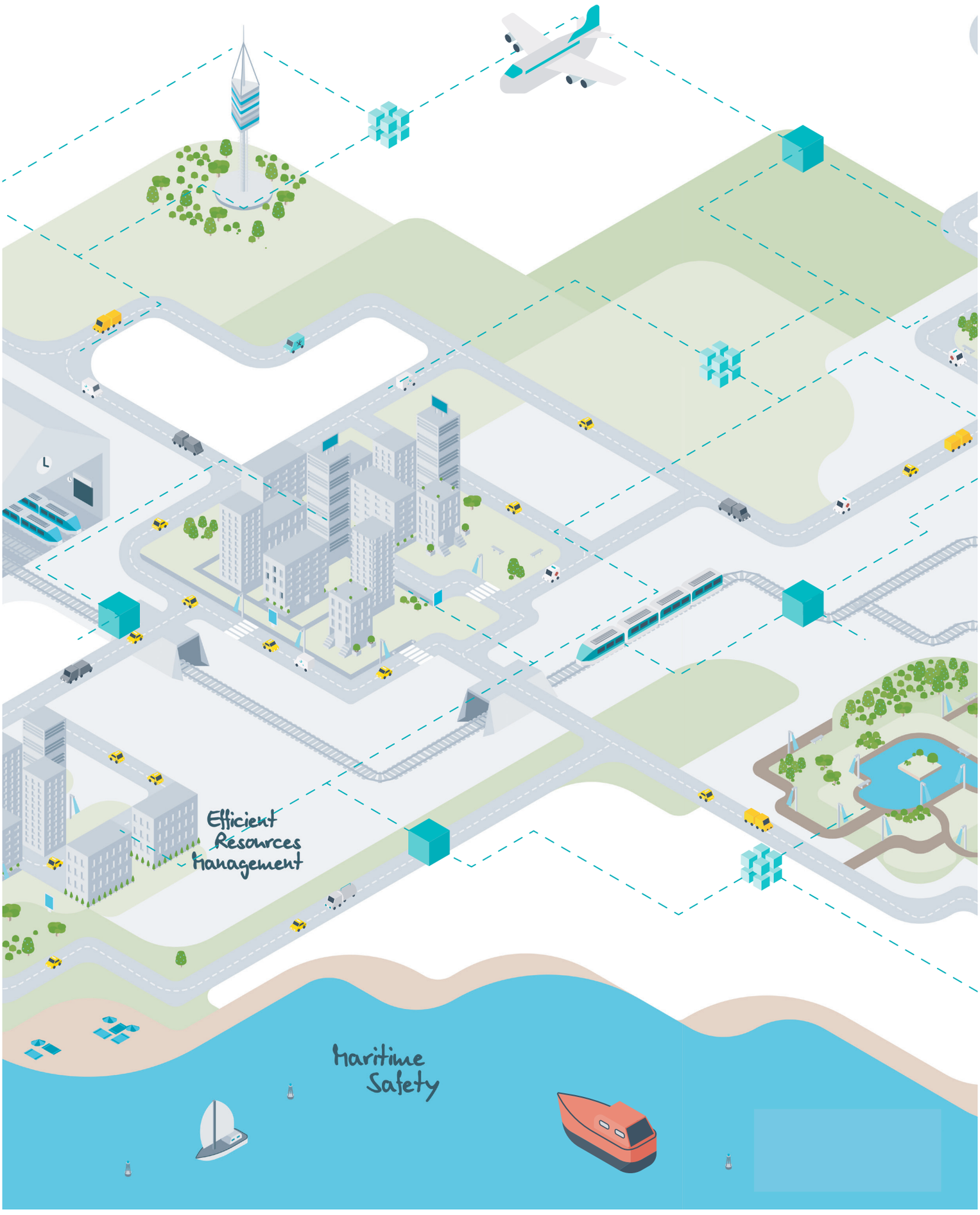
Smart Cities

cellnex
driving telecom connectivity



Cellnex Telecom

Cellnex Telecom is Europe's leading operator of wireless telecommunications and broadcasting infrastructures with a total portfolio of over 50,000 sites including forecast roll-outs up to 2027. Cellnex operates in Spain, Italy, Netherlands, France, Switzerland, Ireland, Portugal and the United Kingdom.

Cellnex's business is structured in four major areas: telecommunications infrastructure services; audiovisual broadcasting networks, security and emergency service networks and solutions for smart urban infrastructure and services management (smart cities and the "Internet of Things" (IoT)).

The company is listed on the continuous market of the Spanish stock exchange and is part of the selective IBEX 35 and EuroStoxx 600 indices. It is also part of the FTSE4GOOD and CDP (Carbon Disclosure Project), Sustainalytics and "Standard Ethics" indexes.

