



MADE IN
FRANCE

RAILWAY PRODUCT AND SERVICES



CLEARSY PRODUCTS AND SERVICES

clearsy
Safety Solutions Designer

CLEARSY OFFER
RAILWAY PRODUCTS AND SERVICES

CONTACT@CLEARSY.COM

COMPANY PROFILE

- French SME created in 2001
- Independent from any customer and privately owned
- About 150 employees (mainly engineers & PhDs)
- Located in France (Aix-en-Provence, Lyon, Paris, Strasbourg)
- ISO certified (9001:2015)
- In-depth knowledge of signalling systems, CBTC, ERTMS/ETCS, interlocking, rolling stock, railway rules and standards
- Sectors: Railways (predominantly), Defence, Energy/Nuclear, Micro-electronics
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- Development of a portfolio of safety critical products for Railways www.fersil-railway.com

CORE SKILLS

- Creation and maintenance of the software development toolkit: Atelier B, used by major signalling companies and technical universities worldwide to produce mathematically proven safety critical software and systems
- Design of safety critical hardware and software, SIL2 to SIL4
- Provision of certified safety critical systems according to CENELEC SIL2 to SIL4
- Usage of formal methods to develop and verify such systems and software applications

EXPERTISE AND SERVICES

- Software and systems mathematically proven (B method)
- Safety critical data validation tools and services
- Safety cases using IEC 61508 and CENELEC EN 50126,128,129 standards
- Safety critical system and software architecture design and development
- Safety PLC program development
- Safety critical electronic hardware design and development
- Safe train track transmission by induction loop
- Safety critical software and hardware commissioning
- Expertise to meet exceptional or unusual safety requirements
- Expertise in pattern recognition from laser sensors (laser, radar, video) and embedded algorithms
- Provision of specialists in safety critical developments
- Provision of CBTC and ERTMS/ETCS specialists (advice, requirements, validation, training, etc...)
- Ability to manage a complete project, from design to deployment and commissioning and level 1 maintenance management
- Management of production, multi-site manufacturing (subcontracting)

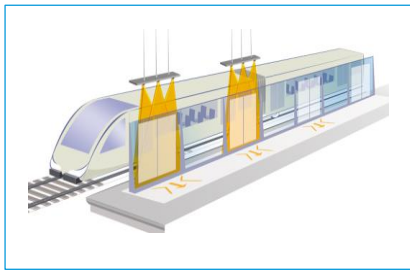
MAIN CUSTOMERS

The customers are mainly end users, railway or subway operators, industrial companies, integration and installation companies.

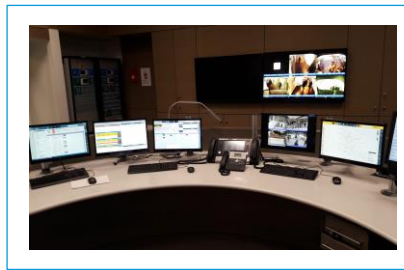


EXAMPLES OF SAFETY CRITICAL SYSTEMS AND PRODUCTS

The following products have been designed and produced by CLEARSY.
About 20 products are certified according to CENELEC standards.



> DETECTION
OF A PERSON
IN A GAP



> SAFETY
CENTRALIZED
SUPERVISOR
OF FIRE
SAFETY
SYSTEMS



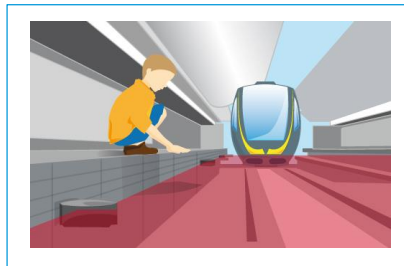
> PLATFORM
SCREEN
DOORS
CONTROL



> SIL4 VITAL
RELAYS



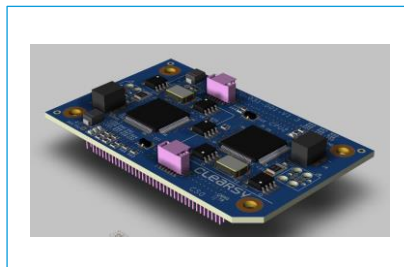
> CONTROLLER
AND SAFETY I/O
NETWORK



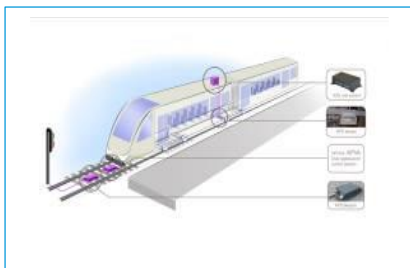
> TRACK
SAFETY
MONITORING



> PLATFORM
DETECTION



> CLEARSY
SAFETY
PLATFORM
- SAFETY
CRITICAL
COMPUTER



> AUTOMATIC
TRAIN STOP
- OVERSPEED
- SIGNAL



> HMI PLATFORM
- ETCS BASELINE 3

R&D PROJECTS, INNOVATION

CLEARSY is always looking ahead and is working on various R&D projects.

