

# 5GMED

Start date: **01/09/2020**

Duration: **48 months**

## D8.2. Impact maximisation plan

WP	WP8
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Dissemination Level	PU
Nature	RE

Dissemination Level:	
PU	Public
PP	Restricted to other programme participants (Including the Commission Services)
RE	Restricted to a group specified by the consortium (Including the Commission Services)
CO	Confidential, only for members of the consortium (Including the Commission Services)

Nature	
PR	Prototype
RE	Report
SP	Specification
TO	Tool
OT	Other

**Synopsis** This deliverable describes 5GMED Impact Maximization Plan, as defined in Task 8.1 *Dissemination and Outreach* of Work Package 8 *Impact Maximization*.

**List of Keywords** Communication, dissemination, outreach, social media plan, 5GMED

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## DOCUMENT HISTORY

Version	Status <sup>1</sup>	Date	Comments	Author
1	Draft	19/02/2021	FMWC	Natalia Cardona Marta Portalés
2	Review	26/02/2021	Cellnex, i2Cat	Raul González, Georgina Padilla
3	Final version	28/02/2021	FMWC	Marta Portalés
5	Draft	10/11/2021	FMWC	Marta Portalés Marjorie Grassler
6	Draft	13/01/22	FMWC	Alberto Sierra
7	Draft	03/10/22	FMWC	Marjorie Grassler
8	Draft	15/06/23	FMWC, I2CAT, 8Bells	Marjorie Grassler, Yuri Murillo, Nikolaos Zombakis
9	Final version	03/07/23	Final review 3 <sup>rd</sup> resubmission, Cellnex	José López Luque

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Status (a status is associated to each step of the document life cycle)  
Draft. This version is under development by one or several partner(s)  
Under review. This version has been sent for review  
Issued. This version of the document has been submitted to EC

## 1. Executive summary

Communication and dissemination are a key speaker for any product or service. In the case of 5GMED, that product or service would be the results achieved by its four use cases to bring a sustainable 5G deployment model for future mobility in the Mediterranean Cross-Border Corridor, both for automotive and railway.

These results to communicate, disseminate and exploit have a long process behind of research, trials, tests and demonstrations carried out by 5GMED partners.

How is the 5GMED consortium going to communicate this? What are they going to disseminate? Which results will they exploit to maximise their impact? And how? Through which strategies and channels?

This document, *Deliverable 8.2 Impact Maximisation Plan (M16)*, part of the Work Package 8 *Impact Maximization*, coordinated by FMWC, contains all the answers to the previous questions.

The deliverable aims at presenting the 5GMED impact maximization plan used to define opportunities for communicating the project's goals, progress, and results among the project's community and target stakeholders. As part of the impact maximization plan, communication and dissemination activities are being presented.

The reader will find the communication strategy, as well as the tools and channels that are used to leverage the potential of the partners' network to grow the 5GMED community and to reach the identified stakeholders. 5GMED will create several communication materials and coordinate the communication actions to explain the project and raise awareness about 5GMED. Eventually, the aim is to create acceptance of CCAM/FRMCS technologies, but not only in the 5GMED community and key stakeholders, but also among the general public.

Moreover, a dissemination plan has also been elaborated to reinforce the 5GMED impacts increasing stakeholders' dialogue and acceptance. It includes publications and presentations at conferences, workshops and relevant scientific, industrial and EC-driven events.

The current document concludes with an analysis of the exploitation strategy. In this context, a primer description of the 5G market structure is deployed, including potential profitable business schemes for cross-border CCAM services. In addition, it highlights the importance of the 5GMED use cases (UCs), outlining the expected exploitable results for each UC in the final business model. Finally, the exploitation strategy is divided into actions about the monitoring of the 5GMED technical progress, the efficient business exploitation and the spread of the innovative results in specific timeline until the end of the 5GMED project.

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**LIST OF ABBREVIATIONS AND DEFINITIONS**

<b>DoA</b>	Description of Action
<b>EC</b>	European Commission
<b>H2020</b>	Horizon 2020
<b>GA</b>	Grant Agreement
<b>CA</b>	Consortium Agreement
<b>KPI</b>	Key Performance Indicator
<b>FSTP</b>	Financial Support to Third Parties
<b>WP</b>	Work Package
<b>CCAM</b>	Connected Cooperative and Automated Mobility
<b>FRMCS</b>	Future Railway Mobile Communication System
<b>CMYK</b>	Cyan, Magenta, Yellow y Key
<b>RGB</b>	Red, Green, Blue
<b>HEX</b>	Hexadecimal colour
<b>FMWC</b>	Fundació Mobile World Capital
<b>MNO</b>	Mobile Network Operator

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## 2. Introduction

The Deliverable 8.2 *Impact Maximisation Plan* describes the 5GMED Impact Maximization Plan, as defined in Task 8.1 *Dissemination and Outreach* of Work Package 8 *Impact Maximization*. It aims to maximise the impact of 5GMED by engaging stakeholders and interested parties outside the consortium using a targeted dissemination and communication outreach strategy and channels, establishing interactions and liaisons with EU projects, EU initiatives (like 5GPPP and the CCAM platform) and other relevant communities.

WP8 aims to maximise the visibility and gather feedback on the project outcomes, paving the way for the exploitation and adoption of the project outcomes into future products, services, and policies in a sustainable manner and beyond the project lifetime. FMWC leads the management and implementation of dissemination and communication activities.

The document includes a detailed dissemination and communication plan addressing how results are disseminated among targeted communities of interest. It also explains how awareness of the project vision and the 5G technologies to improve mobility cross-border scenarios is raised, and how exploitation activities are discussed during the project to ensure the sustainability of its results. The plan includes a detailed calendar of events for the whole project duration and a monitoring and assessment strategy.

Following this introduction, there are 5 more sections. Section 3 corresponds to the overview of the impact maximisation plan, justifies the approach, and presents the pillars followed. This section explains the plan's main objectives and their relation to the project's expected impact. Section 4 describes the communication strategy and plan by explaining how the audience and stakeholders are reached, the communication approach and the social media strategy. Section 5 aims to describe the dissemination strategy and the liaison activities. Section 6 presents the exploitation strategy. The last part, section 7, is dedicated to the conclusions.

This document also includes an Annex to illustrate how 5GMED gathers communication and dissemination materials in toolkits to exploit the results achieved.

## 3. Impact maximisation plan overview

### 3.1 Impact maximisation approach

As mentioned before, D8.2 includes a dissemination and communication plan that will be followed during the 48 months of the project execution. The Impact Maximisation Plan (D8.2) comprises activities for proactive communication efforts, which include maintaining a strategic calendar to prepare for major events, working with a network of communication contacts and strengthening the messaging both in terms of content and in the way it is communicated. However, to understand the impact maximisation approach, it is important to distinguish both concepts and their differences in purposes (also defined by the EC), as they are vital to create a well-defined impact maximisation strategy together with the exploitation of the project.

For this purpose, we follow the guidelines of the [document](#) from the European IPR Helpdesk (Figure 1):

Communication	Dissemination	Exploitation	
<p>"Communication on projects is a strategically planned process that starts at the outset of the action and continues throughout its entire lifetime, aimed at promoting the action and its results. It requires strategic and targeted measures for communicating about (i) the action and (ii) its results to a multitude of audiences, including the media and the public and possibly engaging in a two-way exchange."</p> <p>(Source: EC Research &amp; Innovation Participant Portal Glossary/Reference Terms)</p>	<p>"The public disclosure of the results by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium."</p> <p>(Source: EC Research &amp; Innovation Participant Portal Glossary/Reference Terms)</p>	<p>"The utilisation of results in further research activities other than those covered by the action concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities."</p> <p>(Source: EC Research &amp; Innovation Participant Portal Glossary/Reference Terms)</p>	<p>Definition</p>
<p><b>Reach out to society and show the impact and benefits</b> of EU-funded R&amp;I activities, e.g. by addressing and providing possible solutions to fundamental societal challenges.</p>	<p><b>Transfer knowledge &amp; results</b> with the aim to enable others to use and take up results, thus maximising the impact of EU-funded research.</p>	<p><b>Effectively use project results</b> through scientific, economic, political or societal exploitation routes aiming to turn R&amp;I actions into concrete value and impact for society.</p>	<p>Objective</p>
<p><b>Inform</b> about and <b>promote</b> the project AND its results/success.</p>	<p><b>Describe</b> and <b>ensure results available</b> for others to <b>USE</b> → focus on results only!</p>	<p><b>Make concrete use</b> of research results (not restricted to commercial use.)</p>	<p>Focus</p>
<p>Multiple audiences beyond the project's own community incl. media and the broad public.</p>	<p>Audiences that may take an interest in the potential <b>USE</b> of the results (e.g. scientific community, industrial partner, policymakers).</p>	<p>People/organisations including project partners themselves that make concrete use of the project results, as well as user groups outside the project.</p>	<p>Target Audience</p>

Figure 1 "Making the Most of Your H2020 Project" (page 13)

The Impact Maximization Plan aims to integrate the dissemination, communication, and exploitation actions described above for the 5GMED to promote, communicate, and disseminate its process and results throughout M1-M36.

This specific Deliverable Impact Maximisation Plan (D.8.2) belongs to Task 8.1 *Dissemination and Outreach*, therefore only the communication and dissemination actions are described. The liaison activities are explained in Task 8.2.

### 3.2 Impact maximisation plan goals and strategies

To understand the aim of the Impact Maximization Plan is important to note the specific objectives of WP8 according to the Grant Agreement, which are:

- Create targeted dissemination activities to outreach stakeholders from industry and scientific communities and the public sector.
- Develop a society awareness communication strategy on 5GMED and its use cases, 5G in mobility, other technologies in mobility.
- Initiate a liaison with 5GPPP and CCAM platforms by, for example, being part of working groups to leverage the network and ensure the impact of the project.

- Develop an exploitation plan targeting the best options for using the project outcomes to ensure the 5G deployment in cross-border corridors across Europe.

To reach the specific objectives, three types of strategy are deployed:

- **Communication strategy:**

The management and overall implementation of dissemination and communication activities are led by FMWC as the **WP 8 – Impact Maximisation Plan**, although all partners will be involved. Monthly meetings are set up to discuss the advancements of the WP, as well as announcements and reports, which are performed through the REDBOOTH platform and TEAMS. The communication plan wants to answer to the three phases of the market-driven phased approach focusing on developing a society awareness communication strategy. For that purpose, different activities, tools, and channels will be used, that are described in the following sections.

- **Dissemination strategy:**

It is aligned with 5GMED partners and is focused on a unique strategy for exploiting the results of the project targeting the 5G deployment. The strategy is designed and implemented at different geographical levels (local, regional, and national via the direct involvement of local partners and at the European/international level under the Work Package (WP) 8 leader's coordination and management of the Project's Impact Maximization activities). This enables to identify the benefits and value proposition of each target considering different geographical contexts. 5GMED partners will disseminate the results through a set of dissemination channels that include participation in external conferences, workshops, fairs and other events, organisation of project's events, mobilisation of key stakeholders' and end-user's associations, and clustering with other projects and initiatives. The dissemination plan aims to answer to the objective set up by market driven phased approach in its first phase, Market awareness, which is to communicate early results to the target audience.

