet and make a journey together.

It is a short presentation of our corporation, products and services, our project management and competencies, the way we deliver reliability and results.

“

I have rarely seen a project where products are delivered on time. With them it's the case.

Teams are passionate, helpful, solutions oriented. Technical teams are motivated to get a satisfactory technical solution.”

International train company operator

The history of Compagnie des Signaux began more than 120 years ago

Our 120 years of experience design our systems and foster constant progress.

A pure player

The market needs a reactive, adaptive specialist.

Compagnie des Signaux is an autonomous actor. This status gives to the corporation an innovative and entrepreneurial posture. Compagnie des Signaux is specialized in signalling and works with all market stakeholders.

We are pure player. This double dimension gives us the ability to work on a complex demand and tailor-made products.

We are also an integrated player from design to realization. This vertical integration brings to our clients, consistency and fluidity.

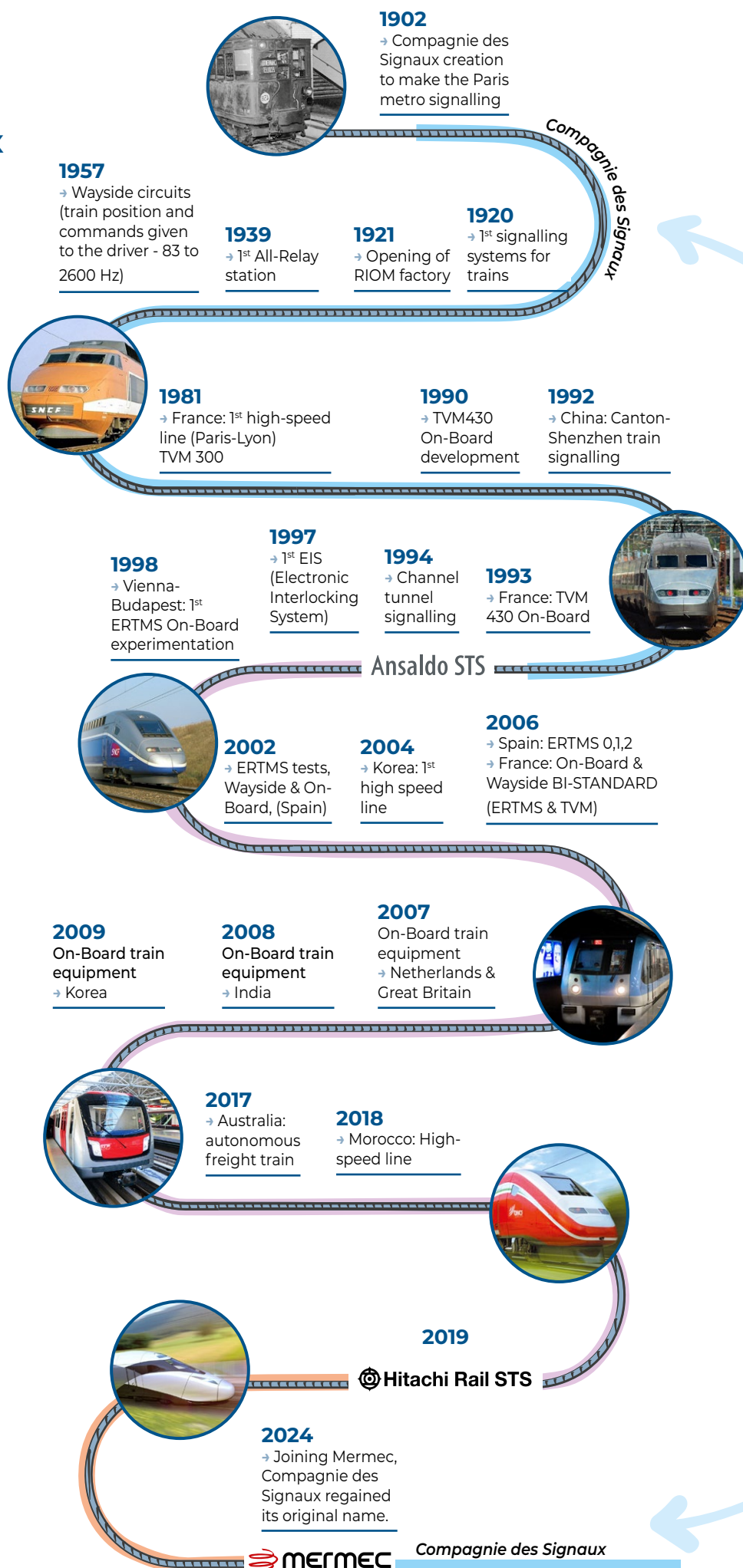
Our values, deeply linked to our work, lead our teams

Excellence: we have a demanding work, with a high level of expectations: passion and research of total safety and optimum comfort for passengers are our drivers.

