



GEDLUX

ELECTRICAL SYSTEMS AUTOMATION
SINCE 2008

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www.gedlux.com

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Overview

Since its inception in 2008, GEDLux has enjoyed a **close working relationship** with Ferrocarrils de la Generalitat de Catalunya (FGC).

FGC **operates** a number of unconnected lines in and **around Barcelona**. We have upgraded and **modernised** their **control systems** in a number of ways, including at the substations and in the **control centre** itself.

During the period between 2015 and 2016, our **company expanded** its reach in the **rail sector** with the addition of underground rail **networks** to its portfolio of services.

Our first contract was to supply **telecontrol cabinets** to Transports Metropolitans de Barcelona (TMB).



The following year, we used **modern RTUs** to replace Metro Madrid's obsolete **telemetry systems**.

This also involved **engineering** signal extensions and **automated sequences**.

In 2019, we **designed** and **commissioned** our first control system for a mountain **railway** in the Pyrenees.

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Deliverables

Our railway projects are **diverse** and cover a wide range of **deliverables**, including:

- **Replacement** of obsolete supervisory systems with RTUs, control and protection relays and MicroSCADA systems.
- Catenary **renewal**.
- **Remote terminal unit** replacement.
- Replacement of **metering centre** cabinets.
- **Analysis of telecontrol** cybersecurity.
- Replacement of **substation cabinets**.
- Engineering of **remote control** of substations and metering centre.
- Migration to MicroSCADA X for the remote control of the **energy control centre**.
- Replacement of the substation remote terminal units; **engineering** of the **remote control** systems and devices.
- Replacement of 6kV **substation cabinets**, including migration of 2II series remote units to RTU5II.



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Project: Energy Remote Control of Railways of the Catalan Regional Government

- HA (High Availability) Power Control System
- 5 servers (2 main + 3 standby)
- IEC 870-5-104 and IEC61850 protocols
- More than 125 RTUs for remote control of
 - 25 substations
 - 70+ substations
 - 400+ catenary disconnectors
 - MV and LV distribution networks
- Integration of cyber security solutions

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Cybersecurity

- Integrated solution including:
 - Remote access for engineering and operations.
 - Access via VPN connection.
 - Independent access for each user.
 - Two-factor authentication/one-time password (OTP).
- Centralised management of anti-virus/anti-malware software with real-time alerts.
- Regular vulnerability scanning of all networked devices.



Topological colouring and automatic sequences.

- Real-time display of overhead line status using personalised coloring.
- Automatic catenary discharge sequences

Network architecture

- Fibre optic network with main and sub ring.

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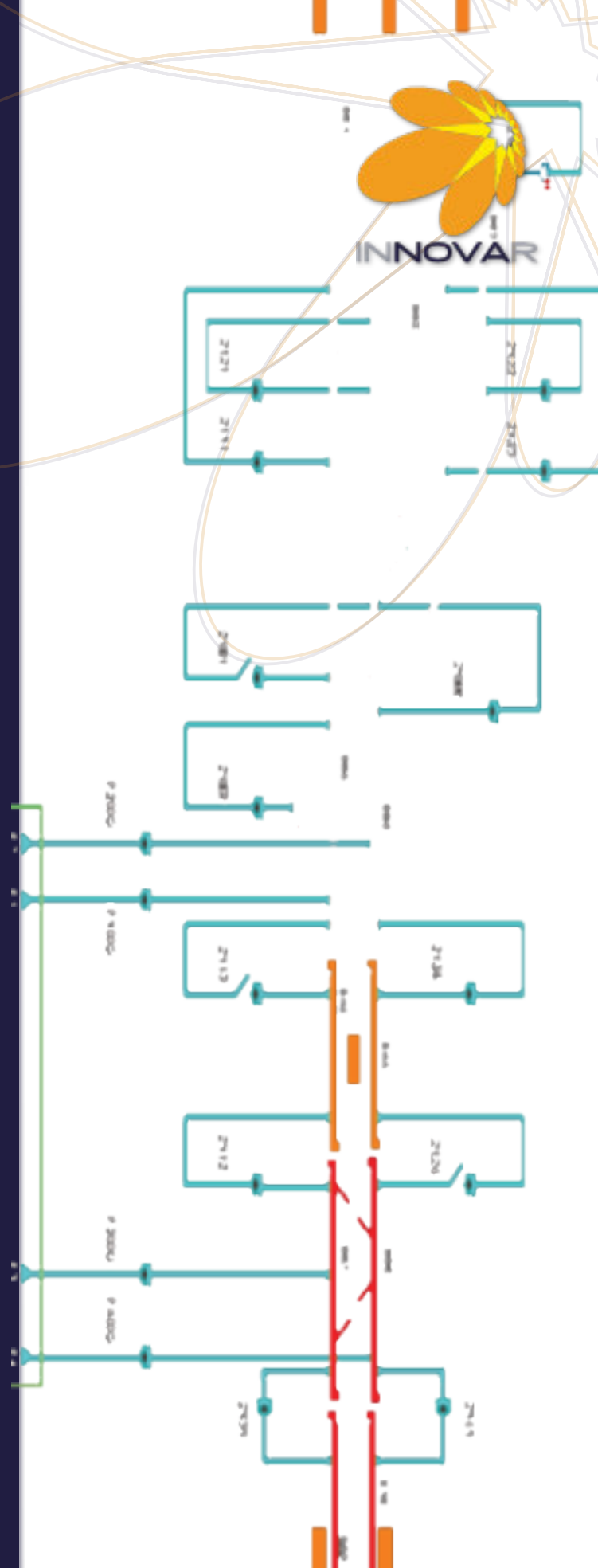
Connection via OPC UA to the production / operating system