- **Exploitation strategy:**

5GMED consortium will exploit several innovative services, processes and components that would not exist without the project-specific uses cases and the infrastructure supporting them, as well as the synergistic actions among the 5GMED stakeholders. The 5GMED strategy is a strong contribution towards safe, convenient and sustainable smart mobility, a core European pillar now and in the future. These activities will be coordinated within WP8 in Task 8.3 starting in M16.

### 3.3 Targeted stakeholders

The 5GMED target groups are categorised in six distinct types of stakeholders: i) Public Sector, ii) Mobility Sector, iii) Telecom Sector, iv) ICT Sector, v) Research, Academia, and Open-Source Communities, and vi) General Public.

A general picture of the involvement of the partners in maximising the project's impact has been created (Figure 1). The communication and dissemination activities are explained in section 4 and 5, and the exploitation plan will be presented in section 6. Since the project focuses on 5G technologies and the Mediterranean Cross-Border Corridor, the actions to be implemented are adapted to those distinctive characteristics. Specific activities are created to respond to the project needs regarding the impact maximisation.

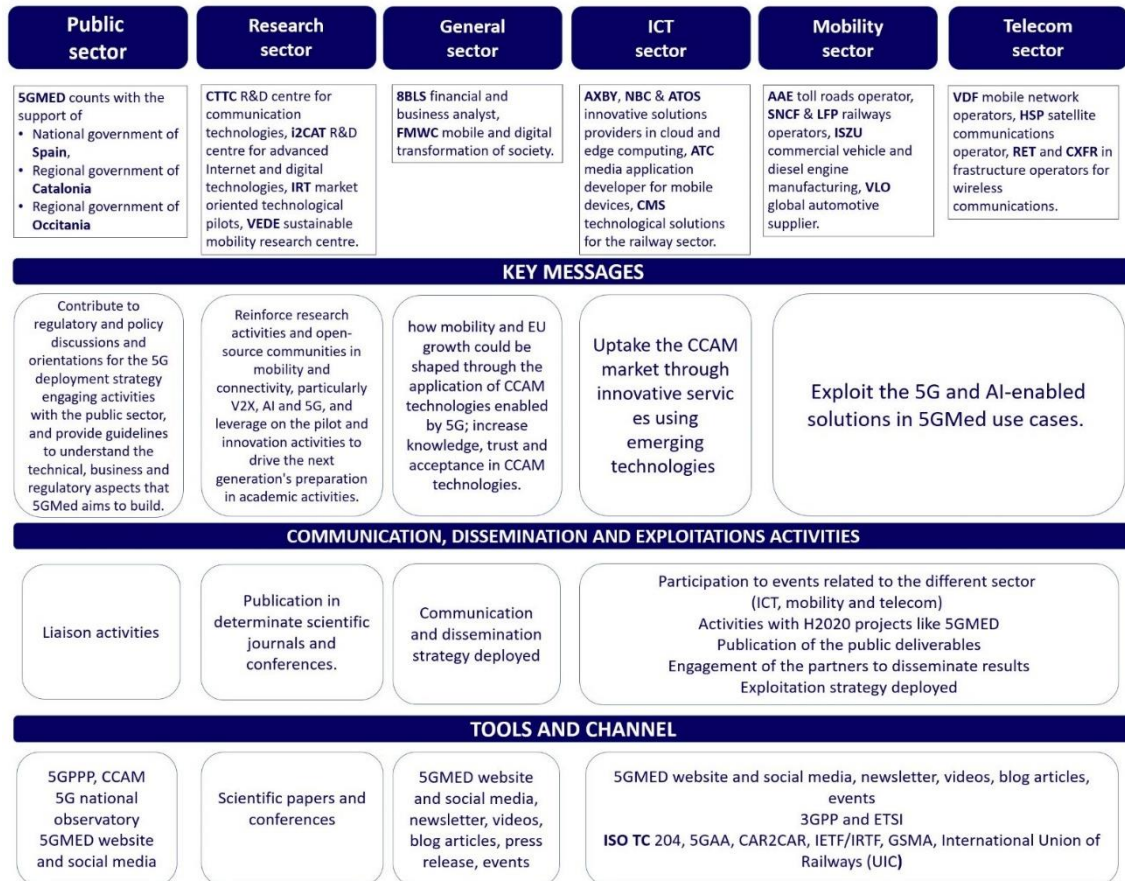


Figure 2 5GMED actions to target stakeholders

### 3.3.1 Communication and dissemination activities

The communication and dissemination strategy contributes to achieve the impacts identified for the project by designing and executing specific activities according to the Grant Agreement statement:

Type of strategy	Activities	Responsible Partner	Month
Communication	(1) Communication channels and tools	FMWC	M01-M06
	(2) Creation of visual content	FMWC	M01-M03
	(3) Elaboration of social media strategy	FMWC	M03-18
	(4) Participation in events	ALL	M06-M42
Dissemination	(5) Publication in scientific papers and conferences	I2CAT	M06-M42
	(6) Dissemination of public deliverables	FMWC	M06-M42
	(7) Analysis and selection of the most relevant 5GPPP Working groups and CCAM platforms	I2CAT	M03-M42
	(8) Establishment and coordination of communication channels with 5GPPP and CCAM community including the 5G cross-border corridors projects	I2CAT	M03-M42
	(9) Coordination of the project communication channels with task and WP leaders to collect and process project outcomes	I2CAT	M03-M42

	(10) Definition of joint agreements and activities with projects and communities	I2CAT	M03-M42
	(11) Organisation of joint events and joint white papers	I2CAT	M03-M42
Exploitation	(12) Creation of AI capabilities and innovative business models in the 4-use case	8BELLS	M18-M42
	(13) Evaluation of the cost/benefit validation of cross border 5G deployment enabling CCAM	8BELLS	M18-M42
	(14) Generate an economically favourable outlook of the mobile communication network	8BELLS	M18-M42
	(15) Define the first commercial elements for the support of CAM roll-out on different road infrastructure networks and connectivity environments	8BELLS	M18-M42

Table 1 Activities related to the strategies

And the impacts beyond the work program that 5GMED aims to reach are:

1. Enhance innovation capacity and create new market opportunities.
2. Societal and environmental impact: advances towards safe, clean and connected mobility.

### 3.3.2 Impact maximisation framework

The 5GMED Impact Maximization Framework is based on the following pillars:

1. Targeted stakeholders: section 3.3 describes who are the stakeholders to be addressed throughout the project.
2. Communication and dissemination activities: the foreseen actions in the field of communication and dissemination are found in section 4 and section 5.
3. Communication and dissemination tools and channels: the platforms and tools that will be used to perform the communication and dissemination activities are described in section 4 and section 5.
4. Liaison activities: different actions will be set up, as explained in section 5.4, to enrich the project's impact by engaging with 5GPPP and CCAM stakeholders.
5. Exploitation strategy: section 6 explains the 5GMED preliminary exploitation strategy to prepare for its kick-off on month 16.
6. Impact assessment: section 6 details the method that will be followed to measure quantitatively and qualitatively the different impacts of 5GMED.
7. Conclusion: in the conclusion section 7 some of the outcomes until next deliverable (8.3 M18) will be summarised.

The dissemination and communication 5GMED activities are launched in a series of phases along with the duration of the project. There will be several occasions to increase project communication efforts, especially during project milestones. The following is an overview of the actions to be taken during each phase:

## 5GMED



Figure 3 Phases of the communication actions

### 4. Communication strategy

Communication addresses a larger public than dissemination and is relevant per se, as it aims to increase awareness and stimulate the interest of multiple stakeholders, including final consumers and citizens.

Table 2 presents a list of communication activities planned, ranging from industry to scientific communities with a particular focus on the general public, to bring the uptake and the public acceptance of CCAM and FRMCS and to participate in the society awareness communication.

Tools and channels	Communication activities	New KPIs
Website	Focal point for the project communication: general information about the project, methodology, partners, use cases evolution, events, an insights section, a community section (to share the liaison activities).	M1 - M48 KPI: 4000 visits / project
Visual identity	It comprises logo and branding guidelines, colour and font codes, templates for presentations in different formats that should be applied to all communication materials.	M3 KPI: 2 templates, 1 branding guiding, 3 logos
Videos	One video about the project with the aim to explain the project visually, one per pilot project (a total of 4) and one with the general outcomes of the project.	M6-M48 KPI: 6 videos
Blog articles	They target key stakeholders' groups and even the general public and concrete technological and business sectors, using also related key influencers. The section contains articles, interviews, newsletters, scientific article, press release.	M3-M42 KPI: 4 per month
Flyers and brochures	One-pager with information about the project, a catalogue of the pilots and their outcomes. Banners for the social media accounts: promoting the pilot projects and the presence of consortium members in events.	M3-M48 KPI: 1 project one-pager, 1 catalogue of use cases, >50 banners for social media
Newsletter	Quarterly newsletter including news items about the project's activities and work, self-created blog articles, participation at events and call for papers. The aim is to gather highlights and push out announcements of interest to all target stakeholders.	M3-M48 KPI: 15 newsletters
Press releases	Distribution among local, national and European media and press contacts to inform about the milestones achieved by 5GMED and use cases.	M3-M48 6 press releases
Social media	Twitter and LinkedIn account to engage the 5GMED community and audience. Weekly information about the project and other interesting deployments of 5G and cross-border corridors.	M1 KPI: 2 social media accounts 3 posts per week

		with total of 100.000 impressions
<b>Marketing materials</b>	Tote bags, stickers, notebooks, polos of the project will be created for the different events.	M6 KPI: 1 tote bag design, 1 sticker design, 1 polo design, 1 notebook design
<b>Scientifics Events</b>	Participation in scientific events to disseminate relevant results.	M06-M48 KPI: 20
<b>Industry events</b>	Presentations or demonstrations of 5GMED use cases.	M06-M48 KPI:40

Table 2 5GMED Communication KPIs

In the following section, the different communication tools and channels are described with more detail to understand how they will be used to communicate the project.

#### 4.1.1 Website

The website is regularly updated by the Communication Manager (FMWC) throughout the three years of project duration. Its statistics are monitored to achieve the KPI (Key Performance Indicators) of 4000 visits during the duration of the project. Its contents will also be displayed using the different social networks of 5GMED.

All the basic information that describes the project is available on the website through the different sections. The website, which is meant to target all the stakeholders identified for this project, has been described in deliverable 8.1 *Project Website*.