Integrity: search for safety implies respect for facts and figures, without which no confidence and progress are possible.

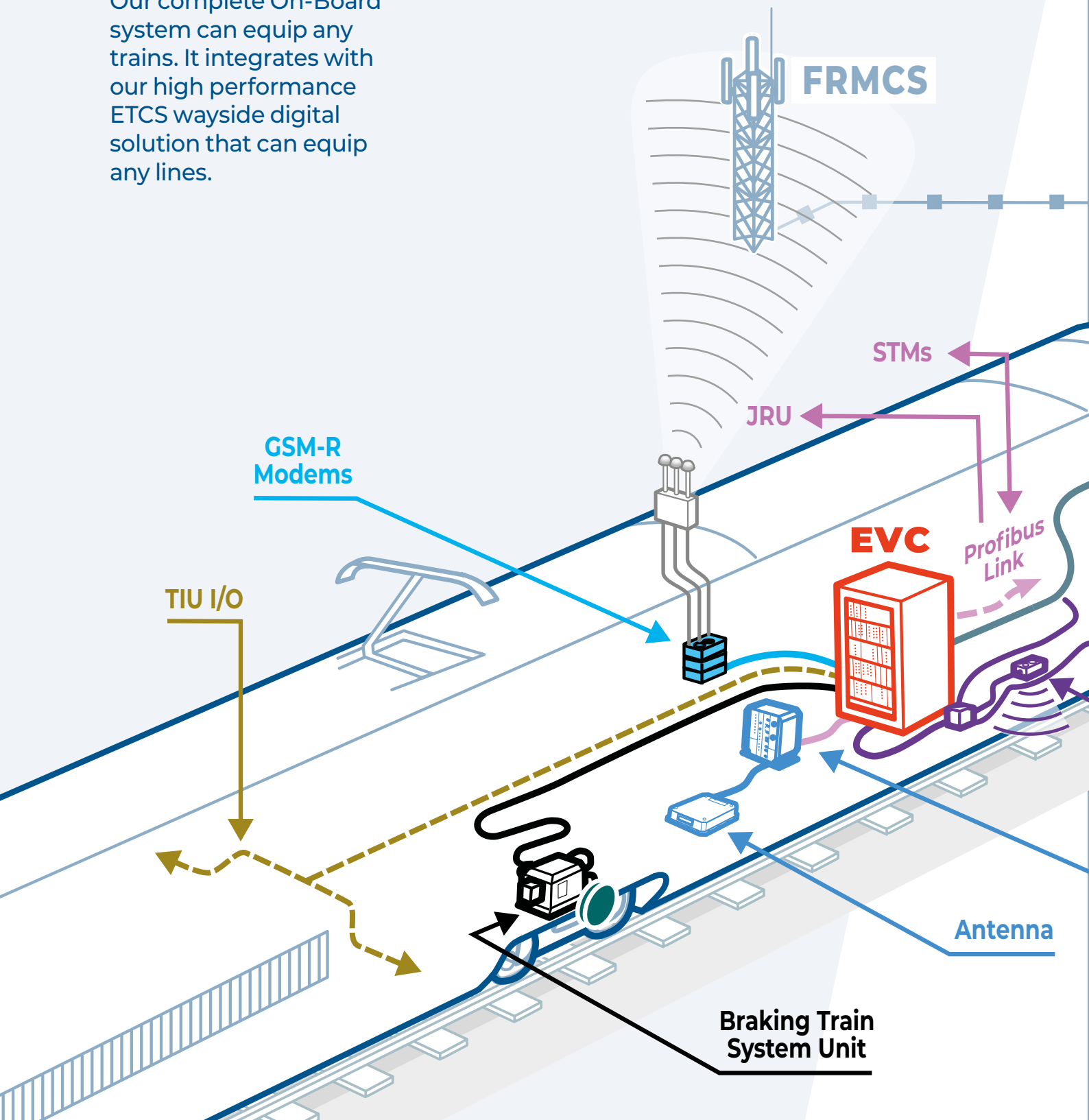
Solidarity: products, systems are linked together, safety of people is our common goal: togetherness in our teams and with our client is our way of working.

