

Advanced Uses of 5G in the City of Madrid

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Capital
Digital

01.



Origin of the Project and Objectives

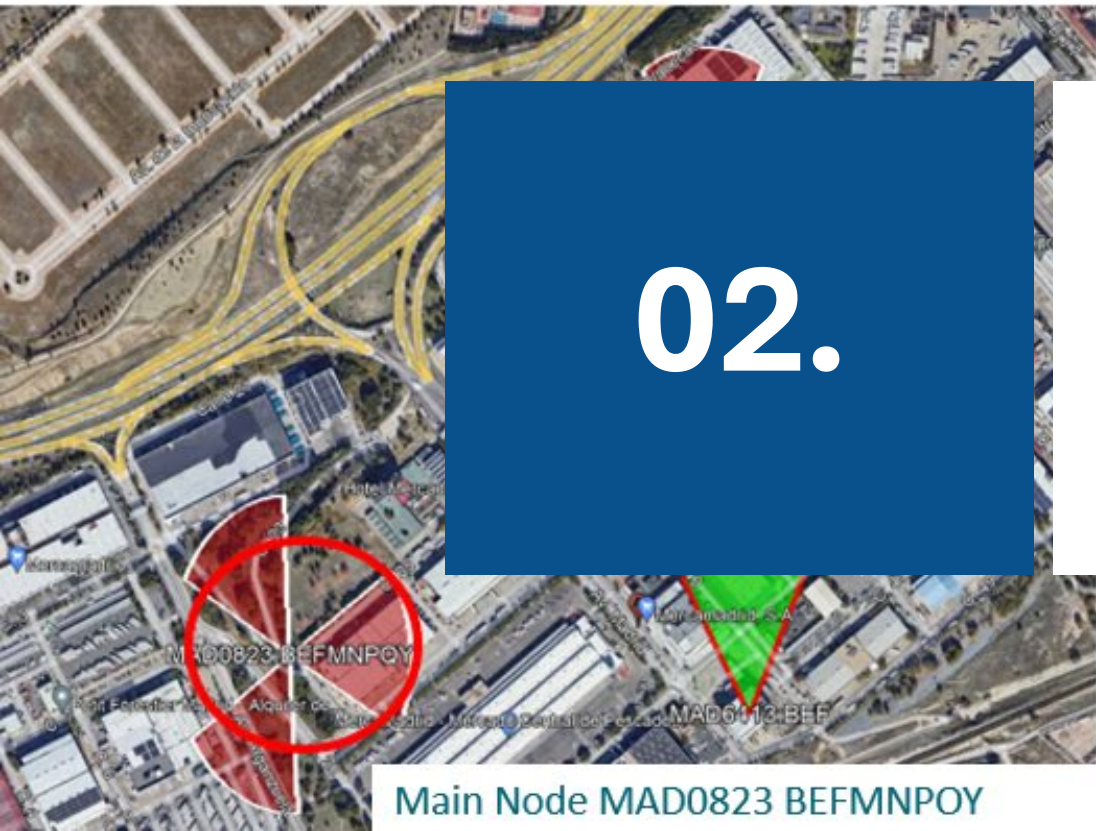
5G Agenda is part of the Digital Transformation Strategy of the Madrid City Council.





The 5G 3.5GHz coverage in the areas where autonomous vehicles will circulate was reviewed.

To reinforce the 5G shadow areas at the back of the Mercamadrid warehouse, it is proposed to add 1 sector to the MADX6413 (MX1773) to reinforce the 3.5 GHz band.