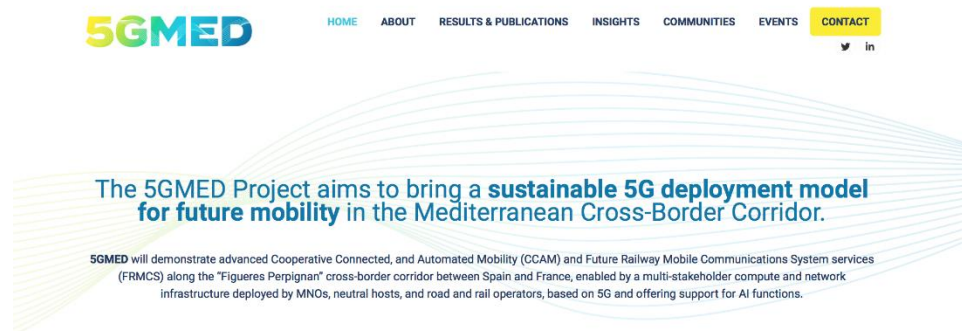


Figure 4 Screenshot of 5GMED website home page

#### 4.1.2 Creation of visual content: visual identity and graphics setting

Comprising logo and branding guidelines, colour and font codes, and templates for presentations in different formats that should be applied to all communication materials. A set of graphics, including fonts, colours and guidelines, are being developed (M1-M6).

The starting point for a project brand identity is based around the title of the project: *Sustainable 5G deployment model for future mobility in the Mediterranean Cross-Border Corridor* (or shorter, *5GMED*).



Figure 5 5GMED white logo over coloured background



Figure 6 5GMED logo in colour



Figure 7 5GMED logo in black and white

## Colour palette

### Core colours



Titanium Yellow

C: 0  
M: 5  
Y: 82  
K: 4

R: 244  
G: 231  
B: 43

#F4E72B



Middle Green Yellow

C: 16  
M: 0  
Y: 51  
K: 20

R: 172  
G: 204  
B: 100

#ACCC64



Maximum Blue

C: 74  
M: 13  
Y: 0  
K: 15

R: 57  
G: 188  
B: 261

#39BCD8



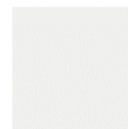
Honolulu Blue

C: 87  
M: 33  
Y: 0  
K: 36

R: 22  
G: 110  
B: 163

#166EA3

### Secondary colour



Cultured

C: 0  
M: 0  
Y: 1  
K: 5

R: 241  
G: 241  
B: 239

#F1F1EF

Figure 8 5GMED colour palette

This section is described with more detail in the public deliverable 8.1. 5GMED visual content will be gathered in a folder and shared with all partners and collaborators to make sure we build 5GMED project brand properly in other organisation's communication channels.



### 4.1.3 Videos

A set of 6 explanatory videos will be developed during the project’s lifetime. The first video will explain the general concept and objectives of the project through animation and infographics.

Other videos (4) will be produced to disseminate the use cases results. Each use case owner will be responsible for creating and editing their use case video. FMWC will take care of the dissemination.

A sixth video will be created to explain all the outputs of 5GMED at the end of the project (M36).

The videos will be uploaded on [5GMED YouTube channel](#) (Figure 7) and on the web, promoted on social media through a dedicated campaign, and showcased in different project presentations and events.

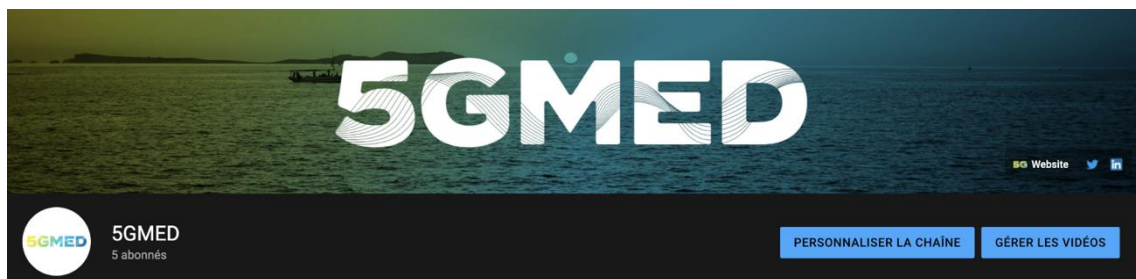


Figure 9 5GMED YouTube channel

### 4.1.4 Blog articles

A series of articles are published on the 5GMED website (from M3 to M36). This action aims to create original and relevant content that can be shared with the project’s key stakeholders to create awareness on the project and subsequently become a leading influence in CCAM and FRMCS topics at European level.

Table 3 indicates the provisional publication date of the interviews made to 5GMED partners to understand their role within the project. This type of communication addresses all sectors.

Each partner is provided with a communication toolkit to share it with their own network to reach a more enlarged community and improve the impact of this kind of publications.

Provisional title	Partners	Provisional Date of release
Hispasat, the satellite operator assuring service continuity for 5GMED project	Hispasat	06/2021
Nearby Computing, orchestration provider for 5GMED	NBC	07/2021
CTTC, a contributor to 5GMED architecture and in-vehicle extension	CCTC	08/2021
Linea Figueras Perpignan: an infrastructure at the service of the 5GMED project	LFP	09/2021
Eight Bells, 5GMED Innovation Manager	8bells	10/2021
SNCF, 5GMED railway developer of advanced applications in cross border situations.	SNCF	01/2022
ATC, 5GMED application developer	ATC	02/2022
Abertis, 5GMED road operator and end user appreciation expert	Autopistas	03/2022
Comsa, 5GEMD expert in the field of telecommunications, energy, and control.	Comsa	04/2022
Cellnex, 5GMED coordinator	Cellnex	05/2022
Atos, developer of the info media infotainment in car services	Atos	06/2022
I2CAT, 5GMED technical partner	I2cat	07/2022
Axbryd, 5GMED manager of the data plane of the network infrastructure	Axbryd	08/2022
Retevisión, 5GMED small scall testbed responsible	Retevisión	09/2022

Vedecom, 5GMED developer of AI-assisted technology	Vedecom	10/2022
Valeo, 5GMED System Architecture contributor	Valeo	11/2022
Vodafone, 5GMED 5G Base Stations in 3,7 GHZ band along AP7 high-way deployer	Vodafone	12/2022
IRT, 5GMED ICT laboratory expert	IRT	01/2023
FMWC, 5GMED communication expert	FMWC	02/2023
Anadolu, 5GMED telematic control unit installer	Anadolu	03/2023
Armines, 5GMED Lidar deployer	Armines	04/2023

Table 3 List of partners' interviews

The following table provides provisional titles of articles that aim to share insights about the 5G impact on mobility and 5G technologies used by the 5GMED project.

All technologies are shortly defined in a section of the web called the "5G lexicon", which participates in making available the knowledge for the general public awareness. Each of the entries of the 5GMED lexicon will be shared on social media through a specific campaign, as well as in the newsletters.

Provisional title	Partners	Provisional Date of release
The future of the mobility: Future Railway Mobile Communications System	FMWC	12/2020
FRMCS will boost the business activities in the railway sector	FMWC	07/2021
CCAM		03/2022
Edge computing	NBC	04/2022
MANO	CCTC	10/2021
MEC	CTTC	01/2022
TCU	CTTC/Anadolu/Autopistas	02/2022
5G infrastructure	Hispasat	03/2022
Network slicing		04/2022
CV2x	Vedecom	05/2022
Backhaul	Cellnex	06/2022
MNO	IRT	07/2022
LBO	IRT	08/2022
LTE	Vedecom	09/2022
Mmwave	Comsa	10/2022
Core network	I2CAT	11/2022
O-ran neutral host	Cellnex	12/2022

Table 4 List of articles about 5G technologies

#### 4.1.5 Press releases

This activity will consist of distributing among local, national, and European media and press contacts 5GMED press releases to inform about the milestones achieved by the project and its four use cases.

A total of 6 press releases will be distributed, targeting important milestones of the project. So far, the first press release announcing the project's kick-off has achieved 91 clippings, 65 of which are press releases.

For each press release written, a toolkit will be created to be shared with the partners, for them to disseminate it within their own company and network. Platforms such as Meltwater will be used to reach European specific audiences and media.

Press release N°	Tentative date	Provisional title
1	1/06/2020	<a href="#">Project presentation</a>
2	TBD	Project participation to relevant event

3	30/01/2022	Demo results
4	TBD	Project participation to relevant event to showcase results
5	TBD	Final project presentation
6	1/09/2023	Final Project Press Release

Table 5 5GMED Press releases tentative schedule

#### 4.1.6 Events

5GMED will make an important effort on communicating the project through dedicated events and taking profit of events already attended by the partners to ensure the 'value for money' of the project resources. The events' participations are listed in the [section](#) of the website and also described in subsection [event's participation](#).

The communication of events is deployed in the following way:

- Creation of toolkit to be shared among the partners involved according to the sector targeted.
- Social media campaigns organised to invite interested stakeholders to be part of the audience.
- Publication of a chronicle summarising the event.
- Social media posts to share the chronicle on the 5GMED website, social media and newsletter.

Four events have already been attended between M1-M6:

- Presentation of 5GMED at "[5G PPP Webinar: 5G for Cooperative, Connected, and Automated Mobility \(CCAM\)](#)". **Target group:** Mobility sector. **Impact:** the participation of 5GMED in this event has been an opportunity to be introduced within the 5GPPP ecosystem with projects such as 5GCroCo, 5GBlueprint, 5G-Routes, 5GRail, etc .
- Presentation of 5GMED at "[Diálogo sobre Infraestructuras Ferroviarias para una Movilidad Inteligente y Segura](#)". **Target group:** Mobility sector. **Impact:** The project has been presented in an event organised by Ministerio de Transportes, Movilidad y Agenda Urbana in the framework of the Spanish Strategy for Safe, Sustainable and Connected Mobility 2030.
- Presentation of 5GMED at InnovaCarretera, the meeting forum that offers a broad and highly specialised vision on products and technologies applicable to the road sector. **Target group:** Mobility sector. **Impact:** Acknowledgement of the project within the Spanish mobility sector and institutional representants.
- Presentation of 5GMED at the 22nd Infocom World Conference "Transforming Greece: The 5G and Fiber Enablers – The Future is Now!". **Target group:** Telecommunication and ICT sector. **Impact:** Presentation of the project solution in the Greek telecommunications infrastructure and ICT services and solutions ecosystem.

The 5GMED partners FMWC and I2CAT will organise dedicated workshops co-located with the main events to take advantage of the concentrated critical mass and audience. Such activities will particularly focus on stakeholders from the public sector, but also for the mobility, telecom, and ICT sectors.

Due to Covid-19, the participation in events has been decreased but the involvement in 2022 for several conferences is foreseen, such as: EUCNC or ITS World Congress, among many others.

