



SIGNALLING SOLUTIONS

SAFETY and management of rail traffic

TRUSTED CONTROL AND SECURITY FOR RAIL MANAGEMENT

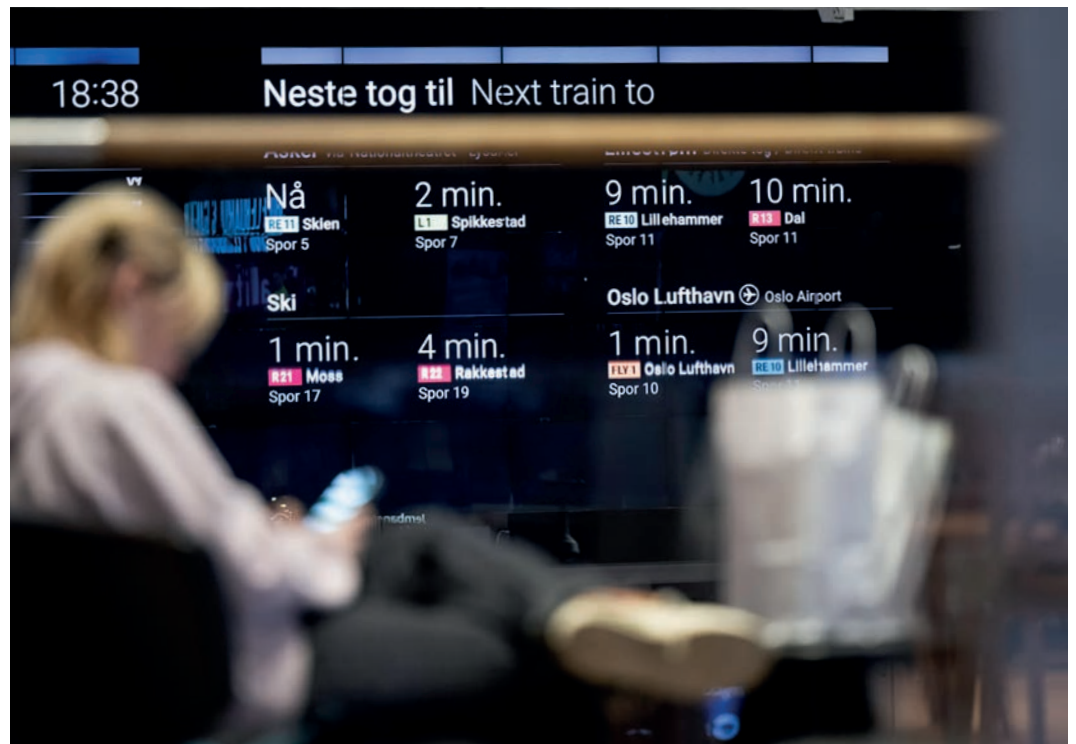


COMPREHENSIVE SOLUTIONS FOR RAIL CONTROL-COMMAND AND SIGNALLING

CAF is an international leader in the design and supply of integrated transport systems.

As a benchmark in sustainable mobility solutions, CAF's high value added-solutions focus on performance and passenger safety and comfort.

CAF offers project and engineering management at all stages, including system design, civil works, signalling, electrification and other electromechanical systems, supply of rolling stock and system operation and maintenance.



CAF designs, manufactures, supplies and maintains railway signalling systems, providing integral solutions both for trackside and on-board applications.

Utilising the company's proprietary cutting-edge technologies, CAF mobility solutions are tailored to meet specific customer requirements, minimising operating costs.