- Sending **real-time information** on the voltage status of the different **catenary** sections.

Emergency shutdown sequences

- System **shutdown option** in case of critical emergency.

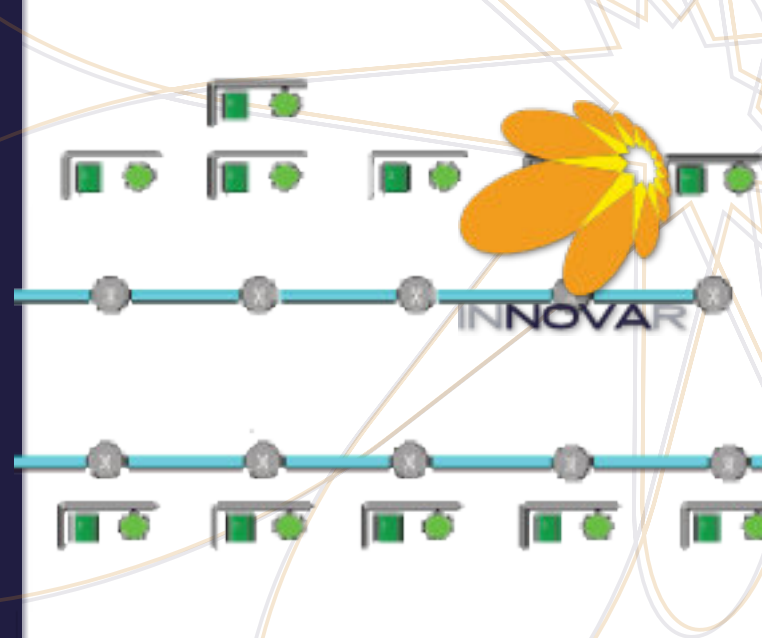
Cascade Tripping Management System



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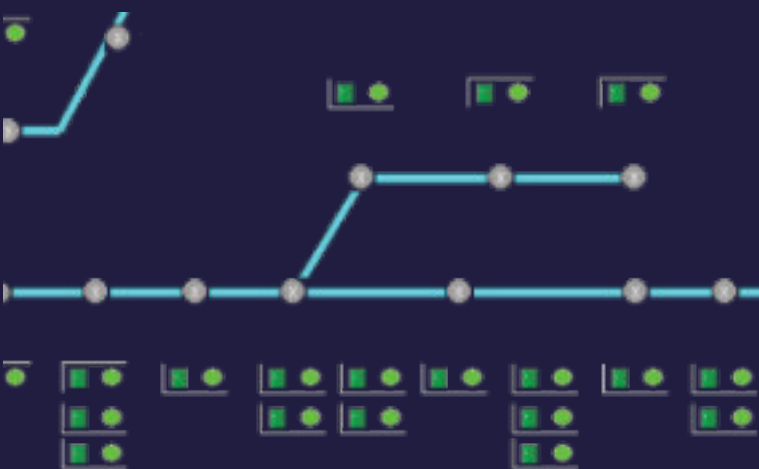
Access Control Module

- Access management
 - In-house staff / external companies
 - Separate permissions for each facility
 - Last access and door status display
 - Separate entry/exit time parameterisation for each facility
 - Optimised solution using existing architecture

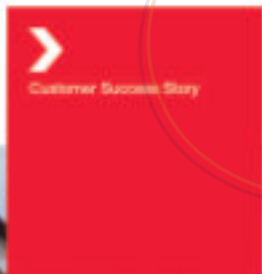


Cloud-based DC measurement recording module

- Cloud-based DC measurement logging module.
- Real-time voltage/ current measurement queries.
- Simultaneous comparison of installations on the same chart
- Enables data sharing and dashboards to facilitate collaborative work



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HITACHI
Inspire the Next



MicroSCADA Pro control

Upgrades improve public rail network in Catalonia.