Event Name	Coverage	Sector	Month	Attendees (approx.)	Participant Partner
ITS España	National	ITS	April	1000	AAE
VEDECOM Mobility Day	National	ITS	April	500	VEDE
ICT, Transport Research Arena, Digital Transport Days, TEN-T Days	EU	Cross-sector	December	2000	CTTC, I2CAT
Mobile World Congress	EU	Cross-sector	February	200,000	FMWC, HSP, I2CAT, CTTC, RET, CFR
Consumer Electronic Show	World	Cross-sector	January	170000	VLO
EUCNC	EU	5G	June	10000	ATOS, CTTC, I2CAT, AXBY
ITS European Congress	EU	Cross-sector	June	1000	ATC, I2CAT
5G Forum	National	5G	May	250	FMWC, HSP, ATOS
ASECAP days	National	Mobility	May	2000	AAE
Smart City Expo World	World	Cross-sector	November	21000	FMWC, CMS, I2CAT, RET
IoT Solutions World Congress	EU	Cross-sector	November	16000	CTTC, AAE, I2CAT
WCRR	World	Rail	October	1000	SNCF
Layer123 World Congress 2020: Service Evolution Beyond SDN NFV	EU	5G	October	3000	ATOS, I2CAT, CTTC
Paris Auto Show	World	Mobility	October	1000000	VLO
Tokyo Motor Show	World	Mobility	October	1300000	VLO
Frankfurt Auto Show	World	Mobility	September	800000	VLO
Global5G event	World	5G	June	3000	I2CAT, CTTC

Table 6 5GMED industry events

A series of 4-6 workshops will be organised during the project to discuss the main challenges of 5G deployment, understand the European tendencies on 5G mobility policy making, and create a space of conversation/debate about 5G mobility policy making.

The objective is to propose a series of recommendations that will be gathered into a white paper and presented to the identified institutions and government (see deliverable 7.2).

This task is part of the Work Package 7, executed by I2CAT. The FMWC oversees the communication and dissemination activities, such as sending invitations to the guests and participants identified by I2CAT, supporting the logistic by providing the platform, ensuring the communication of the event, designing the report elaborated by I2CAT, etc.

#### 4.1.7 Social Media

Twitter and LinkedIn accounts have been created. Our social media strategy is divided into four blocks.

- **Owned social media.** These are the primary accounts belonging to 5GMED: 5GMED Twitter ([@5GMED\\_EU](#)) and 5GMED LinkedIn page ([5GMED](#)).



Figure 16. 5GMED Twitter account

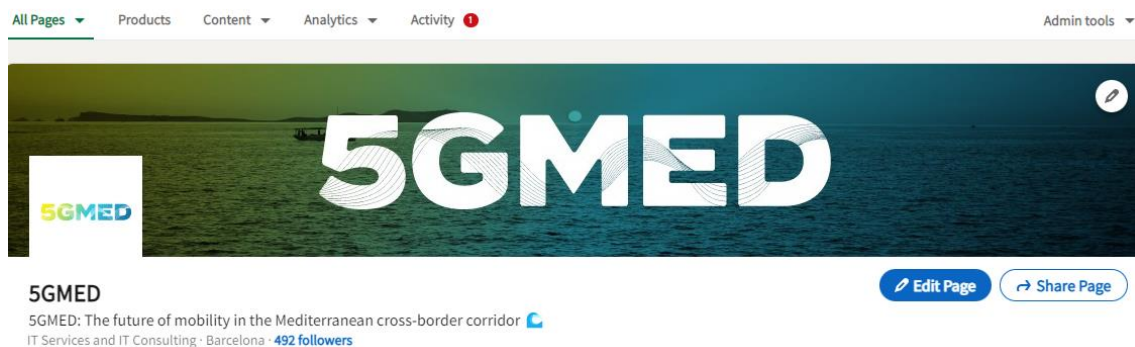


Figure 17. 5GMED LinkedIn account

- **Shared social media.** This refers to social media accounts that do not have the 5GMED name on them, but that nevertheless will be used to share relevant content; namely, partners owned social media. Partners and Mobile World Capital will use their own channels to promote the project.
- **Earned social media.** Refers to coverage achieved as a result of public, blogger and influencer relations efforts, for example online word of mouth, 'viral' tendencies, mentions, shares, reviews and reposts, etc. The supportive communities of 5GMED and other partners networks will help to spread the information published by the official accounts. Material such as PR and Interview toolkits shared with partners will contribute to it. Mentions and relevant hashtag will be used to increment the earned social media. For example, #mobility, #5G or #futuremobility.
- **Paid social media.** When speaking about paid social media, we refer to Twitter and LinkedIn ads. This means ads campaigns will be created in order to get more followers or spread specific messages to specific targets with specific calls to actions. For example, we could launch a LinkedIn InMail campaign in which LinkedIn users receive a message directly into their inbox and we could select the target based on 5G and mobility of LinkedIn. Another example could be Twitter ads with the call to action "Discover the future of mobility" or "Join the 5GMED community", where you can select your target based on demographics and location, interests and likes, job position, etc. This means that both LinkedIn and Twitter advertising allows to reach out to the right and most relevant target based on the filters selected. All the advertising campaigns will be optimised to get the highest number of conversions, and the results will be tracked to note the best

practices and strategies that work to attract the identified stakeholders in the European ecosystem.

Relevant accounts for the 5GMED project in Twitter and LinkedIn are the following: 5GPPP, 5GAA, CCAM, 5GRoutes, 5GBlueprint, 5GRail, 5GCroCo, 5GObservatory.

All the publications described will be gathered in a unique document that will be shared with the partners during **the dissemination and communication webinars**. During the whole project, toolkits will be created and shared with the partners for them to disseminate the participation in events. Some examples can be found on Annex I.

#### 4.1.7.1 Publication strategy on social media

Weekly publications about the project and other interesting deployments of 5G and cross-border corridors will be prepared and published:

- **General:**

Example of copy:

*The future mobility is the confluence between the deployment of a sustainable 5G ✨, Cooperative Connected and Automated Mobility 🚗 and Future Railway Mobile Communications System services 📶*  
5GMED.eu 🌐  
#5g #Horizon2020 #futuremobility



Figure 10 5GMED banner for general campaign

- **Impact:**

Example of copy:

🌐🚗📶 This is how @5GMED Project aims to bring a sustainable #5G deployment model for future mobility in the Mediterranean Cross-Border Corridor

Check our impact goals!

5GMED.eu

#CCAM #FRMCS #5G



Figure 11 5GMED banner for impact campaign

- **Methodology:**

Example of copy:

*This is how @5GMED Project aims to bring a sustainable 5G deployment model for future mobility in the Mediterranean Cross-Border Corridor*

*Check our technology objectives!*

*5GMED.eu*

*#AI #futuremobility #5G #Technology*



Figure 12 5GMED banner for methodology campaign

- **Website:**

Example of copy:

*Discover the future of mobility with @5GMED\_EU project by visiting our website. You are more than welcome!*

*5GMED.eu*

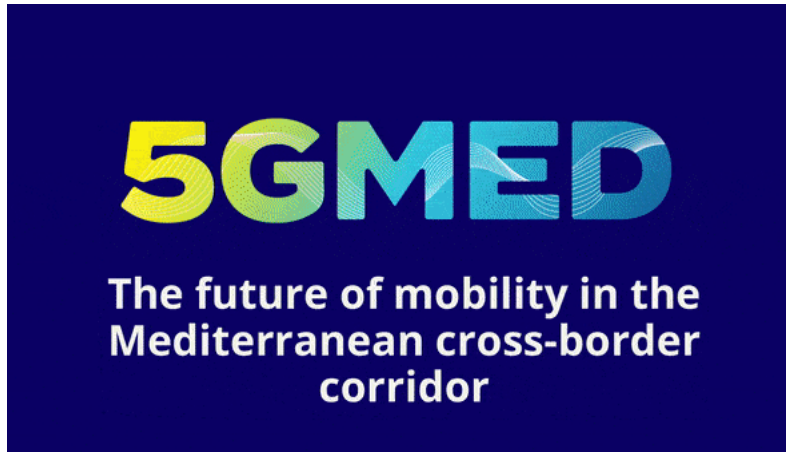




Figure 13 Screenshot of the gif that illustrates the website campaign

- **Newsletter:**

Example of copy:

 *The future of mobility looks promising*

 *Want to know more?*


*Read our last #newsletter*




Figure 14 Screenshot of the gif that illustrates the newsletter campaign


- **Event:**

Example of copy:

 *@5GMED will be presented during the @CambraTarragona virtual event: "La connectivitat 5G. Reptes i oportunitats per a la mobilitat del futur"*

*Join us!*

 *Tomorrow*

 *17.00*


*Register here* 





Figure 15 banner of event

- **Partners:**

Example of copy:

Meet our @5GMED\_EU partners: @8Bells\_research is an independent Research and Consulting company specializing in selected parts of Information and Communication Technologies

#partners #5G #Horizon2020  
 [5GMED.eu/about/](https://5GMED.eu/about/)



Figure 16 Example of a partner promotion banner

- **Use cases:**

Example of copy:

*Automated driving on highway can be safe, remote assistance is the key.*

Read more about use case – remote driving: [5GMED.eu/use-case-1/](https://5GMED.eu/use-case-1/)

#5G #remotedriving #usecase



Figure 17 Screenshot of the use case short video promotion

#### 4.1.7.2 Social media KPIs and metrics to monitor

Social media plays an important role in convincing the target stakeholders of the project’s relevance and keeping it “top of mind”. All social media accounts will be used to communicate news that are timely, relevant and interactive.

Social media presence is necessary to generate awareness of the project and maintain the perception of 5GMED as an authority and leader in the European ecosystem.

- 5GMED LinkedIn metrics

Several metrics of the LinkedIn 5GMED page will be analysed from the start of the Project, on the 1<sup>st</sup> of September 2020 to the 28<sup>th</sup> of February 2021.

Metric	Number
Posts	51
Followers	101
Engagements	390
Engagement rate per impression	6,6%
Clicks	165
Total impressions	5950
Posts clicks	165
Reactions	206
Shares	18

Table 7 Metrics from Hootsuite and Sprout Social - LinkedIn

- Twitter metrics

Several metrics of the Twitter account of 5GMED will be analysed from the start of the Project, on the 1<sup>st</sup> of September 2020 to the 28<sup>th</sup> of February 2021.

Metric	Number
Tweets	69
Followers	215
Engagements	221
Likes	133
Retweets	76
Replies	12

Table 8 Metrics from Hootsuite and Sprout Social - Twitter

#### 4.1.8 Newsletter

The newsletter will include news items about the project's activities and work, self-created blog articles, participation at events, call for papers, as well as news about the 5G mobility ecosystem (5GPPP, 5GAA, ICT-53 projects).

As an essential part of the program's lead generation strategy, the main goal of the newsletter is to increase awareness for the 5GMED project. The aim is to gather highlights and push out announcements of interest to all target stakeholders. The newsletter is elaborated with the help of all partners to ensure that the last sharable results can be spread to the 5GMED community and coordinated by FMWC.

A newsletter template specific for the 5GMED project was developed (M1). The newsletter structure is clear and simple, to reinforce the idea of the brand identity previously described. The design was made following the graphic guidelines prepared and has the 5GMED characteristics look and feel.

Considering the characteristics of the public audience and the nature of the 5GMED project, the newsletter will be quarterly (table 9). This would allow to maintain the balance between becoming a relevant presence for our target audience, but without becoming tedious. In case this strategy is not as successful as wished, we will consider alternative tools, such as the LinkedIn newsletter.