Main Node MAD0823 BEFMNPOY



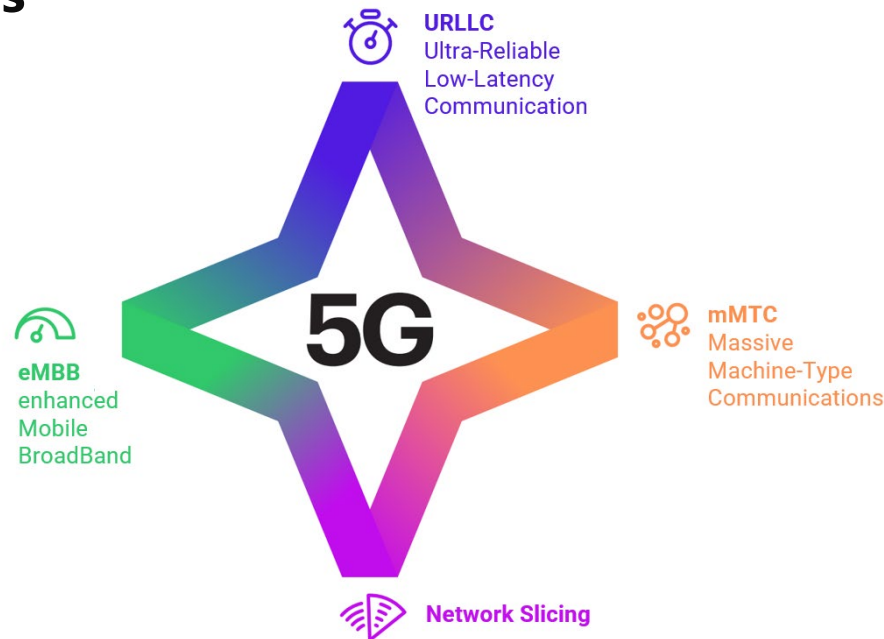
3.5 GHz band reinforcement

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5G Strengths



The projects explore the potential of 5G to revolutionise urban services in Madrid:

- Industrial and recycling environment such as the Valdemingomez Technology Park.
- Logistics, mobility and energy environment in MercaMadrid.
- Critical emergency environment in the Calle 30 tunnels.



ACHIEVEMENTS

Autonomous and sustainable mobility

Process optimisation and error reduction

Improving communication in industrial environments and optimising jobs

Simultaneous translation to overcome language barriers

Connecting advanced life support units with 5G and real-time remote medical assistance.



03.

Industrial Environment

ACCESO PTV

INTEROPERABILITY between different services

IoT Nodes: 49 + 9
 Presence sensors and others: 49 + 9
 Centralized Telemetry and Control (HASS) Dashboard (HASS)

Pit filling
 AI
 Machine Vision
 Advance Data Acquisition
 Integration
 SCADA Integration

Road safety
 Counting people and vehicles
 Speed Detection
 Signage
 Capacity

IoT & Others

WASTE
MANAGEMENT

MOBILITY

LIGHTING

Smart lighting
 High streetlights: 49
 Pedestrian luminaires: 9
 Adaptive Intentional Lighting
 Event Alarm

INFORMATION
AND
CITIZEN
INTERACTION

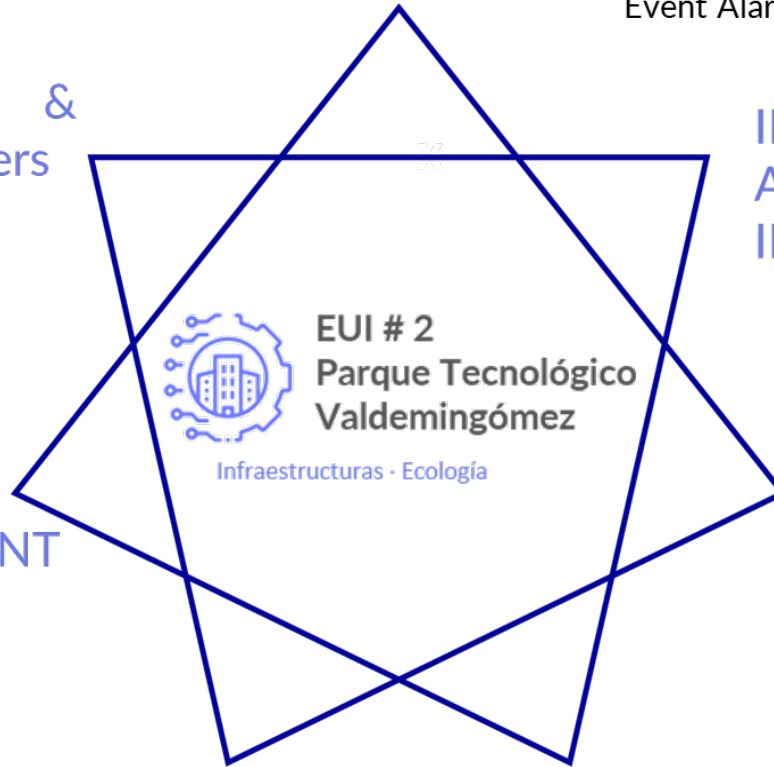
Mobile app according to the specification of new use cases, integration into APP for visitors