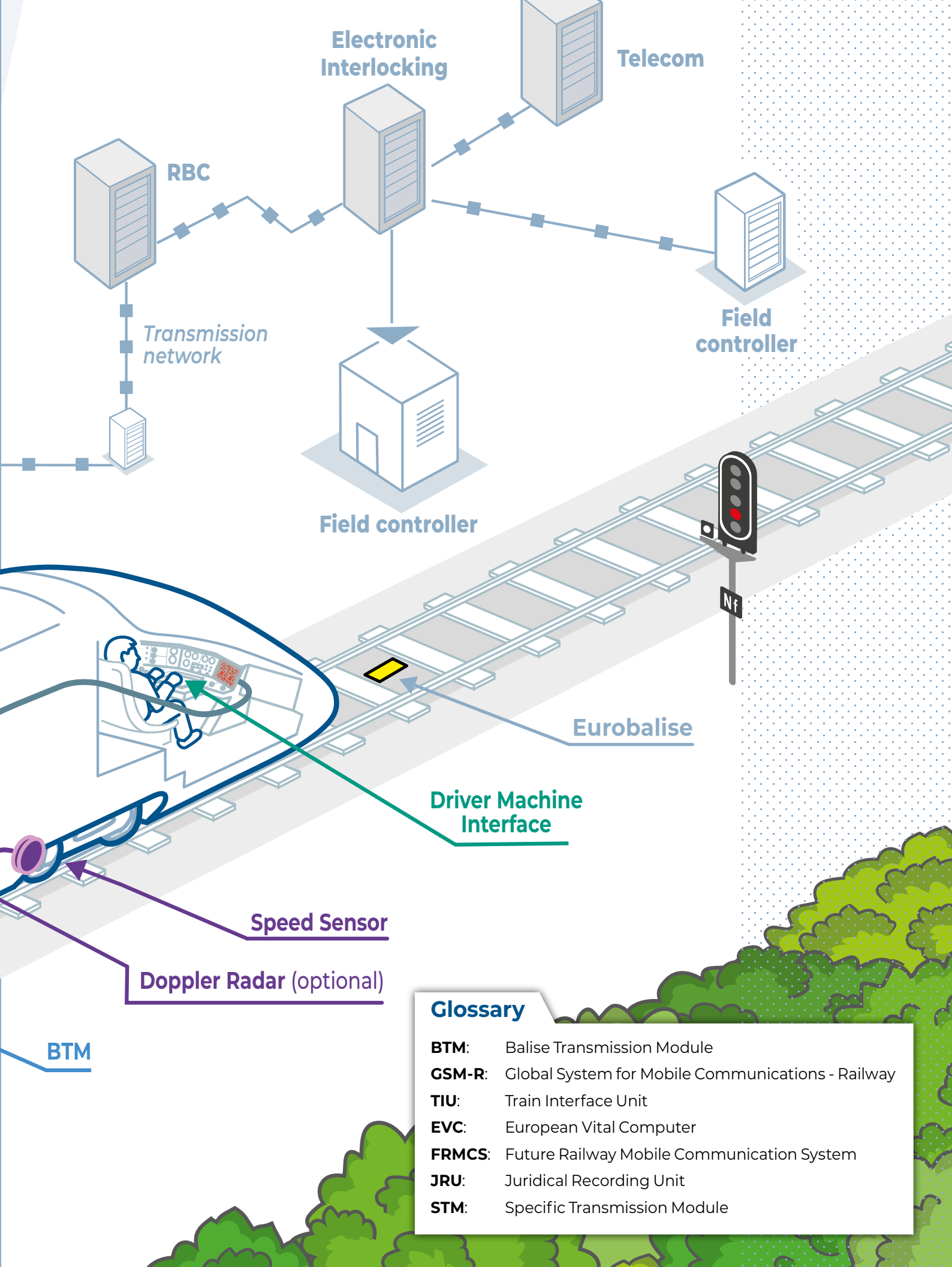
Compagnie des Signaux includes 500 employees in France with a high seniority on signalling activities. Our experience and young mindset are our priceless asset to bring you innovation and real progress.



A complete high performance digital system: safe, reliable, maintainable

Our complete On-Board system can equip any trains. It integrates with our high performance ETCS wayside digital solution that can equip any lines.





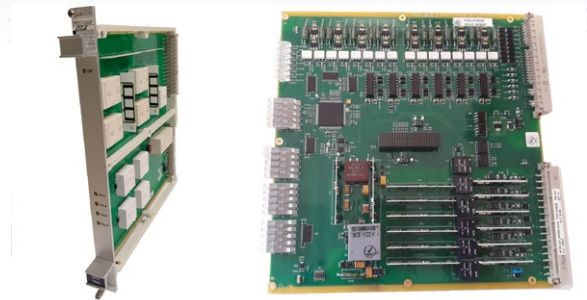
Glossary

BTM:	Balise Transmission Module
GSM-R:	Global System for Mobile Communications - Railway
TIU:	Train Interface Unit
EVC:	European Vital Computer
FRMCS:	Future Railway Mobile Communication System
JRU:	Juridical Recording Unit
STM:	Specific Transmission Module

Our DIVA platform and all our On-Board products can fit in any types of locomotives or trainsets, conventional or High Speed



EVC unit



ETCS I/O and safe relay boards



DMI



High performance computing electronic boards

Our tailor made CCTE+ electronics ensure an exceptional response time for our systems (< 150 ms).