Newsletter number	Month of publication
1	April 2021
2	July 2021
3	October 2021
4	January 2021
5	April 2022
6	July 2022
7	October 2022
8	January 2023
9	April 2023
10	July 2023
11	October 2023

*Table 9 5GMED newsletter calendar*

To increase the number of newsletter subscribers and recipients list, social media publications will be creating by embedding a visible call-to-action button on the website, a social media campaign will be deployed via relevant content sharing, furthermore, the newsletter will de be shared as posts on social media channels.

The newsletter will be also available in the section [insights](#) of the website.



### 5GMED Newsletter | April 2021

**5GMED: The future of mobility in the Mediterranean cross-border corridor**



*Figure 18 5GMED Newsletter - January 2021*

Email and messaging targeting: partners will provide a list of contacts that will receive information about 5GMED. A list of contact points will be established. The project will design and execute a portfolio of templates fit to the specific target group, integrating call-to-action measures to increase traffic.

#### 4.1.9 Communication materials

5GMED is preparing the standard communication materials such as **Flyers, Posters, Testimonials, Stories**. These materials are created to disseminate information about the project's objectives and other relevant information. These communication toolkits are set up and delivered, containing all the information of each project milestone to facilitate its sharing between 5GMED partners.

The use of printed marketing materials is mainly focused on events attended by the project with the goal to engage and communicate to interested audiences the achievements of 5GMED. Environmental sustainability will be considered. All dissemination materials are labelled with the 5GMED logo, the consortium partners' logos, and the Horizon 2020 disclaimer. [A power point template](#) has been created to be used by partners for all presentations regarding 5GMED. Toolkits have been created and shared with the partners for them to have a prepared document in case of event participation.

Another material is one-pager with information about the project, a catalogue of the pilots and their outcomes. This document will be distributed in events, as well as flyers, that will be designed to share basic information about the project.

## 5. Dissemination plan

### 5.1 Dissemination activities and responsible partners

The specific dissemination activities carried out by partners will reinforce the 5GMED impacts increasing stakeholders' dialogue and acceptance:

**Telecom 5GMED partners:** RET, CFR, HSP, VDF:

- Joint dissemination with ongoing 5G CCAM cross-border projects and contribute to the 5GPPP landscape, activities, and events – **Key stakeholders: Mobility, Telecom, ICT, Research sectors.**
- To disseminate awareness of the project, the technical activities, values and advantages of the solutions developed in the project – **Key stakeholders: Public, Mobility, Telecom, ICT, Research, and general sectors.**

**Mobility 5GMED partners:** AAE, CMS, ISZU, SNCF, VLO, LFP:

- To disseminate awareness of the project, the technical activities, values and advantages of the solutions developed in the project – **Key stakeholders: Public, Mobility, Telecom, ICT, Research, and general sectors.**
- Participation in relevant events and fairs for the mobility ecosystem – **Key stakeholders: Public, Mobility, ICT, Research sectors.**

**ICT 5GMED partners:** 8BLS, ATC, ATOS, AXBY, NBC, Armines:

- Support a proactive online presence, dissemination about 5GMED outcomes in other innovation initiatives/associations, and also commercial oriented context – **Key stakeholders: Public, Mobility, Telecom, ICT sectors.**
- Disseminate portfolio of solutions and innovative developments of 5GMED among investor communities and business angels and venture capitalists – **Key stakeholders: Public, Mobility, Telecom, ICT, Research sectors.**
- Disseminate technical and scientific activities and outcomes through the publication of scientific peer-reviewed journals and in conference proceedings to broadcast its results and get feedback from the scientific and industry community – **Key stakeholders: Mobility, Telecom, ICT, Research sectors.**
- Joint dissemination with ongoing 5G CCAM cross-border projects and contribute to the 5GPPP landscape, activities, and events – **Key stakeholders: Mobility, Telecom, ICT, Research sectors.**

**Research 5GMED partners:** I2CAT, CTTC, IRT, VEDE:

- Disseminate technical and scientific activities and outcomes through the publication of scientific peer-reviewed journals and in conference proceedings to broadcast its results and get feedback from the scientific and industry community – **Key stakeholders: Mobility, Telecom, ICT, Research sectors.**
- Exchange and interaction with major open-source fora with a focus on platform for telco infrastructure frameworks – **Key targets: Open Networking Summit Europe, OpenStack Summit, Open Source Mano and/or ONAP events.**
- Joint dissemination with ongoing 5G CCAM cross-border projects and contribute to the 5GPPP landscape, activities and events – **Key stakeholders: Public, Mobility, Telecom, ICT, Research sectors.**

**Outreach partner:** FMWC:

- Dissemination of the project outcomes through privileged channels (e.g., **National 5G Observatory** linked to other European and global

initiatives) and global events (like **Mobile World Congress**) part of the FMWC mission driving the mobile and digital transformation of society while helping to improve people's lives globally. FMWC will link 5GMED to digital entrepreneurship initiatives, the rise of digital talent through industries, and reflection on society's impact. – **Key stakeholders: Public, Mobility, Telecom, ICT, General sectors**

### 5.1.1 Dissemination tools and channels

Globally, the same tools and channels will be used to disseminate the results of the project: website, videos, blog articles, flyers and brochures, events, social media, newsletter.

In addition, the project will publish its results in scientific journals and conferences and make visible the results through the publication of the public deliverables on the website. The scientific publications will be submitted to the Open Research Portal (e.g., Open Research Europe Portal) in order to contribute to maximize the value and impact, to make search results fully open access and to contribute to the acceleration of the progress of research. These publications will also be published on Zenodo, where a [5GMED Community](#) will be created to increase visibility.

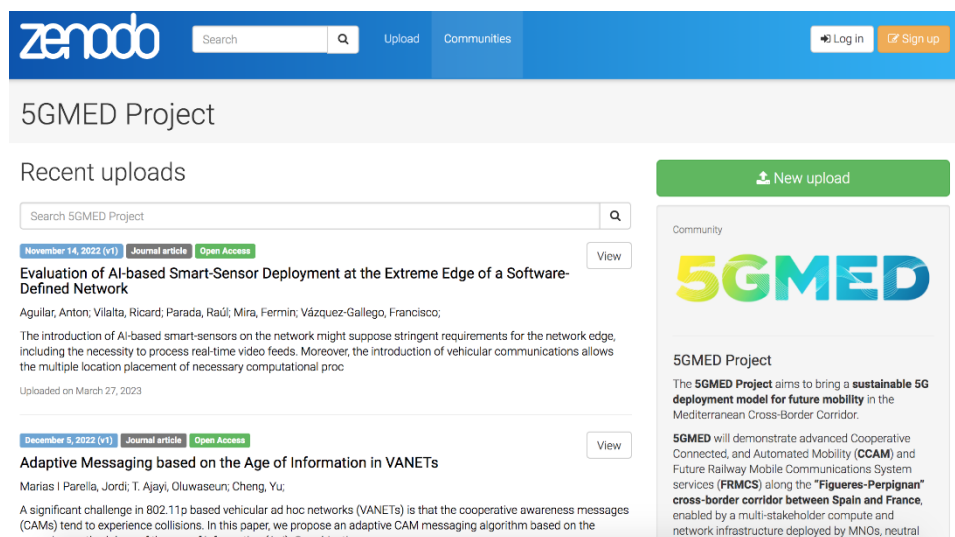


Figure 19 5GMED Zenodo Community

For each of the contents disseminated about the 5GMED project (events, articles, deliverables, scientific papers, etc.) a communication and dissemination toolkit will be created to share with 5GMED partners and the ICT-53 5GPPP projects. A standard toolkit contains the following:

- Brief introduction the objective of the toolkit and the materials included.
- Social media handles of the stakeholders involved to increase reach and engagement.
- Copies for Twitter and copies for LinkedIn, including mentions and hashtags.
- Banners, pictures or videos to share along with the copies.
- Contact data of Marjorie Grassler (FMWC) in case of questions or for more information.

Examples of these communication and dissemination toolkits can be found on Annex I.

#### 5.1.1.1 Research topics

During the project, the research partners will regularly meet to establish lines and topics of research as much as to prepare publications and to decide in which publication or

event to participate in. The innovation manager who leads the research within the 5GMED project will involve the partners by requesting them to contribute to the topics and propose scientific publication journals or events. The list of topics has been established by Innovation Coordinator I2CAT (table 7):

Topic	Partners	Possible event
<p>5GMED Automotive and Railways Use Cases in Cross-Border Scenarios</p> <ul style="list-style-type: none"> <li>• Overview of the 5GMED cross-border corridor</li> <li>• Overview of 5GMED use cases and KPIs</li> <li>• Why do we need 5G in all use cases? 5G features used?</li> <li>• Why do we need other radio technologies in 5GMED?</li> <li>• Architecture of the 5GMED Network and infrastructure</li> </ul>	I2CAT, IRT Saint Exupéry, CTTC	<p>Conference EUCNC 2022</p> <p><a href="https://www.eucnc.eu/authors/call-for-posters/">https://www.eucnc.eu/authors/call-for-posters/</a></p>
<p>5GMED Architecture for Advanced Automotive and Railway Communication Services in Cross-Border Scenarios</p>	I2CAT, CTTC, IRT Saint Exupéry, Cellnex, Hispasat, Vedecom,	Conference FNWF 2022
<ul style="list-style-type: none"> <li>• Challenges of cross-border scenarios for the deployment of CCAM services</li> <li>• Description of automotive use cases of 5GMED. For each use case: <ul style="list-style-type: none"> <li>○ Functional description of the use case</li> <li>○ Description of the service KPIs of the use case</li> <li>○ What is needed in the vehicles to implement the use case? Automotive requirements</li> <li>○ What is needed in the network and infrastructure to implement the use case? Network and infrastructure requirements</li> <li>○ Why do we need 5G to implement the use case?</li> </ul> </li> </ul>	I2CAT, CTTC, IRT Saint Exupéry, Cellnex, Hispasat, Vedecom, Autopista, Comsa	Journal TBD

<ul style="list-style-type: none"> <li>• Description of railways use cases/services of 5GMED. For each service:             <ul style="list-style-type: none"> <li>◦ Same as for automotive use cases</li> </ul> </li> <li>• 5G Network and Infrastructure proposed in 5GMED             <ul style="list-style-type: none"> <li>◦ Key enabling technologies</li> <li>◦ Overview of the 5GMED Network and Infrastructure</li> <li>◦ For each use case:                 <ul style="list-style-type: none"> <li>▪ List the key enabling technologies</li> <li>▪ Show the architecture of the use case and the allocation of its building blocks on the architecture of the 5GMED Network and Infrastructure</li> </ul> </li> </ul> </li> </ul>		
<p>5GMED Castellolí Trial Site for Connected and Automated Mobility Use Cases in Cross-border Scenarios</p> <ul style="list-style-type: none"> <li>• Castellolí trial site Infrastructure</li> <li>• Architecture of the Use Cases deployed on the Infrastructure of Castellolí trial site à high-level description of components in roadside infrastructure and Edge-Cloud backend services             <ul style="list-style-type: none"> <li>◦ UC2</li> <li>◦ UC4</li> </ul> </li> <li>• Vehicles used for each use case à high-level description of components needed in the vehicles of each use case             <ul style="list-style-type: none"> <li>◦ UC2</li> <li>◦ UC4</li> </ul> </li> <li>• Network Slicing and Service Orchestration</li> </ul>		<p>Conference</p>