Monitoring of electricity consumption (Detailed, zones, patterns)
 Meters: >6 (at least one in each electrical panel of each group of streetlights)

ENERGY

ENVIRONMENT

Environmental sensors of exterior and interior parameters and magnitudes
 Smart irrigation





04. Logistics, mobility and energy environment

-  Electrificación int...
-  Vehículo autónom...
-  Data Market



Year 1	Year 2	Year 3	Year 4	Year 5
2024	2025	2026	2027	2028



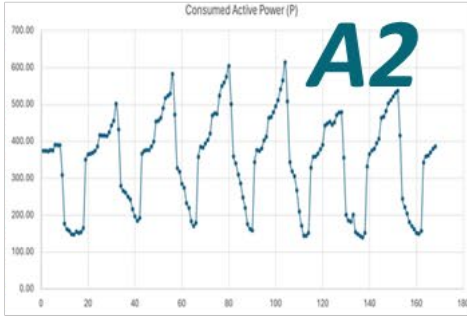
T2.3 Public licenses, special licenses and licenses in process. (39 months)



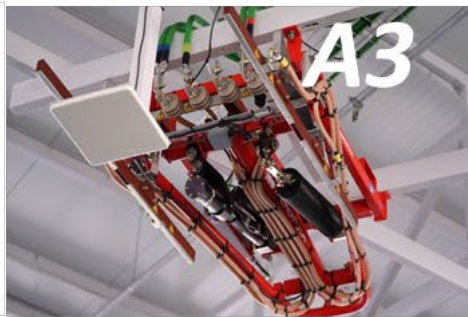
5 PoC Madrid Ecosystem



Autonomous electric vehicles within Mercamadrid for goods and people



Electricity network based on RES chargers and V2G in Mercamadrid



Efficient charging and electrification of fleets for people and goods



Implementation of H2 charging stations and 10 H2 fuel cell buses



Implementation of Data spaces services.



MERCAMADRID: Results

- Characterize photovoltaic solar production and energy consumption in the logistics field.
- Have a real experience of the interaction between the citizen and the autonomous vehicle: expectations vs. limitations.
- Establish the conditions to guarantee a safe environment for the coexistence between autonomous vehicles, pedestrians and vehicles with drivers, including forklifts and pallet trucks, as well as with the infrastructures of public roads.
- Highlight the initiatives of municipal companies in energy generation and efficiency and in the management of production versus consumption.
- Analysis and evaluation of the coexistence of current logistics systems with new trends in this sector.
- Evaluation of energy efficiency and sustainability measures.
- Characterization of the mechanisms for making energy consumption more flexible through intelligent electrification and measurement, based on a data market.



05.

Critical emergency environment

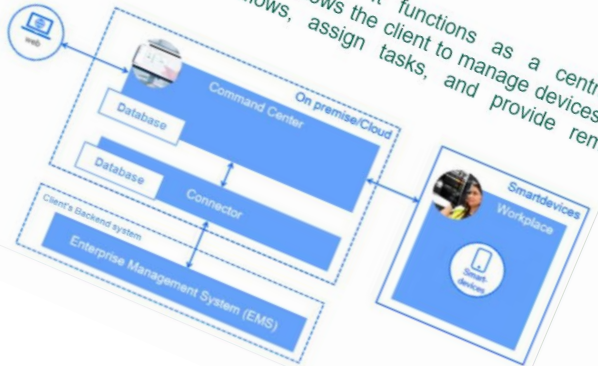
M30 Tunnels: Use Cases

1. CONNECTED ADVANCED LIFE SUPPORT UNIT: This involves connecting a 5G ALSU (Advanced Life Support Unit) to expand its functionalities, allowing REAL-TIME TELEMETRY OF MEDICAL INSTRUMENTATION WITH MINIMAL LATENCY. This connectivity allows access to the telemetry data of the ALSU's medical instrumentation from any location, whether a control center or supervisors en route to the site of interest, through SAMUR operators.