 **Hitachi Energy**

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2 | CUSTOMER SUCCESS STORY CATALUNYA

In addition to increased reliability, the upgraded system provides greater clarity, security and reduced runtime tasks. The railway company Ferrocarrils de la Generalitat de Catalunya, Catalan Government Railways or FGC, operates rail lines in the region of Catalonia. Their track run in northeastern Spain, including metro and commuter lines in and around the city of Barcelona; mountain tourist railways and rural rail lines. In all, FGC operates about 300 km of rail lines that include conventional and rack railways and four funicular lines, comprising four different gauges.

Customer need

FGC needed to upgrade its existing dispatch center to a 24-hour system operation to improve its public transport service. The company selected an Hitachi Energy supervisory control and data acquisition (SCADA) network control and monitoring solution, MicroSCADA Pro, which includes Historian information management function as well as network topology coloring in order to provide updated overview of network status. The project is being delivered by the Spanish substation automation and network control specialist, GEDLux, an Hitachi Energy Authorized Value Provider since 2009. From October 2015 to the expected commissioning date of February 2018 a total of 23 Substations, 69 MV stations and 15 Catenary Stations will be migrated to the new system.

Hitachi Energy response

For this project Hitachi Energy is supplying a variety of components to facilitate the migration of FGC's remote control system from existing MicroSCADA to the latest software version. The existing HMI was based on the old MicroWin 3.1 (dated 1998). The smooth upgrade includes network topology coloring of the rail lines and a redesign of the interface and Monitor Pro graphics to enable easier and more immediate interpretation of system information.

The delivery comprises a compact, modular and scalable SYS600 automation system, which delivers MicroSCADA Pro functionality for real-time monitoring and control of primary and secondary equipment; Historian information management, and System Data Manager SDMS600 software to manage service and cyber security relevant data; DMS600 network management that provides versatile SCADA and Distribution Management System (DMS) functionality in the same system; routers and network infrastructure.

In addition to improving public transport service, FGC's system can also be modernised without interrupting its metro and commuter lines, tourist railways or rural rail lines.

Customer Benefits

The upgrade immediately increases system reliability as a result of Hitachi Energy SYS600C servers, which are designed with redundant power sources and are permanently monitored. The upgraded system also provides greater clarity, security and reduced runtime tasks thanks to new features like topology coloring of the 25-kilovolt (KV) network and a 1.500Vdc catenary network. It also improves various display functions, such as zooming, panning and deblurring, and strengthens the system's cyber security features. The equipment is to be housed in two new electrical cabinets and GEDLux will provide the FGC employees with customized training of the newly installed applications. The entire system migration will be performed in stages whilst maintaining the existing system operable.

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MicroSCADA Pro host image functionality will allow information to be received by both the old and new dispatch centers simultaneously during the three year transition phase.

Adding local value

GEDLux has worked closely with FGC since 2008, demonstrating the value of Hitachi Energy's strong cooperation with local third-party sales, support, engineering and service channels.

As Hitachi Energy control and protection system specialists, GEDLux brokered an agreement with FGC and Hitachi Energy that has become a successful, ongoing relationship, yielding about 30 projects so far. Deliveries include MicroSCADA Pro systems and RTUs (RTU560) to modernize substations, starting with the Hospitalet substation in 2010, the migration of the MicroSCADA Pro control system for FGC's network power, and its adaptation to the Ethernet network; and the engineering and commissioning of 6-kV transformer stations along the train network in Barcelona and the surrounding area.

Ongoing relationship

Most FGC projects now require the integration of new devices and modifications into the MicroSCADA Pro system of the central Dispatch Control Center. The relationship with FGC is close enough that Madrid-based GEDLux set up a branch office in Barcelona specifically to tend to FGC business. Hitachi Energy's intense customer focus extends to communications, which are in the Catalan language.

Wherever possible, applications are translated into Catalan. Outstanding Hitachi Energy products combined with strong customer focus and local engineering capability are delivering tremendous long-term customer value. FGC receives an exceptionally customized and integrated control system and service that is specifically designed to meet its needs.

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