<p>5GMED Paris Trial Site for Connected and Automated Mobility Use Cases in Cross-border Scenarios</p> <ul style="list-style-type: none"> <li>• Paris trial site Infrastructure</li> <li>• Architecture of the Use Cases deployed on the Infrastructure of Paris trial site à high-level description of components in roadside infrastructure and Edge-Cloud backend services <ul style="list-style-type: none"> <li>◦ UC1</li> <li>◦ UC2</li> </ul> </li> <li>• Vehicles used for each use case high-level description of components needed in the vehicles of each use case <ul style="list-style-type: none"> <li>◦ UC1</li> <li>◦ UC2</li> </ul> </li> <li>• Network Slicing and Service Orchestration</li> </ul>		Conference
The same for the railways small-scale testbed		Conference
Demonstration and performance evaluation of UC1 in 5G-Enabled cross-border scenarios		
Demonstration and performance evaluation of UC2 in 5G-Enabled cross-border scenarios		
Demonstration and performance evaluation of UC3 in 5G-Enabled cross-border scenarios		
Demonstration and performance evaluation of UC4 in 5G-Enabled cross-border scenarios		
TCUs developed for UC2: CTTC TCU, VEDECOM TCU, VALEO TCU	CTTC, Vedecom, Valeo	
ACS-Gateway developed for railways use cases	Axbryd	
Evaluation of AI-based Smart-Sensor Deployment at the Extreme Edge of a Software-Defined Network	CTTC, i2CAT	NFV-SDN'22
Sensors based on AI used in 5GMED railways use cases: LIDAR, audio and video	Comsa, I2CAT	
Satellite backhauling of mobile platform	IRT Saint Exupéry, Hispasat	TBD

Predictive QoS	IRT Saint Exupéry, Valeo	
eBPF HW acceleration (note: eBPF is the Linux SW framework used to implement the ACS-GW)	Axbryd	USENIX ATC '22
eBPF HW acceleration (note: eBPF is the Linux SW framework used to implement the ACS-GW)	Axbryd	USENIX NSDI '22
Cross-MNO service orchestration platform. Application in UC4: migration of services in the edge (reference <a href="#">here</a> )	NearByComputing, ATOS, CTTC, I2CAT	IEEE VTC 2023 ( <a href="#">Call for Papers - VTC2023-Spring (vtsociety.org)</a> )  EuCNC ( <a href="#">Call for Papers - EuCNC</a> )
Standardization Initiatives and Market Approaches in Edge Federation	NearByComputing	IEEE Conference on Standards for Communications and Networking
Interoperability between native V2X radio technologies (802.11p and LTE-PC5) and cellular V2X over a public 5G network using a MEC based architecture.	I2CAT	INFOCOM conference

Table 10 list of research topics

#### 5.1.1.2 Scientific publications activities

Scientific dissemination activities address **stakeholder target group e (see section 3)**, but also research groups in large companies and SMEs from the **target groups b, c, d (see section 3)**. The following table (Table 11 *Scientific dissemination publications/events*) lists the possible participation, talks and submission of papers in scientific conferences.

Participation, talks and submission of papers in scientific conferences	Partners
<b>Telecommunications:</b> Advanced Satellite Multimedia Systems Conference (ASMS), International Communications Satellite Systems Conference (ISSC), IEEE Communications Magazine, IEEE Access, IEEE Transactions on Network and Service Management; IEEE Wireless Communication Magazine, IEEE/ACM Transaction on Networking, Infocom, International Journal of Satellite Communications and Networking, EuCNC, ICTON	HSP, IRT, AXBY, I2CAT, CTTC, 8BLS
<b>Artificial Intelligence:</b> International Conference on Machine Learning, Conference on Artificial Intelligence, International Joint Conference on Artificial Intelligence (IJCAI), International Conference on Artificial and Statistics, Engineering Applications of Artificial Intelligence	IRT, I2CAT
<b>Intelligent Transport Systems (ITS):</b> IEEE Transactions on Intelligent Transportation Systems journal; IEEE Transactions on Vehicular Technology; IEEE Vehicular Technology Magazine	VEDE, 8BLS, i2CAT

Table 11 Scientific dissemination publications/events

The dissemination strategy of scientific publication and events focuses on:

- Publishing all the scientific papers on the 5GMED website under its corresponding section on its own page: Results & Publications > Scientific Papers.
- Creating a 5GMED Community on Zenodo to publish in this platform all the 5GMED scientific papers.
- Publishing the scientific events and its chronicles on the Events section of the 5GMED website (including Industry Events and Scientific Events sub-sections).
- Sharing both the papers and the events on the 5GMED monthly newsletter according to calendar.
- Creating communication and dissemination toolkits to share these contents on 5GMED social media (Twitter and LinkedIn) in several formats: articles, interviews and YouTube videos. Examples of these toolkits can be found on Annex I.

## 5.2 Dissemination of public deliverables

The last results of the project will also be available through the publication of the 25 public deliverables uploaded on the website. Each of these represents an opportunity to share early results. Private deliverables will only be summarised.

The public deliverables are listed below:

#	Deliverable name	WP	Lead	Type	Level	Due
D2.1	Definition of 5GMED use cases	2	IRT	R	PU	M04
D2.2	Initial definition of 5GMED test cases, deployment options and tools	2	VEDE	R	PU	M08
D3.1	Analysis of 5GMED infrastructure requirements and 5G HO between networks & cross-border	3	VDF	R	PU	M08
D3.2	5GMED ICT architecture and initial design	3	RET	R	PU	M11
D3.3	First release of 5GMED ICT infrastructure	3	VEDE	R	PU	M20
D3.4	Final release of 5GMED ICT infrastructure	3	NBC	R	PU	M32
D4.1	Requirements and initial design for Automotive test cases	4	ATOS	R	PU	M08
D4.2	Initial apps for Automotive test cases	4	VLO	R	PU	M11
D4.3	Pre-integration apps for Automotive test cases	4	AAE	R	PU	M22
D4.4	Final apps for Automotive test cases	4	AAE	R	PU	M32
D5.1	Railways application requirement analysis report	5	CMS	R	PU	M08
D5.2	Initial design for FRMCS and railways infotainment test cases	5	SNCF	R	PU	M11
D5.3	Pre-integration for FRMCS and railways infotainment test cases	5	IRT	R	PU	M24
D5.4	Final implementation for FRMCS and railways infotainment test cases	5	ATOS	R	PU	M32
D6.1	Test case definitions for the small scale testbed	6	VEDE	R	PU	M20
D6.2	Integration and validation of use cases in small scale testbed	6	CMS	R	PU	M27
D6.3	Test case definitions for the cross-border trials	6	RET	R	PU	M32
D6.4	Integration and validation of use cases in cross-border corridors	6	AAE	R	PU	M36
D7.1	Cross-border market viability and market analysis	7	RET	R	PU	M18
D7.2	Business models and replication plans	7	8BLS	R	PU	M30
D7.3	Policies, regulations, and standardisation for 5G CAM deployment	7	I2CAT	R	PU	M36
D8.1	Project website	8	FMWC	SW	PU	M01
D8.2	Impact Maximization Plan	8	FMWC	R	PU	M06
D8.3	First Impact Report and Plan Update	8	FMWC	R	PU	M18
D8.4	Final Impact Report	8	FMWC	R	PU	M36

Table 12 List of the public deliverables

Following the strategy to disseminate scientific publication activities, 5GMED deliverables will be disseminated as follows:

- Publishing all the public deliverables on the 5GMED website under its own section: Results & Publications > Deliverables.
- Sharing the deliverables on the 5GMED monthly newsletter according to calendar.
- Creating communication and dissemination toolkits to share the deliverables on 5GMED social media (Twitter and LinkedIn).

The coordination and follow up of the 5GMED deliverables dissemination campaign will be implemented through an [excel document](#) – it is an internal work in progress document.



Figure 20. Example of deliverables dissemination on social media (Twitter)

### 5.3. Field trials and showcases

- Field trials

The project will have access to four small scale testing facilities that will be a key asset to perform an initial integration and validation of the use cases before going for the final validation in the cross-border corridor.

- Circuit ParcMotor in Castellolí (Catalunya, Spain),
- Paris Circuit: Satory and the UTAC/CERAM (Paris, France),
- LFP's maintenance site (Spain) .

The results for the use cases will be disseminated through four videos, one for each case. A social media strategy will be deployed to share the results.

- Demo trials in Circuit ParcMotor in Castellolí and LFP's maintenance site (Spain).

Planification of trials will be coordinated by Work Package 6 leader Vedecom and the logistic ensured by Cellnex. FMWC will help with the communication and dissemination.

After the trial planned for February 2023, the results will be disseminated through 1 video resume, interviews to the partners (use cases owner), +1 video per use case, 1 press release, +1 scientific article, and +5 panels at major events and +20 demo presentations.

This information will also be accessible on the 5GMED website section About > Methodology > Test Sites and About > Use Cases.



Figure 21. 5GMED website sub-sections Test Sites and Use Cases

An example of how these field trials and showcases will be disseminated can be the Demo Days 2023 campaign, in which the following activities are considered:

- Publication of chronicle article: [5GMED proves connectivity beyond limits in mobility cross-border scenarios with 5G](#).
- Publication of YouTube video: [5GMED Small Scale Pilot's Demonstrations](#).
- Publication 5GMED partners video interviews on YouTube and social media (Twitter and LinkedIn).
- Publication of these contents on the 5GMED newsletter.
- Creation of the social media toolkit "5GMED Demo Days 2023 Social Media Toolkit" gathering all these materials to be shared with the 5GMED partners to increase the dissemination channels of this activity and improve its reach to impact the 5GMED audience and stakeholders. This toolkit can be found on the Annex I of the present document.

Organisation of final demo presentation will be coordinated by Work Package 6 leader Vedecom, and the logistic ensured by Cellnex.

### 5.3 Liaison activities

Liaison activities corresponding to Task 8.2 are intended to align 5GMED activities and progress with ongoing activities in CCAM and 5GPPP. These liaison activities will focus in three main pillars: 5GPPP Working Groups (WG) and CCAM platforms, 5G-cross border corridor projects, and other European associations and bodies related to 5G activity. For all three pillars, a concrete list of initiatives and actions are given below.

