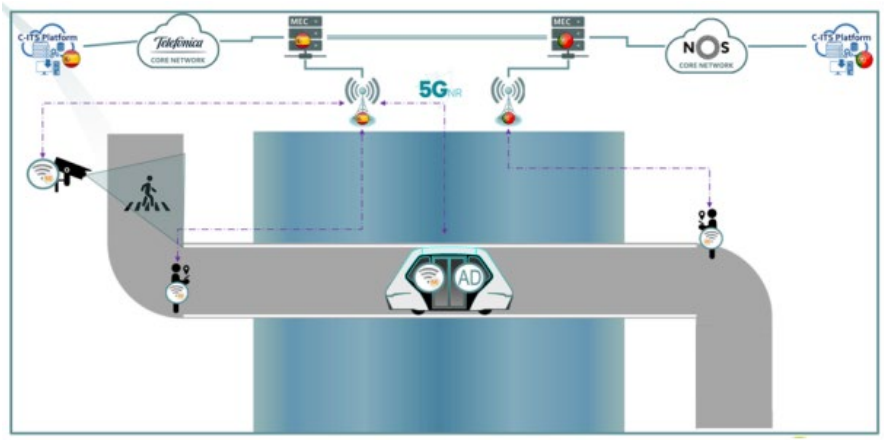
5G-MOBIX USE CASES

Cooperative Automated Operation



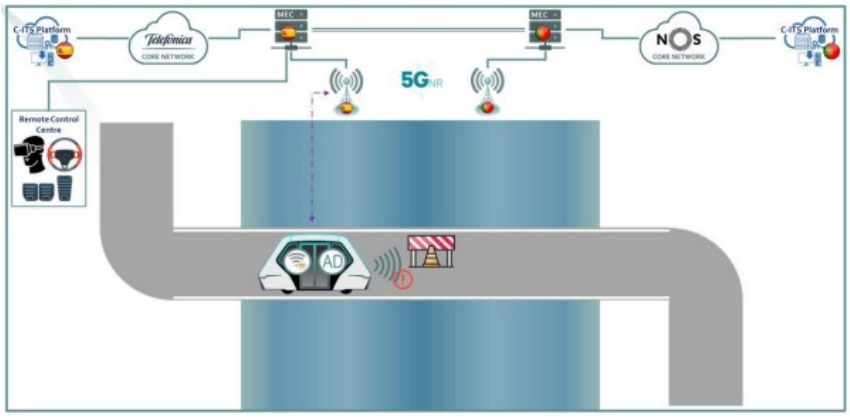
In this use case, CTAG's autonomous shuttle is running its route in autonomous mode along the bridge crossing the border.

At the ends of the bridge, there are areas with no pedestrian visibility, so an anti-collision system has been installed, cameras in this case, which send the detected information to the MEC through 5G. In addition, some vulnerable road users have been equipped with a 5G phone with an app that will send their position information to the MEC.

The MEC then sends the messages to the ITS Centre and to the 5G OBU of the shuttle, which, upon receiving the vulnerable road user detection information, slows down or comes to a complete stop to avoid any accident risk situation.

This use case is colloquially referred to in the project as Vulnerable Road User (VRU).

Remote Control

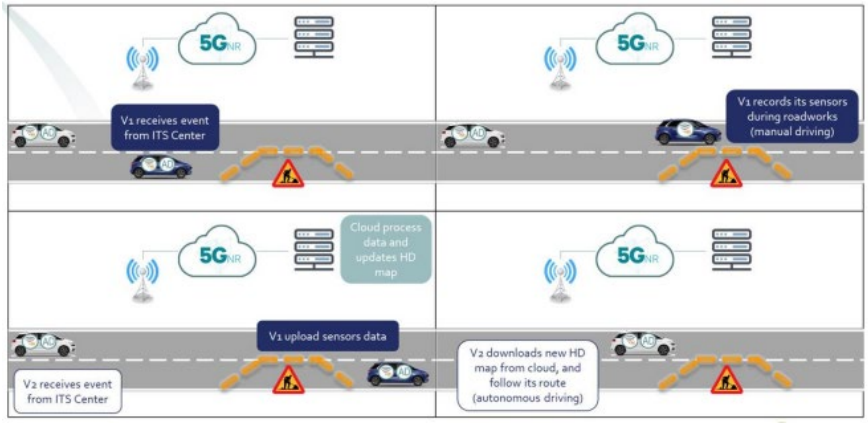


In this use case, the autonomous shuttle runs its route in autonomous mode until, in the middle of the bridge, it is blocked by a static object, which brings it to a controlled stop.