2. 5G REMOTE MEDICAL ASSISTANCE: Step-by-step guidance directly in the SAMUR operator's field of vision, replacing error-prone paper lists and allowing tasks to be completed hands-free, optimizing manufacturing processes. This productivity, saving up to 25% of time, and reduces errors by up to 50%. Consta de dos componentes principales:

Frontline Command Center. It functions as a centralized management panel that allows the client to manage devices and users, create workflows, assign tasks, and provide remote assistance.

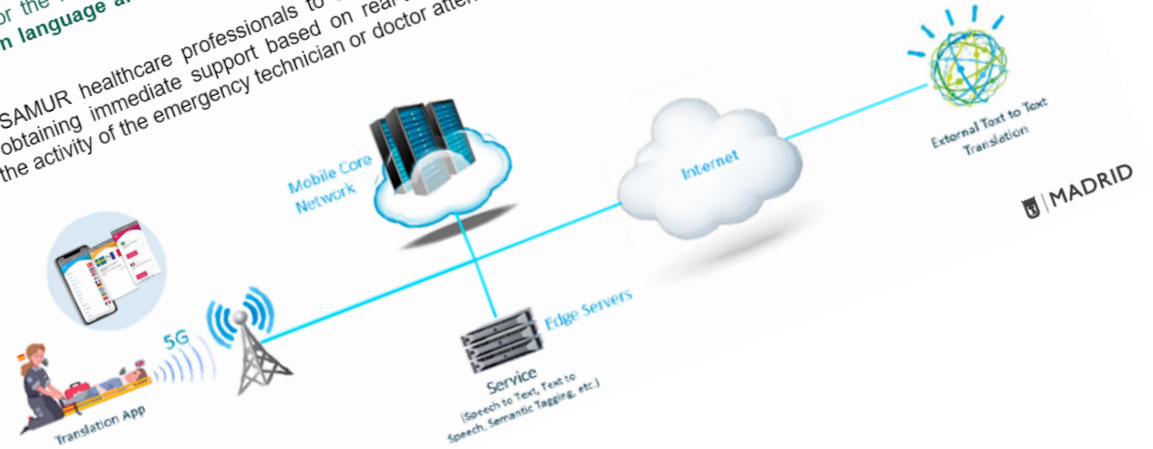


Frontline Workplace. It is the on devices such as smartphones or tablets, allowing users to access the remote expert assistance.



3. SIMULTANEOUS TRANSLATION: It will involve a mobile application installed on the rugged terminal provided for the remote assistance use case. This application will allow users to speak in their own language and generate translated audio with very low latency in the target language.

This will allow SAMUR healthcare professionals to establish real-time communications with the Base-0 team, obtaining immediate support based on real-time visualization of the patient's condition and the activity of the emergency technician or doctor attending to them.



M30 Tunnels: BENEFITS



IMPROVED TUNNEL SAFETY: Having 5G connectivity in the main M-30 tunnels will improve safety, especially in emergency situations where SAMUR personnel have communication difficulties with the Base.



SAVINGS FOR THE CITIZEN: Thanks to European funds subsidizing this deployment, no additional public funding will be needed to achieve 5G coverage in M-30 tunnels, as it is not in the short-term deployment plans of the operators.



SERVICES FOR THE CITIZEN: The equipment deployment will remain once the project is completed, allowing citizens to take advantage of the services offered by the operator.



INNOVATIVE USE CASES: 3 innovative use cases will be deployed that will highlight the qualities of 5G technology and its benefits.



INTERNATIONAL POSITIONING: This deployment will place the city of Madrid in a relevant position regarding the application of 5G technologies in emergency management.



LOCATION S1