#### **Pillar 1: 5GPPP Working Groups and CCAM platforms**

##### *A) Initial assessment of relevant WG and platforms*

5GMED partners are expected to participate in a wide range of WGs, ranging from technically-oriented ones to more business and policy related ones. In order to obtain an accurate representation of which WG is relevant to which partner, and initial assessment will be carried out in the form of a questionnaire to be filled by all partners. This questionnaire will address the following questions:

1. Whether the partner is already participating in any specific WG/platform or is willing to participate in one(s), and which one(s)
2. The contact person(s) involved in such participation
3. The level of involvement (full/active participation or just follower)
4. The nature of the activities of the WG (technical, business, policy/regulation, standardization)
5. The bidirectional impact of this participation (the contributions from the partner towards this WG and the potential outcomes from this participation for 5GMED)
6. Additional involvement in (i) any other European association/body related to 5G and (ii) other relevant 5G projects

The results of such questionnaire will be used to create an ecosystem map, with a clear link between each partner and the 5GPPP WG and CCAM platforms.

##### *B) 5GMED impact committee and communication channels*

After this ecosystem map is created, a 5GMED impact committee will be constituted, formed by all three WP8 task leaders to monitor the ecosystem activity. The committee will actively follow up on the main progress of the identified WGs and platforms by establishing recurring meetings with the contact persons involved in these platforms every 3 months.

The ecosystem map is expected to be a living document, updated after these recurring meetings. The update will focus on the progress done by each partner and the main outcomes that are relevant to 5GMED activities.

This ecosystem map and the activity updates will be available to all partners via a shared folder. Additionally, this shared folder will centralise all communication, events, papers, publications and liaisons activities.

##### *C) Identification of relevant contributions and potential activities*

After every progress report and ecosystem update, the most relevant activities and contributions will be identified. The impact committee will propose dissemination and further liaison activities in the form of workshops, events and white papers executed via these 5GPPP WG and CCAM platforms where the partners would contribute. These will be focused on the four main areas described above: technical, business, policy/regulation and standardization.

Note that this will be an active follow up task, where the impact committee will be responsible for detecting the most relevant activities and will coordinate the relevant 5GMED partners and WP leaders to ensure that 5GMED extends its contribution on the identified ecosystem.

## **Pillar 2: 5G cross-border corridor projects**

### *A) European 5G cross-border task force*

The 5GMED impact committee will coordinate the creation of a European 5G cross-border task force, formed by dissemination representatives of all ICT-53 projects: 5GMED, 5GBlueprint, 5GRoutes and 5GRail.

This task force will meet every three months in order to establish a calendar of joint events and dissemination activities. Additionally, a shared folder will be created where the meeting minutes and calendar planning will be saved, along with joint templates for dissemination material: banners, visuals, social media posts, etc. These templates will be used to create a joint dissemination campaign for all events where the task force will be attending. Finally, the ecosystem map created in the previous pillar will also be available to the rest of the partners of the task force, and it is expected that they will also provide their own ecosystem map, so the task force can analyse the potential reach of the joint contributions.

### *B) Events calendar and joint activities*

The European 5G cross-border task force will coordinate the joint participation of the four projects in workshops, events and publications, addressing the four areas of technical, business, policy/regulation and standardization activities.

The following initiatives are targeted:

1. Online webinars: in order to maximize the impact of the joint initiatives, a set of online webinars will be planned, where best practices / common issues and results will be shared. These webinars will be short and will be set before a conference / event where the ICT-53 projects will participate, in order to introduce the potential audience to the topics that will be discussed and to serve as promotional material for these events. These webinars will be later on stored in each project website and available as video on demand.
2. Joint workshops & booths: the core of the activities will be the coordination of joint workshops and booths at selected conferences and fora. The workshops will have at least the representation of each ICT-53 project, but will try to involve further related projects (such as ICT-18). A calendar will be developed by the task force, but tentative events include the following ones (as a rule of thumb, at least two scientific congresses and two industrial congresses will be targeted by the task force):

- a. Mobile World Congress – Workshops on policies and regulation & business models
  - b. ITS European Congress – Joint booth and workshops on technical results obtained and lessons learned in the deployment of 5G cross-border corridors
  - c. EuCNC – Joint booth and workshops on best practices and current issues in the deployment of 5G cross-border corridors
  - d. INFOCOM – workshops on future steps in the deployment of 5G cross-border corridors
  - e. TRAcference – workshops on technical results and roadmaps for deploying 5G cross-border corridors
3. Joint publications: the task force will coordinate the preparation of joint publications, in the form of both technical papers (potentially in the same conferences where the joint workshops will be organized) and white papers. The target will be one technical joint paper at a conference and one white paper per year.

### Pillar 3: Other relevant projects and associations/bodies

Based on the initial questionnaire filled in by the partners and the ecosystem map, the 5GMED impact committee will also identify other relevant projects and associations where joint activities could be coordinated, in the form of workshops or publication of white papers.

A tentative list of such projects and associations is given below:

1. Projects: Target-x, Podium, Artus, Creta, IN2CCAM, In-Move, MODI Project
2. Associations / bodies: 6G-IA (telco), one6G (telco), 5GAA (automotive), ACEA (automotive), ERTRAC (road transport), ERTICO (road operator), UIC (rail)

Note that the impact committee will follow up reactively to these initiatives, identifying the most relevant contributions when they occur but will not actively pursue collaborations among these actors during the recurring follow up meetings.

For the monitoring and reporting of Tasks 8.1. *Dissemination and Outreach* and 8.2 *Liaison activities with 5GPPP and CCAM platforms and fora*, a reporting tool has been created. Every month the partners are requested to fill in information about different communication and dissemination activities, such as:

- a. **Press clippings** reached by their entities' communication departments: magazines and newspaper name, date, country, and link of the news item featuring 5GMED.
- b. The **scientific and industry events** the partners have attended: dates of the event, name, location, link and proof of activity (pictures, presentation).
- c. Papers written by partners in **scientific publications**.
- d. The **5GPPP (SNS) and CCAM participation** of partners in Working Groups or meetings.



## 6. Exploitation plan

### 6.1 Mission

The 5GMED consortium comprises industrial and scientific partners who combine their efforts to develop innovative Cooperative, Connected and Automated Mobility (CCAM) services bridging the 5G roaming issues at the Spain-France borders. The main objective is to create innovative wireless services viable for commercial use, leveraging the 5G network capabilities. 5GMED actions aim to support the digitalisation of automated driving, road and rail infrastructure and combining safety and commercial exploitation. While 5G services have been growing steadily in urban and non-urban areas, they face critical limitations in uninterrupted operation in cross-border areas of countries due to roaming issues.

The impact on commercial exploitation of these services is remarkable as the 5G network disruptions influence the reliability and safety, prerequisites for human-centric services. The mission of 5GMED is to develop all the necessary technological solutions for the cross-border transparent use of the 5G connectivity, highlighting business exploitation opportunities. It is noted that several EU projects (5G CARMEN, 5G MOBIX, etc.) have dealt with relevant cross-border 5G coverage issues. However, 5GMED is the only one (so far) that combines cross-border 5G services on highways (cars) and railways (high-speed trains), covering the special specifications and use cases of both sectors in a common architecture. While this venture increases the technological challenge, it also increases the exploitability and added value of the developing solution, expanding the potential commercial uses.

### 6.2 Business exploitation

In the current subsection, we will outline the main axes of the 5GMED exploitation strategy.

Two main approaches will be followed: 1) The vertical approach is based on the 5G market structure, and 2) the horizontal one on collaborations between potential stakeholders. Considering that an exploitation plan must investigate any possible profitable scenario, we conclude on these approaches by following in the first case a straight-forward path based on how the 5G market usually works, and in the second case, more flexible collaboration schemes that could be profitable for special conditions, such as the cross-border 5G covering.

#### 6.2.1 Vertical Approach

Figure 22 illustrates the vertical exploitation scheme as it emerges based on the existing 5G market structure. In this approach, stakeholders start from the inner layers by creating collaborative schemes with partners in the outer layers. In the following paragraphs, we briefly outline the stakeholders' interests and objectives for each layer and how they act on market opportunities.

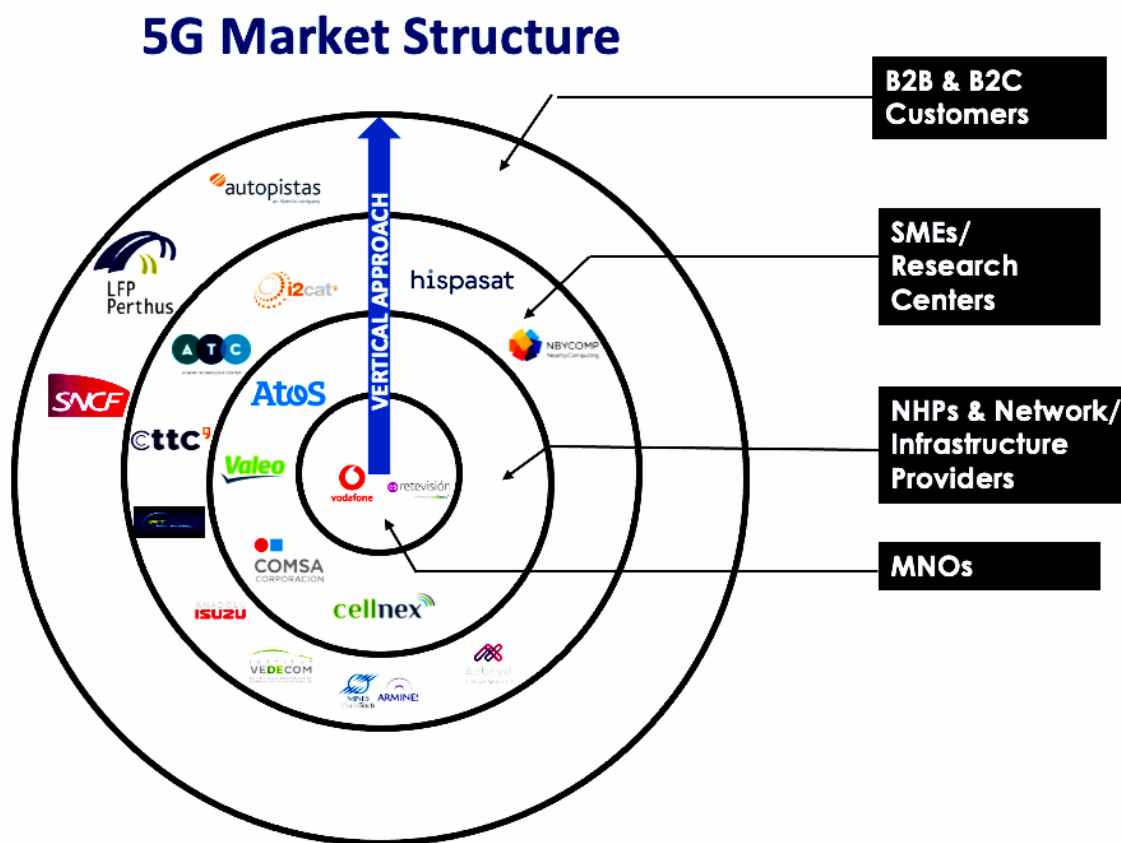


Figure 22 Vertical Exploitation Scheme

6.2.1.1 MNOs

MNOs, as the main stakeholders of the 5G services, are at the core of the exploitation scheme. The MNOs are motivated to deploy new innovative solutions that extend existing services or increase their reliability and effectiveness. They aim to provide end-to-end solutions, incorporating state-of-the-art technologies in ready-to-market platforms or services eliminating the technological risk either for business (B2B) customers or for service (B2C) consumers. The MNOs face high competition and seek to increase their market share by incorporating solutions that will provide them with a dominant position in the future 5G market. At the same time, they do not exclude cooperation with other MNOs in special cases, sharing the operating costs and technological risks. In the context of the exploitation plan of 5GMED, every potential business scheme that can be proved profitable from a techno-economic perspective will be examined, even investigating such collaborations.