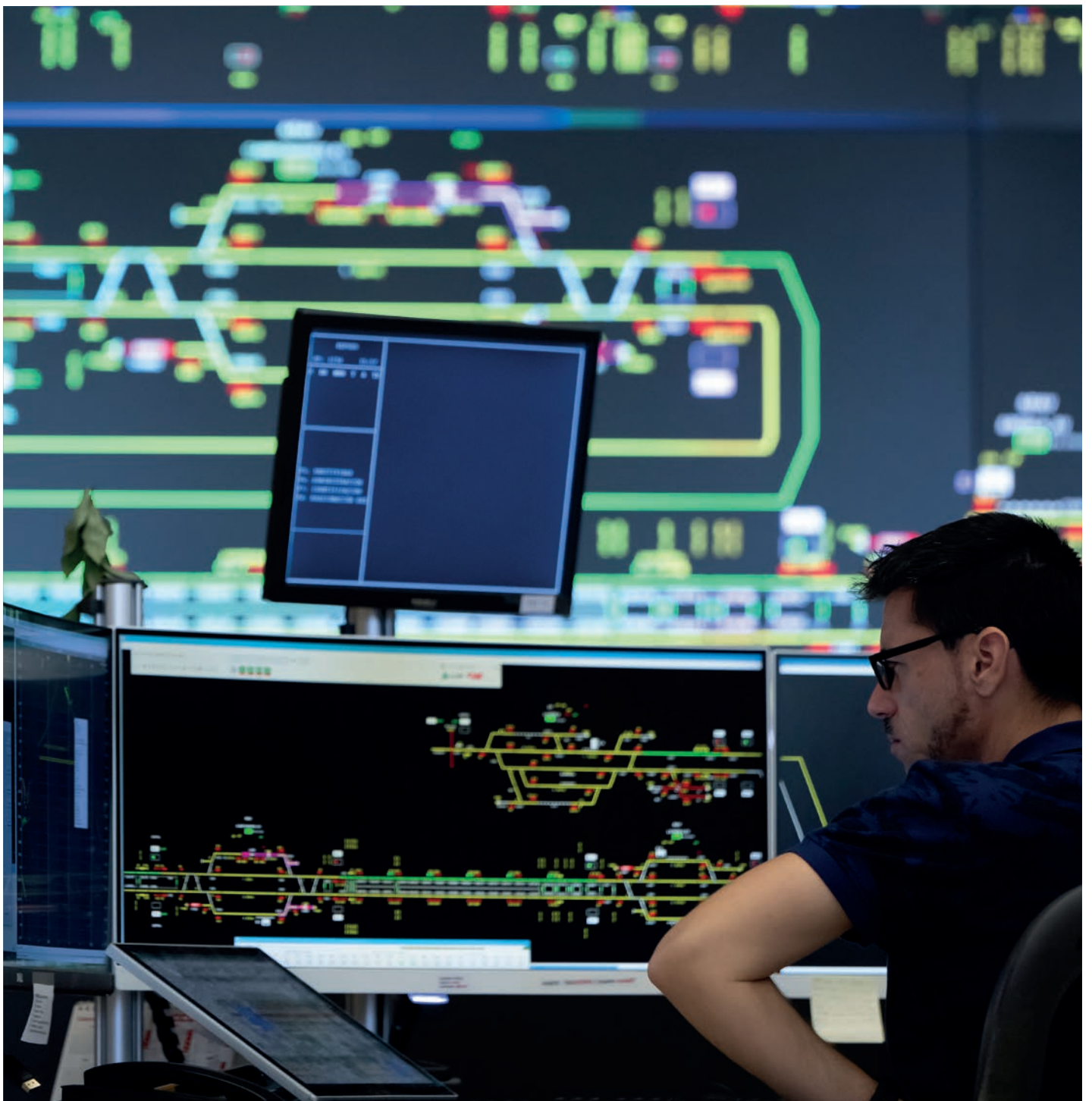
INTEGRAL SOLUTIONS

FOR RAILWAY CONTROL COMMAND AND SIGNALLING

We have a comprehensive solution portfolio for railway signalling and control allowing us to deliver all kind of projects successfully.

We specialise in both infrastructure managers and on-board equipment. Our prime proprietary technology products form the core of our complete solutions.

With a clear customer focus, we develop signalling turnkey projects that include the design, manufacture, supply, maintenance, testing and commissioning of railway signalling systems.



CAF's advanced signalling solutions guarantee infrastructure managers and operators the highest safety standards.

AURIGA
ETCS LEVEL 1, LEVEL 2 AND LEVEL 3

QUASAR Q4
ELECTRONIC INTERLOCKING

NAOS
INTEGRATED CONTROL CENTRES

AURIGA

ETCS & ATO

Comprehensive solution for the European Rail Traffic Management System (ERTMS) and Automatic Train Operation (ATO) solutions, for both, infrastructure and on-board systems in vehicles.

AURIGA guarantees high performance ERTMS solutions for both Level 1 (AURIGA L1) and Level 2 (AURIGA L2), and also mixed systems in which both levels coexist simultaneously, ensuring technical and functional interoperability and providing important benefits in the operational and maintenance fields.

QUASAR Q4

ELECTRONIC INTERLOCKING SYSTEMS

QUASAR Q4 is the basis of CAF's signalling solutions. A pioneer in the application of EN-50126 and other derived standards, the QUASAR Q4 electronic interlocking has evolved to support new functionalities and compatibility with ERTMS systems.

NAOS

INTEGRATED CONTROL CENTRES

NAOS has been specifically developed for the integrated and multifunctional control centres required by today's railway infrastructure control, command and signalling systems.

The NAOS integrated control centre not only provides an integration platform, but also encompasses several key systems. It includes centralised traffic control (CTC), the energy control system, SCADA systems to manage auxiliary equipment, control centres for detectors, and maintenance support systems. All of this combines to offer a comprehensive and efficient solution for railway management.



OPTIMAL RAILWAY MANAGEMENT

CAF is a specialist in railway signalling and control.

Our technology guarantees the highest standards of safety and efficiency in urban environments and main lines.