Smart Ecosystem

Smart ecosystem

Cellnex has been a **pioneer in the Smart ecosystem** since this concept began to be developed more than 10 years ago.

It works with manufacturers and developers to design solutions to facilitate closer contacts between administrations and citizens, while also allowing an efficient management of their resources, identifying behaviours and needs.

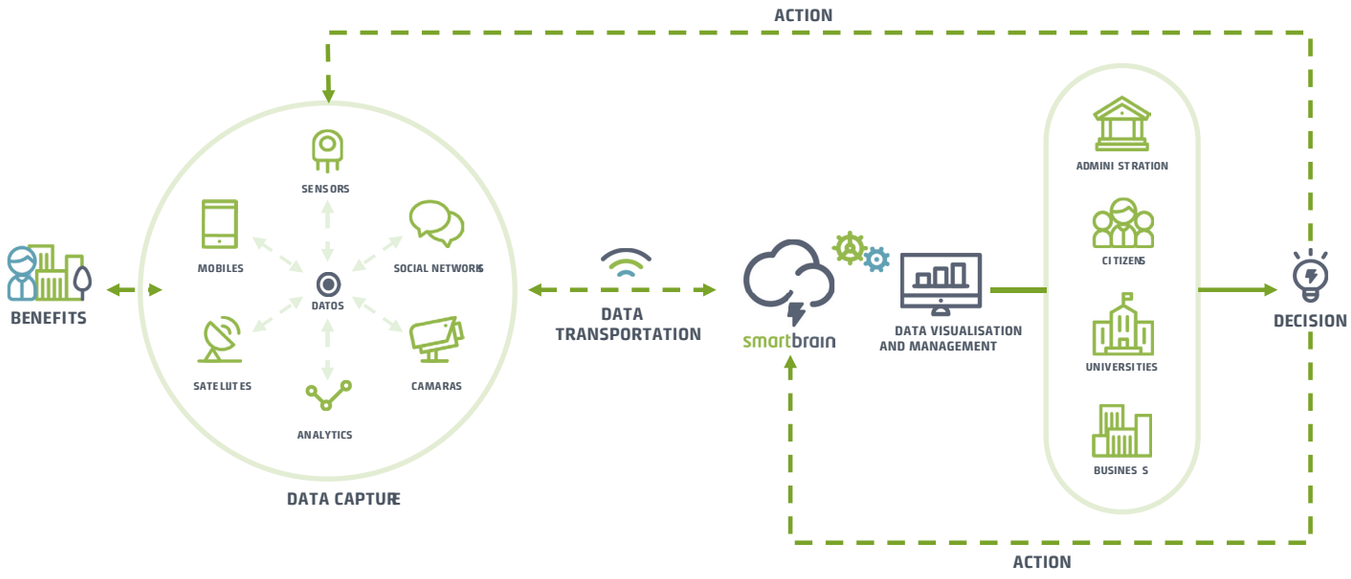
Various local and regional administrations have already entrusted the management of their resources and their relationship with the public to Cellnex Telecom.

Smart Brain, the brain of the city

Cellnex has developed the Smart Brain platform, which makes it possible to collect all the heterogeneous "city" data to provide managers **with a holistic vision of the city and of its citizens and an integrated management of information helping to facilitate real-time decision making.**

Administrations have access to the data collected through the various networks of different technologies in a uniform platform facilitating:

- co-creation of solutions designed around people, making it possible to develop local entrepreneurship.
- Knowledge to provide better, more efficient public services.
- A direct channel of communication with citizens that allows them to be an active player within the city.



Hyperconnected society, mass communications

Cellnex is already working to offer solutions to the digital society in which we currently live, which increasingly requires mass mobile, high-bandwidth and low-latency connectivity.

Cellnex is a benchmark for various types of wireless access connectivity solutions that cover the different needs of the market.

IoT Networks

Wireless Broadband

At present it is impossible to imagine a production, marketing and distribution process without the integration of wireless broadband within the European industrial fabric.

Cellnex offers solutions in this field that are designed to cover the needs of each customer, whether they are an administration or telecommunications operator.

Cities or operators rely on the wi-fi networks implemented by Cellnex and their end-to-end wi-fi offload, premium wi-fi and wi-fi roaming services.

More than 2,000,000 connected devices

Cellnex has had the **first IoT network** with national coverage since 2015. It has more than 1,450 sites affording a national coverage of 94%.

These figures show how the Internet of Things is no longer a futuristic concept and is now a primary need within Industry 4.0.