After a few seconds, the shuttle alerts the Control Centre of the blockage and asks the Control Centre to take control.

The Control Centre, upon receiving this warning from the shuttle, remotely steers the vehicle supported by the speed and low latency of the 5G network until it has cleared the obstacle. Once this is done, the autonomous mode is reactivated, and CTAG's autonomous shuttle can again continue its route autonomously.

HD Maps (HDM)



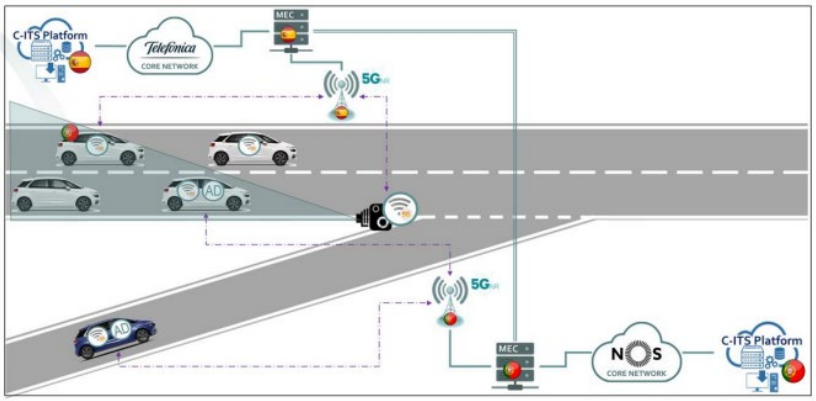
In this use case, the blue lead autonomous vehicle is driving on the motorway and receives a message from the ITS Centre notifying it of a road works event.

The OBU of this vehicle receives the information, compares it with its own map information and concludes that its internal map is out of date. It then prompts the driver to take control and begins to record what the sensors are seeing as new.

When the works event is over, the blue lead vehicle continues its route in autonomous mode and the OBU sends the data recorded by the sensors over the 5G network to the ITS Centre, which processes it and generates a new HD map.

This new map is sent back via the 5G network to nearby vehicles so that they can autonomously overcome the work event.

Lane Merge (LM)



In this use case, the main autonomous vehicle (the blue one) will merge onto a motorway. Autonomous, connected and non-connected vehicles will drive in the main lanes. We call these non-connected vehicles "Legacy".

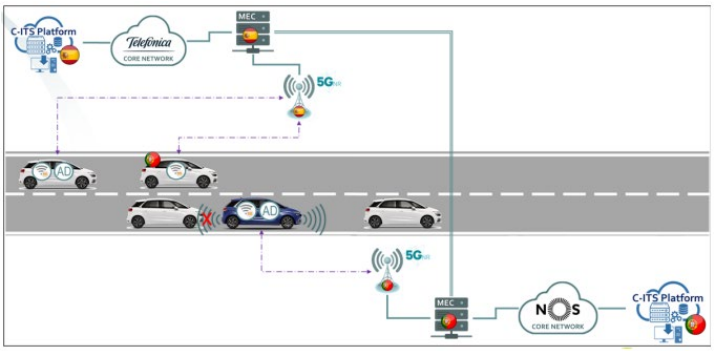
The autonomous and connected cars send their position and the Legacy vehicles will be detected by the radar located for this purpose.

The messages transmitted by the vehicles and the radar are forwarded to nearby vehicles through 5G devices (CTAG's OBUs and radar equipped with 5G modems), MEC and servers.

Thus, the main vehicle (the blue one) receives the information concerning the vehicles in the main lanes of the motorway, predicts the trajectories of the detected vehicles and calculates the risk of collision.

If necessary, the speed of the lead vehicle is adapted and the merging manoeuvre is allowed to proceed with maximum safety.

Overtaking (OVT)



In this use case, the main autonomous vehicle (the blue one) is driving on the right side of a motorway. Ahead and behind it there are vehicles reducing or blocking the view of its sensors.

Other connected vehicles drive in the left lane behind the main vehicle at higher speeds.

Messages from the connected vehicles are received via the 5G network and transmitted to nearby vehicles so that the blue vehicle can check the safety of the overtaking manoeuvre. The overtaking manoeuvre is then performed or, if not possible for safety reasons, the blue vehicle cancels the manoeuvre and adapts its speed to that of the vehicle in front to avoid any collision.