Designed to anticipate future needs, this high performance board is adapting to technological developments. Thanks to our design expertise and ability, we guarantee a minimum 25 years life span, without compromising on performance.

Integrated Relay boards

MTORE Boards are designed to manage I/O functions in SIL2 due to its integrated HES and KDI circuits.

Moreover, on-Board racks can embed NS1 kind of relays to manage EB triggering and feedback functions in SIL4.

Specific relay board racks are also available and customizable.

Various DMI sizes to fit all cabins

Our DMIs adapt to each dashboard and can display STM data or be positioned next to national displays if necessary. Several hardware are available from touch-button single 8" portrait to double 10" portrait touchscreen and of course the most conventional 10" landscape displays.

Small shelter's size

Our shelters are optimised to fit in small cabins.



Dimensions

Weight Tension Power consumption

	Dimensions	Weight	Tension	Power consumption
EVC Rack	W = 482,6mm ; H = 265,9mm ; D = 320mm (399mm with handles and protective ears)	21 kg	72V DC	250W
Display (unit)	Several sizes available. Example (size 8") : L = 178mm ; H = 264mm ; D = 142mm (without connections)	2.5 kg	72V DC	40W
Balise Reader (BTM/LTM)	Several sizes available. Example (size 8") : W = 320mm ; H = 248,5mm ; D = 295mm	5.5 kg	24V DC	63W
Euroantenna	W = 499mm ; H = 116,5mm ; D = 420mm	11.5 kg	--	--
Sensor Wiegand	Without connections : Diameter = 200mm ; D = 90,1mm	7.3 kg	--	--
Radar	W = 550mm ; H = 120mm ; D = 231mm	8.5 kg	72V DC	37,5W
TVM 2G Sensor	Without connections : W = 130mm ; H = 65mm ; D = 124mm	2.2 kg	--	--
TVM I/P Sensor	Without connections : W = 130mm ; H = 65mm ; D = 124mm	2.1 kg	--	--
TVM BSP Sensor	Without connections : W = 165mm ; H = 67mm ; D = 100mm	2.5 kg	--	--

“

It is very simple to work with them. However, we are on a very high tech and specialized market. But they all know perfectly their job, they know what they are talking about.”

International
train company
operator

Continuous commitment to support our solutions

Because availability is key in our market, we are committed to offer the best level of support to our customers.

We train customers' maintenance teams to our high-tech products we supply with all maintenance guidelines to be integrated in maintenance ranges.

We provide training and tooling to help on supporting during commissioning and commercial revenue.

We fight against obsolescence guaranteeing the maintenance of our solutions during all their lifecycle.