Cellnex's IoT network, developed using LPWA (Low Power Wide Area) technology provided by Sigfox of France, offers low bandwidth and long-range communication and is energy-efficient, secure and robust, guaranteeing communications for companies and sectors that are part of the *smart* industrial ecosystem and position themselves as the drivers of the European economy.

Efficient use of municipal resources and irrigation management in rural areas

In the urban setting, Cellnex provides its data management platform to enable municipalities to efficiently manage the resources available to citizens, such as waste collection, energy supplies and road traffic.

With the participation of this platform, the municipality can make decisions to anticipate what its citizens will need, optimising resources while managing these efficiently.

In this area, Cellnex is working hand in hand with the Third Social Sector Board of Catalonia through an agreement that has made it possible to equip social housing with sensors to allow their managers to detect anomalies in the use of energy resources and provide their inhabitants a solution to their needs.

Cellnex offers an all-embracing solution in the water field, covering three key areas: system homogenisation, security of service and data sharing.

With these three axes, Cellnex provides telecontrol solutions for water consumption and smart irrigation management for local and regional administrations.

Innovation partners:

Union Europea FEDER
Invertimos en su futuro

GRUPO spri TALDEA

EUSKO JAURLARITZA GOBIERNO VASCO
EKONOMIAREN GARAPEN ETA AZPIEGITURA SAILA
DEPARTAMENTO DE DESARROLLO ECONÓMICO E INFRAESTRUCTURAS

MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

CDTI Centro para el Desarrollo Tecnológico Industrial

utilities 4.0

Unió Europea
Fons Europeu
de Desenvolupament Regional

ACCIÓ

Generalitat de Catalunya

R&D&i Projects

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GrowSmarter

Transforming cities for a smart, sustainable Europe

Project co-financed by the European Union H2020 programme. GA No. 646456.

GrowSmarter aims to encourage European cities to adopt innovative measures to improve the quality of life of their citizens, enhancing energy efficiency, the sustainability of urban areas and improving environmental quality, based on the experiences of the actions implemented in the three Lighthouse cities of the project (Barcelona, Cologne and Stockholm).

Various Smart solutions are applied in Lighthouse cities in three action areas (Low-Consumption Districts, Integrated Infrastructures and Sustainable Urban Mobility), to serve as an example of replication and scalability in other places.

Cellnex Telecom has taken on the role of reference ICT partner for the solutions implemented in the city of Barcelona, providing the communications infrastructure for IoT and wireless broadband, and the integration platform for data and urban resources. Cellnex leads solutions called **Smart Towers** (transformation of urban fixtures into communication nodes) and **Integrated Data Platform.**

RESILTRACK

Resilience of Railway Infrastructures Against Climate Change

Project IDI-20171003, co-funded by the CIEN programme of CDTI

The project applies innovative IoT solutions that ensure the resilience of rail services. The project focuses on digitising railway infrastructures to improve the safety and predictive maintenance tasks of this type of network. RESILTRACK creates a monitoring and sensing system making it possible to evaluate the effects of climate on train tracks and thus be able to take appropriate preventive measures.

Cellnex is an ICT partner of the project, facilitating the implementation of **robust IoT connectivity solutions** in the railway sector. Cellnex is responding to extreme connectivity needs in this area, with a robust network of wireless communications infrastructures.

R&D&i Projects

BICISENDAS

Bicycle lane: Sustainable, Energetically self-sufficient, Intelligent, Decontaminant, Integrated and Safe

Project financed by CDTI with the CIEN Strategy Program 2018.
Reference: IDI-20181108

The BICISENDAS project concentrates on the investigation of innovative solutions applied to bicycle lanes in order to improve the environment and increase comfort and safety in bicycle lanes. For this, it will rely on the experimentation of new construction and material processes, but also on digital transformation of bicycle lanes integrating new digital communication systems.
Cellnex is a TIC partner of the project, adding value in the development of:

- **An IoT Communication Network** of low bandwidths and long reach, energetically efficient, safe and strong, that provides connectivity between network sensors and drives and the integrative information platform.
- **A V2X communication network** that allows developing C-ITS services (Cooperative Intelligent Transport Systems) in order to create services that improve the safety of the user that are vulnerable on the transport roads, such as pedestrians and cyclists.
- **The information integrative platform** that guaranties the correct management and use of information gathered on bicycle lanes and that eases up the development of the new services and applications.
- **Applications that offer real-time services** for bicycle lane users but also for the ones who manage them.

SECUTIL

Security and Cyber Security Solutions for protection of Critical Infrastructures

Project COMRDI16-1-0060 of the RIS3CAT "UTILITIES 4.0" Community, co-funded by the ERDF operational programme in Catalonia 2014-2020

The SECUTIL project focuses its activity on the resilience and protection of Utilities, developing a system that guarantees the overall security of Critical Services Infrastructures. To this end, the project addresses a serious of aspects such as: physical protection of infrastructures; functional safety; IT security; and defining resilience strategies.