- Train passage detection system based on HF technology
- Track plan editor
- Management tools for the supervision, exploitation and maintenance of systems
- CLEARSY Safety Platform for SIL4 applications
- New version of Atelier B, new tools and methods, training courses
- SIL4 relays for on board or signalling applications
- Train localisation systems with detection by induction loop or rail
- Various simulation tools

ERTMS/ETCS



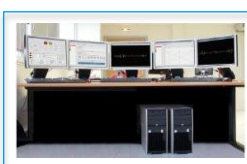
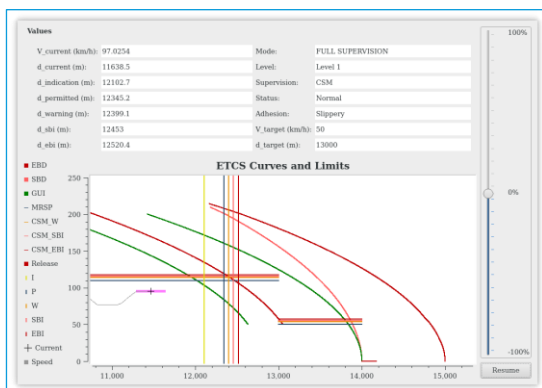
ERSA and CLEARSY are joining forces to offer the following services and products:

PRODUCTS AND TOOLS

- Simulation tools for ETCS baseline 3 braking curves
- ERTMS/ETCS Operational Simulator with optional STMs and optional 3D
- ERTMS/ETCS Traffic Simulator for baseline 2 or baseline 3
- Test Bench for ETCS on board units according to SUBSETs 094 or 111
- Test Bench for ETCS trackside components and/or cross tests (IOP testing)
- ETCS DMI software according to CENELEC SIL2
- Formal validation of ETCS data Specific applications (including HMI) tailored to the needs

SERVICES

- Consulting activities (specification, design, test ...)
- ERTMS Training programme
- Design and development of software, embedded software up to SIL4
- Validation testing (compliance with requirements)



CBTC

FORMAL MODELLING USING THE B METHOD AND LANGUAGE

Up to « unattended train operation (UTO) » (GoA4)

- Analysis of the safety of systems (train and track) for existing lines or new projects - mathematically proven
- Automatic production of safety critical code (ADA or C)
- Validation/verification of safety critical data through a B-model checker

SERVICES

- Training & consulting
- Safety demonstration
- Assistance to software project development (from specification, design, to integration, validation).

REFERENCES

- System analysis performed for major subway and railway operators



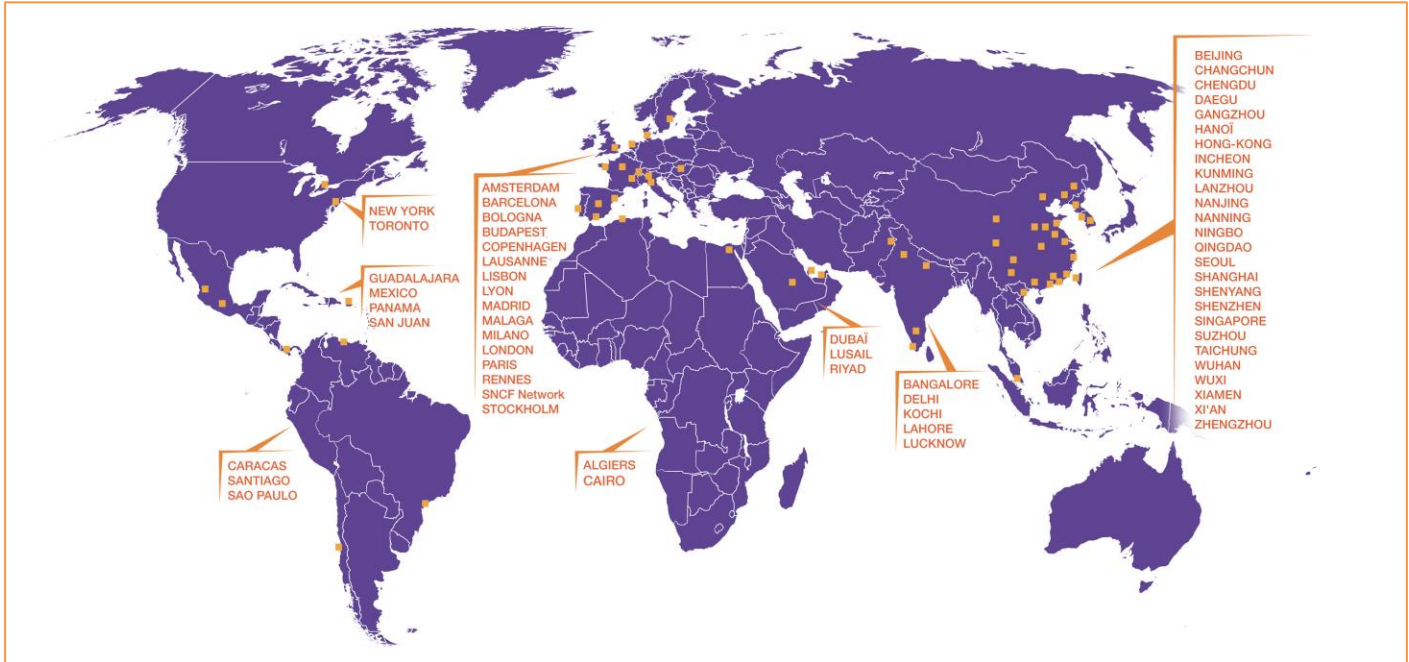
- Modelling, code production and related services for major signalling companies / Formal software analysis



- Data validation for major signalling companies and infrastructure managers



THE B METHOD TOOLKIT DEVELOPED AND EDITED BY CLEARSY



ISO 9001:2015 CERTIFICATE

The scope of the certificate is:

« *Design and Implementation
of safety control-command systems
and software – Consulting* »





CLEARSY

Safety Solutions Designer

THE MORE AUTOMATED THE SYSTEMS ARE,
THE MORE RELIABLE AND SAFE THEY HAVE TO BE.

CLEARSY has been innovating for 20 years by designing and deploying safer systems, based on the software tools and secure computer we develop.



Energy/Nuclear
Transport
Defence



25%
Exportation



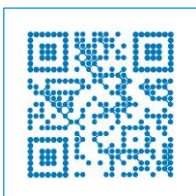
Software
Hardware
Safety



Turnkey industrial
Equipment
Supplier

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