CAF applies all its knowledge and experience in the development of a range of products and services that includes complete solutions for all types of railway systems:

TRAM SIGNALLING

ERTMS & ATO ON-BOARD

MAINLINE SIGNALLING TRACKSIDE

MAINLINE SIGNALLING AUTOMATION

TRAFFIC MANAGEMENT SYSTEMS



TRAM SIGNALLING

CAF creates tramway solutions that have been proven successful in global projects.

We have extensive experience in adapting our knowledge to each customer's unique requirements with tailor-made solutions, integrating its own or third party products. These complete solutions in the tram segment are materialised with products such as:

- **QUASAR Q4:** Interlocking based on a modular hardware platform widely proven in light rail projects.
- **BUS NAOS:** Proprietary ESB bus system, where all the different systems needed to operate and maintain a tramway system are integrated at the control centre level.
- **CTC, SCADA:** Integrated control centre applications for tramway control and operation.
- **Automatic Train protection (ATP):** Train protection system applications.
- **AVLS, RSS, TPS:** Over time we have achieved a long history of successful integration of auxiliary systems such as the Automatic Vehicle Location System (AVLS), the Route Request System (RSS) or the Traffic Priority System (TPS).



ERTMS & ATO ON-BOARD

CAF's own compact and modular technology allows to respond to any particular need thanks to its flexible architecture, which adapts to all types of vehicles and platforms.

AURIGA OBS enables scalable strategies depending on the various operational needs and the availability of track infrastructure, going from ERTMS N1 to N2 and to ERTMS N2 with ATO.

It is an optimised solution that enables interoperability, fully compatible with ETCS track systems from other manufacturers. AURIGA OBS performs train movement supervision with high availability and safety.





MAINLINE SIGNALLING TRACKSIDE

CAF builds comprehensive solutions in the mainline trackside segment thanks to the use of the different product families in our portfolio:

- **QUASAR Q4:** SIL4 electronic interlockings for all railway applications.
- **AURIGA TS:** Automatic Train Protection (ATP) based on the ETCS standard, which can be integrated into complete ERTMS solutions.
- **NAOS:** Modular and flexible solution for multifunctional Control Centres.

MAINLINE SIGNALLING AUTOMATION

Automatic Train Operation (ATO) systems are transforming the railway ecosystem. This cutting-edge technology contributes to increase punctuality, energy efficiency, passenger comfort and improve traffic regulation.

- **AURIGA ATO:** It is the ATO system over ERTMS that enables automatic train driving up to GoA2 degrees of automation following the Technical Specifications for Interoperability (TSI) standards. The Auriga ATO system together with perceptual systems are being used for the development of systems with higher degrees of automation up to GoA4.
- **NAOS ATO:** This is the system that allows automatic planning and control of any line with ATO from track and which, by communicating with the trains enables the possibility of changing train gears, optimising energy consumption and ensuring punctuality. This system makes it possible to resolve conflicts due to incidents in real time.

TRAFFIC MANAGEMENT SYSTEMS

Our NAOS system has been implemented in numerous projects worldwide. Thanks to its experience in research and development (R&D), CAF develops ad-hoc solutions that adapt to the needs of any infrastructure manager or operator.

CAF covers products and services from integration into existing control centres to the delivery of turnkey solutions, ensuring flexibility and efficiency in each project.



OUTSTANDING PROJECTS WORLDWIDE

AFRICA

EGYPT - Signalling and telecommunication system for Egyptian National Railways (ENR)

MOROCCO - Railway signalling for Casa-Port railway terminal for ONCF - Railway energy control system for ONCF network

AMERICA

ARGENTINA - Control centre for Roca Line for Administración de Infraestructuras Ferroviarias Argentinas, Sociedad del Estado (ADIF SE)

CHILE - Concepción and Alameda traffic control centre for Empresa de los Ferrocarriles del Estado (EFE) - Remote energy management system for Valparaíso metro for Metro Regional de Valparaíso S.A.

MEXICO - Integrated control centre, ATO and on-board ERTMS L2 for Mexico-Toluca intercity line for Secretaría de Comunicaciones y Transportes (SCT) - Retrofit of on-board L1 ERTMS for 20 Civitys for Ferrocarriles Suburbanos

URUGUAY - Signalling systems, OCC and telecommunications for Consorcio Constructor Ferrocarril Central - On-board L1 ERTMS for 7 locomotives for Stadler

ASIA / PACIFIC

AUSTRALIA - On-board L2 ETCS and ATO for 29 CAF's DEMUs for Transport for New South Wales (TfNSW)

NEW ZEALAND - Retrofit of on-board L1 ERTMS for 73 locomotives for Kiwi Rail - ETCS & ATO on-board systems for Auckland Transport