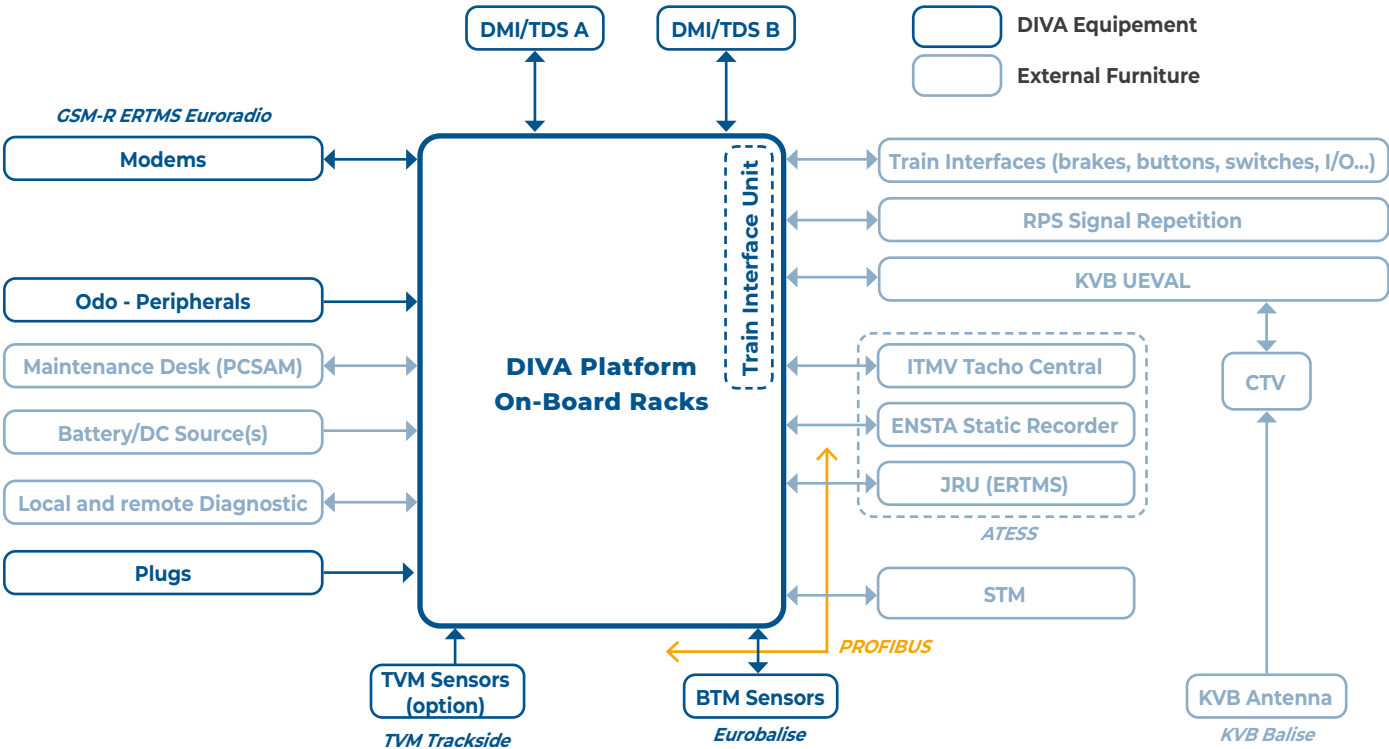
Besides, we improve them continuously taking into account feedbacks. From more than 15 years of daily commercial revenue on European and Korean ERTMS lines.

Integrated value chain

For odometry, we have developed a unique partnership with Faiveley since 2001. Our speed sensors and doppler radars monitor wheel slip and make sure that, at any time, in any climatic conditions, available and reliable information is sent to our calculators to ensure a perfect train localization and speed accuracy.

Quality interfaces

DIVA ETCS platform interfaces with I/O, PROFIBUS, Ethernet and MVB buses. We build our interfaces according to applicable standards, taking into account each train system's specificities.



Example: System Integration on TGV trains

Our products are
100% secure, available...

High safety standards and high level of availability

The 2 out of 3 design of our CSD DIVA platform succeeds in combining high safety standards and high level of availability, enabling safe circulations on high frequency traffic lines.

Through CSD DIVA architecture, our systems are end to end SIL4 homologated, achieving a PFH (Probability of dangerous Failure per Hour) of 10^{-9} .

The 3rd calculator serves to improve availability of the system. It can be integrated in the same rack on standalone ETCS solution.

We adapt to our customer needs offering 2 out of 2 or 2 out of 3 configurations depending on train installation constraints.



One of the main added values of our systems is its safety level. Our platform, through its robustness and construction, inspires everyone.”

Compagnie des Signaux Engineer

...and interoperable

An ERTMS platform...

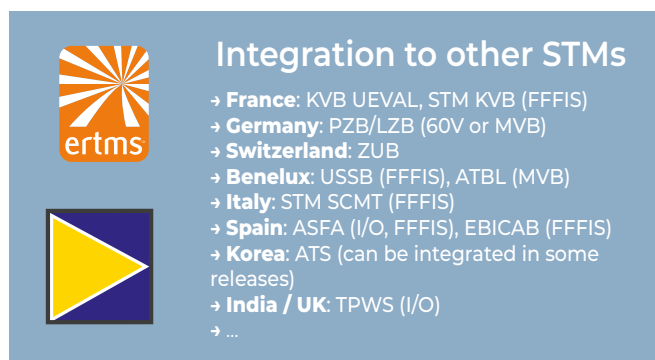
Our CSD DIVA platform complies to ERTMS Baselines. Through its modular architecture, it can be interfaced with many ETCS Wayside products, without compromising safety.

...managing TVM....