As a benchmark for Critical Communications Infrastructure, Cellnex actively promotes the study of **resilience models** and the **unified management of physical and logical security**.

www.resistoproject.eu · *@RESISTO_project*

RESISTO

RESIlience enhancement and risk control platform for communication infraSTructure Operators

Project co-financed by the European Union H2020 programme. GA No. 786409

The project aims to protect critical communications services by developing solutions for prevention, detection, mitigation and rapid response to physical attacks, cyber-and hybrid attacks, whether natural or man-made.

As a critical infrastructure operator certified by the CNPIC, Cellnex leads the activities of the work scenario dedicated to **guaranteeing the protection of future 5G communications infrastructures for critical civil protection and public security services.**

AI MARS

Artificial Intelligence system for Monitoring, Alert and Response for Security in events

Project financed by CDTI with the CIEN Strategy Program 2018. Reference: IDI-20181108

The project AI MARS concentrates on the investigation of diverse technologies, techniques, tools and methods used to develop technological and innovative solutions that help surveillance and prevention of attacks or other incidents in crowded places and situations (such as airports, fairs, manifestations, sport events, parties, malls or similar environments).

Cellnex is a coordinator of TIC consortium and partners of the project, adding value to the use of high capacity and low latency 5G technology, with adaptative MEC solutions, in order to process high volume information in real-time, that allow to improve security and vigilance services.

R&D&i Projects

V2x-Arch

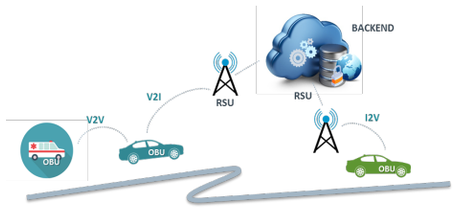
Evaluation of technologies and architectures for connected vehicles

Project TSI-100102-2015-13, co-financed by the Spanish Ministry of Industry, Energy and Tourism within the Strategic Action of Economy and Digital Society, part of the National Plan for Scientific Research, Development and Technological Innovation 2013 2016.

V2X-ARCH is a Cellnex project that is part of the connected car field. The project focuses on research into various technologies and V2X architectures to provide added value to connected car services with vehicle infrastructure communications.

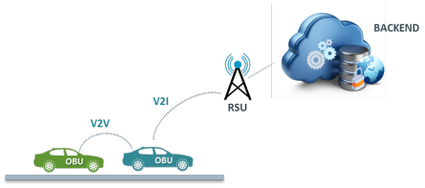
Emergency Vehicle Warning

The Emergency Vehicle saves time to arrive the target destination because other cars in its path are advised to clear the road.



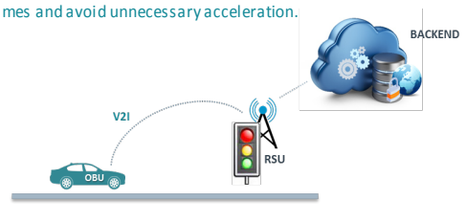
Cooperative Forward Collision Warning

Car-to-car warning in order to avoid collisions. In case of an accident, the backend alerts emergency services.



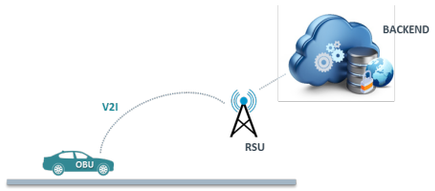
Green Light Optimal Speed Advisory

Traffic Light informs about phase scheduling to the approaching vehicles. Then, cars can adapt their velocity to avoid stop. Cars save fuel and decrease emissions because they reduce stop times and avoid unnecessary acceleration.



Media Downloading

Cars download information for added value services: Infotainment, maps update, SW update, etc.



With V2X-ARCH, Cellnex is also creating an experimental V2X infrastructure in order to evaluate various usage cases.

ESKALA 4.0

Optimization of the layover time in the airport environment according to Industry 4.0 paradigm

An action co-financed by the Basque Government and the European Union through the European Regional Development Fund 2014-2020 (ERDF)

The ESKALA project focuses on Research into innovative solutions to reduce and optimise stopover times in an airport, considering all the factors (aircraft, luggage and passengers).

Cellnex is an ICT partner of the project, providing value in the **vehicular communications network of the airport.**

cellnex
driving telecom connectivity

- Over 50,000 points of connectivity.
- Telecom and infrastructure services.
- DAS & Small Cells.
- Broadcasting networks.
- Smart cities, Internet of Things and Network Security.