INDIA - Scada system for Delhi Metro Rail Corporation

TAIWAN - Control centre for Kaohsiung light rail system for Mass Rapid Transit Bureau, Kaohsiung City (KMRT)

EUROPE

BELGIUM - Signalling system and control centre for Liège tramway for Société Régionale Wallonne du Transport

BULGARIA - Signalling system for National Railway Infrastructure Company (NRIC)

CZECH REPUBLIC - On-board L2 ETCS with LS for 33 PESA's DMUs and 30 PESA's DMUs (series 844) for CD České Dráhy - Retrofit of on-board L2 ETCS with LS for 54 yellow machine and Plasser & Theurer's EM100 yellow machine for SZDC Správa železniční dopravní cesty - On-board L2 ETCS with SHP for 7 EMUs for CZ locomotive - On-board L2 ERTMS integrated with LS for 6 MTW s/100.506 Yellow Machines for Plasser & Theurer - Retrofit of on-board L2 ERTMS integrated with LS for 8 Yellow Machines for TESMEC; 1 s/810 class Locomotive for AZD; 19 s/750 Locomotives and 23 s/841.2 DMUS for České Dráhy; 39 s/742.7 Locomotives for CD Cargo and 7 Elf EMUs for RegioJet - Retrofit of on-board L2 ERTMS integrated with LS and AVV for 37 DMUs and 34 s/954 pilot cars for České Dráhy - Retrofit of on-board L2 ERTMS integrated with SHP for 17 s/841 DMUs for České Dráhy - On-board L2 ERTMS integrated with LS for 8 s/744.1 Locomotives for CZ locomotive - On-board L2 ERTMS for 3 locomotives and 2 s/744.1 locomotive for CZ locomotive - Retrofit of on-board L2 ERTMS for 13 DMUs for Arriva

NETHERLANDS - On-board ETCS equipment for Civity NS for Nederlandse Spoorwegen (NS) - On-board L2 ERTMS

integrated with ATB for 60 Double Deckers for Nederlandse Spoorwegen (NS) and 10 trains for QBUZZ

POLAND - On-board L2 ETCS with SHP for 111 Locomotive for PKP Cargo; 227M & 228M Locomotives for FPS Cegielski and 25 EMUs for KD Koleje Dolnośląskie - On-board L2 ERTMS integrated with SHP for 1 s/111EL Locomotive for PKP; 16 s/111DEa Locomotives for PKP Intercity; 4 LKA Vehicles for LKA and for 20 trains for Newag - Retrofit of on-board L2 ERTMS integrated with SHP and Mirel VZ1 for 29 753.7 Locomotives for PKP

ROMANIA - On-board L2 ERTMS and PZB for 20 trains for PESA

SPAIN - ETCS L1/L2 on-board equipment for Oaris very high-speed train for RENFE - Pilot project for the implementation of ERTMS L1 and L2 solution for ADIF - Railway energy control system in Madrid for Metro Madrid and Manzanares, Miranda de Ebro, Sevilla and Valladolid for ADIF - Signalling system for Vicálvaro freight terminal for ADIF - Traffic management systems (TMS) for conventional, metric line and high speed for ADIF - ERTMS signalling systems of the atlantic axis railway for ADIF - Signalling and communications systems for different lines for ADIF - On-board L2 ERTMS for 5 s/980 serie trains for Euskotren and integrated with ASFA for 81 trains for RENFE - Retrofit of on-board L1 ERTMS for 4 s/940 serie trains for Euskotren

SLOVAKIA - Retrofit of on-board L2 ERTMS integrated with LS for 1 diagnosis vehicle for Slovak Railways and with LS for 4 742.6 Locomotives for ZSSK - Retrofit of on-board L2 ERTMS integrated with LS and SHP for 5 Flirt for Leo Express

SLOVENIA - Modernization of signalling systems of the railway line Zidani Most-Sentilj for Slovenian Railways

TÜRKIYE - Signalling and communication system for Antalya light metro for Antalya Metropolitan Municipality - ERTMS L1 signalling and communication system on the Pamukova-Köseköy and the Pehilvanköy-Pythion railway line for TCDD

UK - Trackside ERTMS L2 National 10 years Framework agreement (2024-2034) for Network Rail - On-board L2 ETCS with TPWS for DMUs, Cambrian Line adaptation included for Keolis - ETCS L1/L2 on-board equipment for Civity trains for Directorate General of State Railways

MIDDLE EAST

SAUDI ARABIA - Retrofit of on-board L2 ERTMS for 11 trains for SAR

ISRAEL - Signalling system, OCC for Jerusalem light rail for Jerusalem Transportation Master Plan Team (JTMT) - Signalling of Tel Aviv purple line for NTA Metropolitan Mass Transit System

UNITED ARAB EMIRATES - On-board L2 ERTMS for 9 Push-Pull locomotives for Etihad Rail



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SCAN TO VISIT
OUR CHANNEL