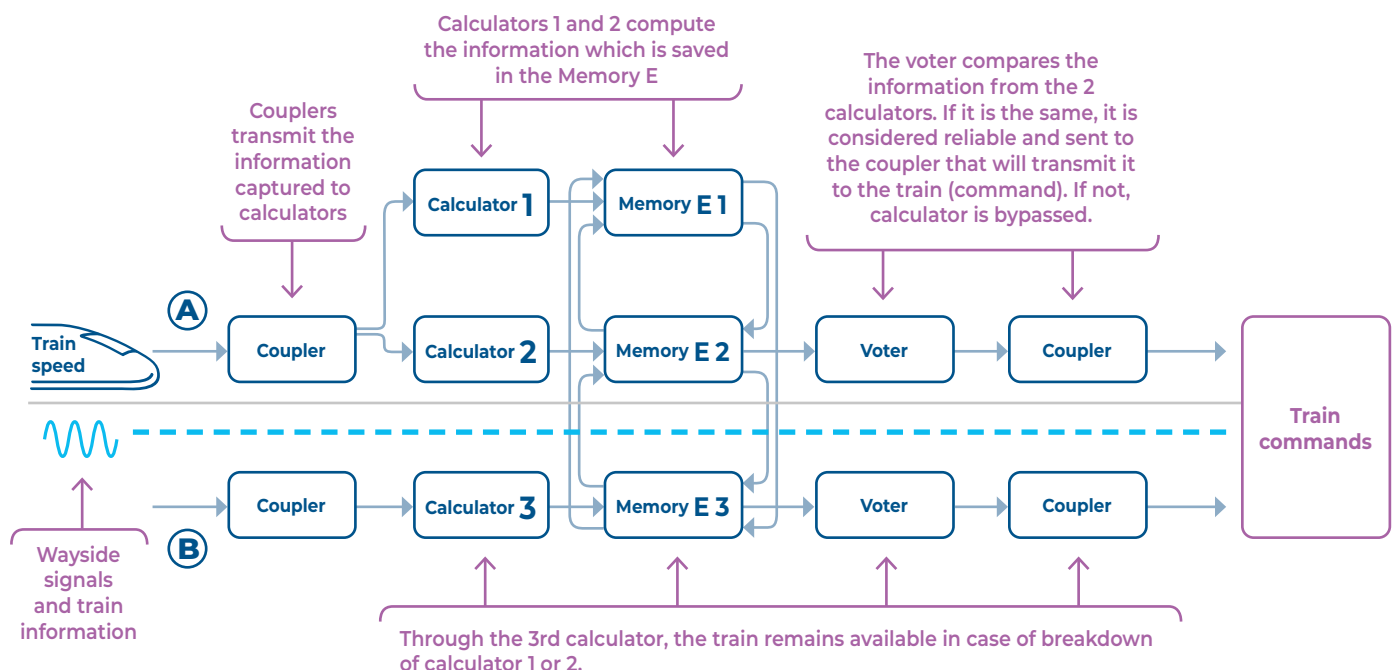
As CS key product, our DIVA platform manages TVM for French (and Korean) high-speed lines. TVM can be embedded in standalone mode and together with ETCS functionalities in the same equipment.

...and other STMs

Our DIVA platform is compliant with SUBSET-035 and enables dynamic transitions with several European STMs (KVB, SCMT, ATBL, PZB/LZB, USSB...).



2 by 3 calculators system maximising reliability and availability





“

When auditors ask technical questions, Compagnie des Signaux brings the good answer.”

International train company customer

Project management

Haute couture and ready to wear

Our key success factors are **a deep understanding of your needs**

We elaborate the solution together, to make a tailor-made product. We can also deliver packaged products. Our modular hardware and software approach allow us to adapt to all types of configurations, without imposing our views.

“

Even in challenging technical situations, human contact is there. They are available and efficient.”

International train company operator

Consistence and continuity

Program managers coordinate all the dimensions of the project: client relation, budget, technical, design and realization, test & commissioning, aftersale services and maintenance. A large part of the solution is realized inside the company. All our teams work over two cluster sites for engineering and manufacturing activities. This allows meetings and interactions essential for a successful project.

Competency

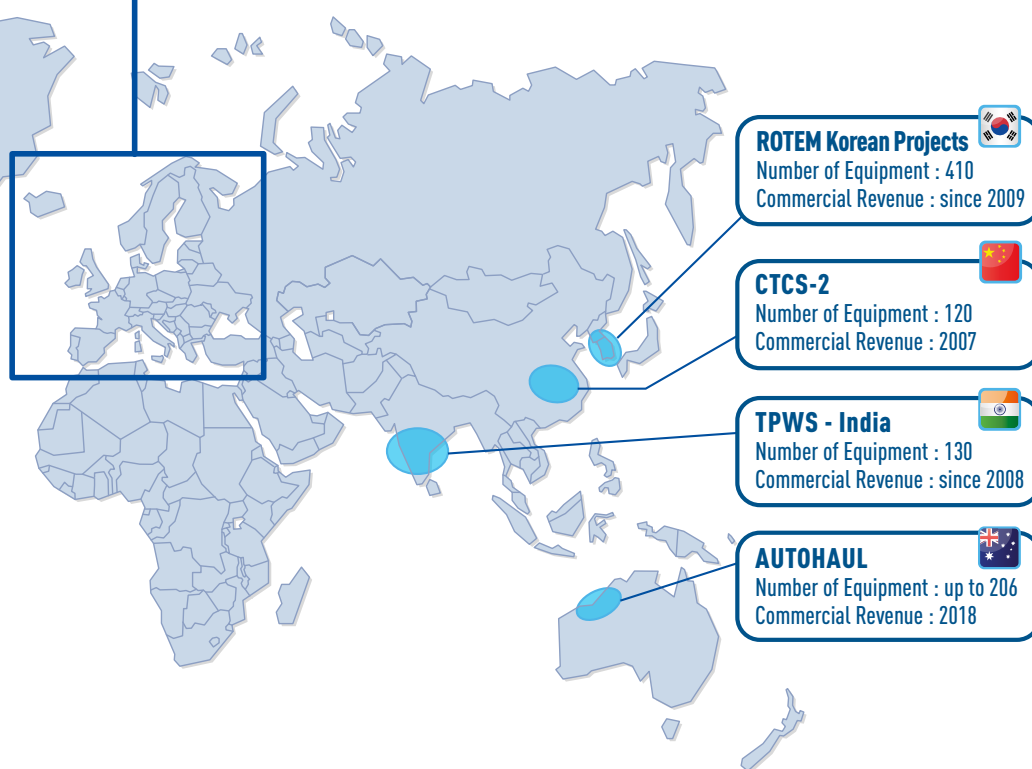
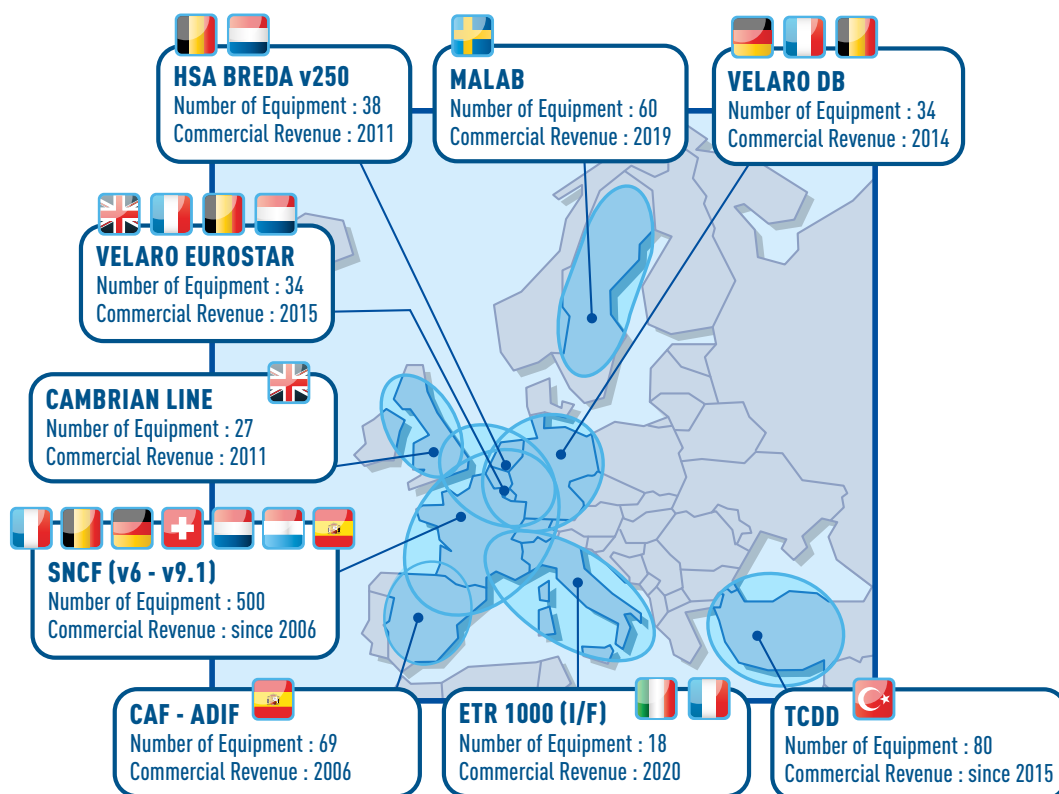
Signalling is a challenging job, where it is necessary to question oneself to make continuous progress. Experience of engineers guarantees reliability.

Flexibility

Beyond the logical process of the V-model, we adapt the cycles to shorten the duration and stick to your needs.

An exceptional **technical diversity** of references

A unique system operated in different European countries

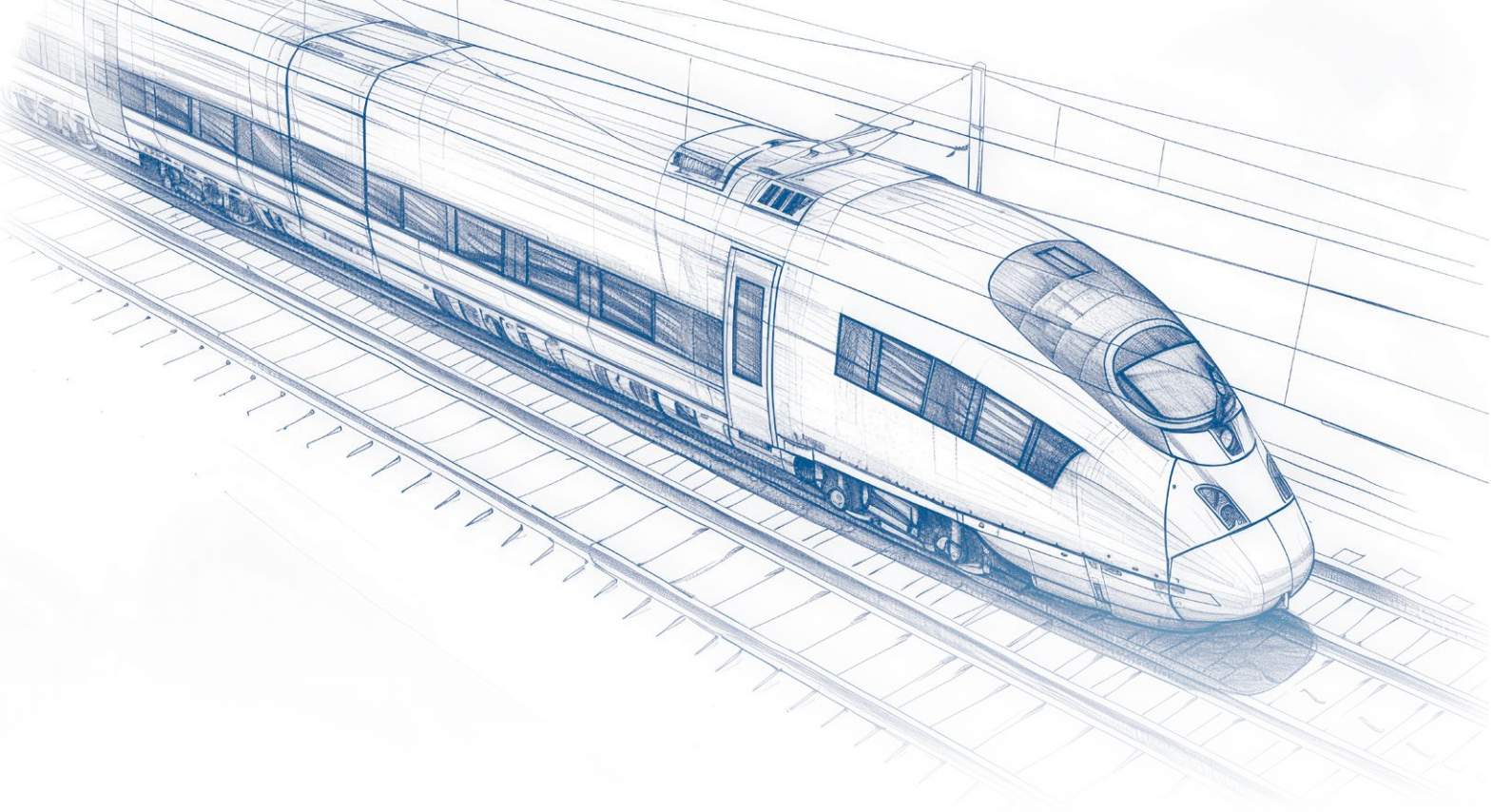




We adapt to a wide range of rolling stoks

Rolling stock	Signalling Systems (intefaces)
TGV Duplex	ERTMS, TVM, KVB
TGV DASYE	
ZTER	
TGV POS	ERTMS, TVM, KVB, LZB/PZB, ZUB/INTEGRA
TGV 2N2	
TGV PBA, PBKA	ERTMS, TVM, KVB, ATB-TBL/ATBL, LZB/PZB
TGV ^M	ERTMS, TVM, KVB, SCMT
VELARO Eurostar	ERTMS, TVM, LZB 80E, USSB, ATBL
EMU-138R, EMU-KCL	ERTMS, ATS
LOCO EL8200, LOCO EL8500	
DAEGOK-SOSA	ERTMS, TVM
GTX-A	
KTX II	ERTMS, TVM, ATS
MR410	ERTMS, TPWS

Non-exhaustive list of references



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