6.2.1.2 NHPs & Network/Infrastructure Providers

The second layer is the neutral host providers (NHPs) and the network and infrastructure providers (NIPs). They play a key role in building the 5G network infrastructure, the equipment installation and the follow-up support of the 5G services. In practice, the NHPs and NIPs deploy, test, evaluate and maintain the involved equipment and services. They greatly influence the main operational and infrastructure costs for the techno-economic analysis of any business model.

### 6.2.1.3 SMEs/Research Centers

The third layer of the exploitation scheme is the companies that deploy 5G innovative solutions (platforms, software, sophisticated equipment, etc.) that import a new functionality/service or improve the operation characteristics of the existing ones or reduce the operating cost. This category includes innovative start-ups, SMEs and big companies that deploy sophisticated equipment or software for 5G applications. Additionally, research institutes or non-profitable research centres that contribute to the deployment of such solutions without developing end-user products are also included. The main idea is that the stakeholders from the previous layers (MNOs, NHPs etc) will explore for solutions in this layer that will make their services more functional, efficient, flexible and cost-effective.

### 6.2.1.4 B2B & B2C Customers

All the previous layers aim to produce solutions at the requirements of the final layer that represents the business (B2B) customers and customer consumers (B2C). In the context of the 5GMED project the Road and the Rail Operators are the key players in this layer. The provided services could be even for internal operational needs like surveillance, optimization of the traffic flow in highways etc., or services to third parties as end-customers such as reliable connectivity for automated vehicles in highways, high bandwidth connectivity for streaming application at end-users, etc. The end-user customers represent the last layer of the exploitation scheme.

## 6.2.2 Horizontal Approach

The horizontal approach of the exploitation plan includes business collaborations that could be profitable regardless of market structure. In a potential business model, the key is who is running the business. The main objective of the key player is to ensure the largest benefits in terms of market share, intellectual property (IP) rights and know-how of the developing services/products. This could be challenging for several partners to collaborate and agree on in a business deal. For example, innovative SMEs or start-ups with non-remarkable market share and mature products but with potentially high-value technological solutions could be reluctant to commit their IP to an agreement without considering the future added value of their products. On the other hand, evaluating such innovative solutions without real market data is difficult and easily challenged by other partners.

Thus, the aforementioned vertical approach involving partners from all market layers could be non-viable, as the profit margins for each partner vary due to the business case and business agreement. For example, a large organization such as an MNO or NHP could claim such a large share of business benefits that it could discourage other players from participating. However, a venture's complexity and technological risk could lead key stakeholders to combine their efforts and share the benefits.

### 6.2.2.1 1st Business Scheme: MNOs and NHPs

The first business scheme that will be investigated is between the MNOs and the NHPs as main stakeholders with the highway and rail operators. In such a scheme, MNOs are reasonably the key actors motivated to direct and coordinate such a business. The MNOs are, in most cases, big organizations with B2B and B2C customers on a national and multinational basis. This means that any deployed solution can easily be scaled to many markets which MNOs have already penetrated. MNOs can also estimate the potential benefits and profit margins by having customers. This is very critical because the development cost could be prohibitive for a specific use case or limited area, but due to the ability of the MNOs to use a service widely, this could change the entire business perspective. For example, the design and the development costs of a cross-border 5G roaming solution for an area where the vehicle and train passengers are very limited could not be justified by the expected revenues. However, if this solution was applied as a complete cross-border service including other high-traffic border areas where

MNOs already have access without the need for additional development costs, this could change the techno-economic data. Thus, the first investigated business scheme is a partnership between an MNO and an NHP.

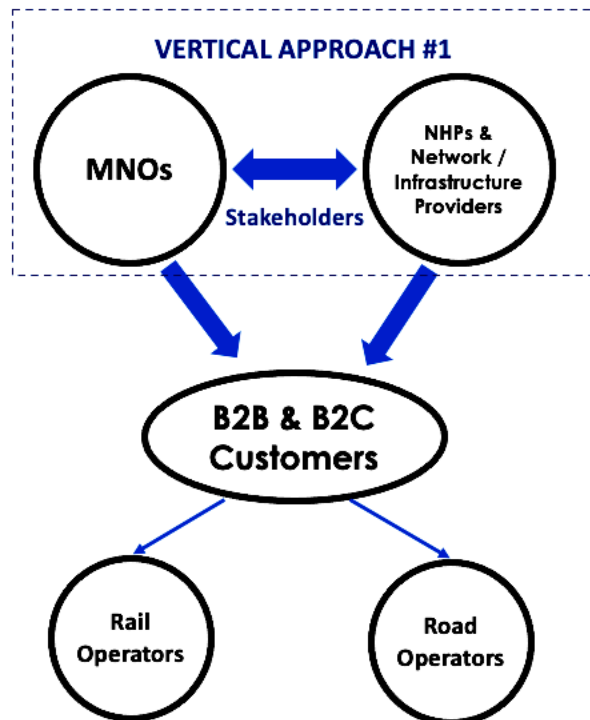


Figure 23 Vertical Exploitation - Business Scheme #1

The NHP will establish the network infrastructure, including the necessary hardware and software components and follow-up support services in the cross-border area, providing transparent network 5G services to road and rail operators. The key to such a scheme is that the MNO has already an established network in the area of interest. Thus, the necessary internet speed and physical access to base stations can be easily ensured, reducing installation costs and avoiding time-consuming legal procedures for binding areas of interest. Additionally, if the MNO servers at the border of both neighbour countries facilitate the synchronization of the equipment, for example, the installation of the appropriate network orchestrator, for the transparent use of the 5G network in both border areas. At the same time, potential issues regarding the use of spectrum areas are resolved, as the MNO already respects each country's rules individually.

Even if an MNO does not physically broadcast in both neighbouring countries, collaborations with other MNOs of the other country are very common since they are not direct competitors, and such collaborations extend their markets. In summary, the launch of such a business by an MNO, in addition to market penetration benefits, facilitates technical and regulatory issues that would otherwise require time and cost. Thus, the most reasonable scenario is a MNO to take advantage of all these benefits in partnership with an NHP with the necessary 5G network infrastructure and know-how and develop the necessary services for potential customers that in our case are the rail and road operators.

In the case of rail operators, for example, the provided service could be the connectivity support of the surveillance infrastructure that detects dangerous objects on train tracks. Alternatively, it could be the serve of the train passengers, who could also be existing customers of the MNO via cellular mobile devices. So, from the MNOs' point of view, this can be translated into reliable use of its 5G network from their customers on onboard high-speed

trains in cross-border areas. From the rail operators' point of view this could be the providing of high-bandwidth internet access to their customers at the cross-border areas. Both scenarios can be investigated in the context of such a business and be included in the final exploitation agreement between MNOs and rail operators.

Respectively similar agreements could also exist with the road operators, considering services that aim to the road infrastructure support or to the vehicle passengers of the highways.

However, in the case of road operators, it exists meter of the rapidly growing market of automated driving, which is expected to become a dominant market in the next decade. Automated driving is of particular interest to both MNOs and road operators. For the MNOs, it opens a new prospect for agreements with the automotive industry, having the most extensive networks that could support the operation of automated driving nationally and internationally. For the road operators, considering that automated driving will become a reality and it is closely correlated with transport safety, they will probably be forced to provide the necessary network reliability and availability in the area of their responsibility. Special attention will be paid to the techno-economic impact analysis of automated driving in this context.

#### 6.2.2.2 2nd Business Scheme: NHPs and Network Infrastructure Providers

In the second business scheme NHPs and Network Infrastructure Providers (NIPs) have the leading business role. Establishing and maintaining the network infrastructure for the MNOs could be profitable for them to deploy the necessary 5G network roaming configurations for cross-border areas, providing a ready-to-market solution. This solution could be potentially used by any MNO or any business customer with special interest in the transparent 5G network services in both sides of the borders, like rail and road operators. In the context of this scheme the scope is the NHPs/NIPs is to deploy an integrated solution that can be easily customized in the needs of each use case.

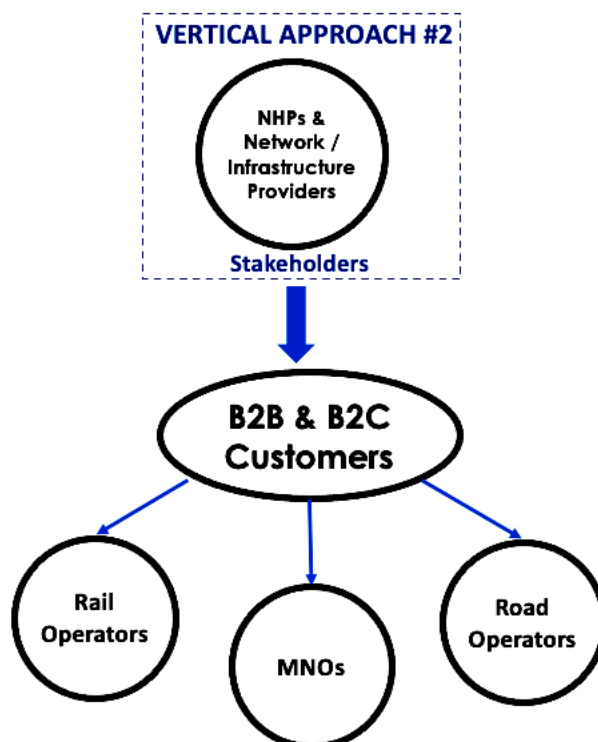


Figure 24 Vertical Exploitation - Business Scheme #2

Acting autonomously, they need to overcome the regulation issues regarding the use of the spectrum areas in several countries, in combination with the network roaming arbitration issues for the transparent use of the 5G network in the cross-border areas. In the case of the non-MNOs customers, it is also included the issue of the necessary internet access. The estimation of the deployment cost and the operating cost of such a venture is a critical parameter. In this direction, potential collaborations with innovative companies/start-ups that provide cost efficient and flexible services that facilitate the solving of technical issues, and reduce the technological risk, could be profitable. In this context, the trade-offs benefit-cost could be part of a contract agreement in such partnerships.

6.2.2.3 3rd Business Scheme: Road and Rail operators

In the current business scheme, the two main business customers (rail and road operators) act autonomously to deploy their own custom cross-border 5G network to serve their needs. In both cases it is needed the contribution of at least an NHP/NIP that will establish and maintain the necessary infrastructure. Due to special needs, for example, to connect trains to the 5G network in tunnels, special equipment providers as contractors could be required.

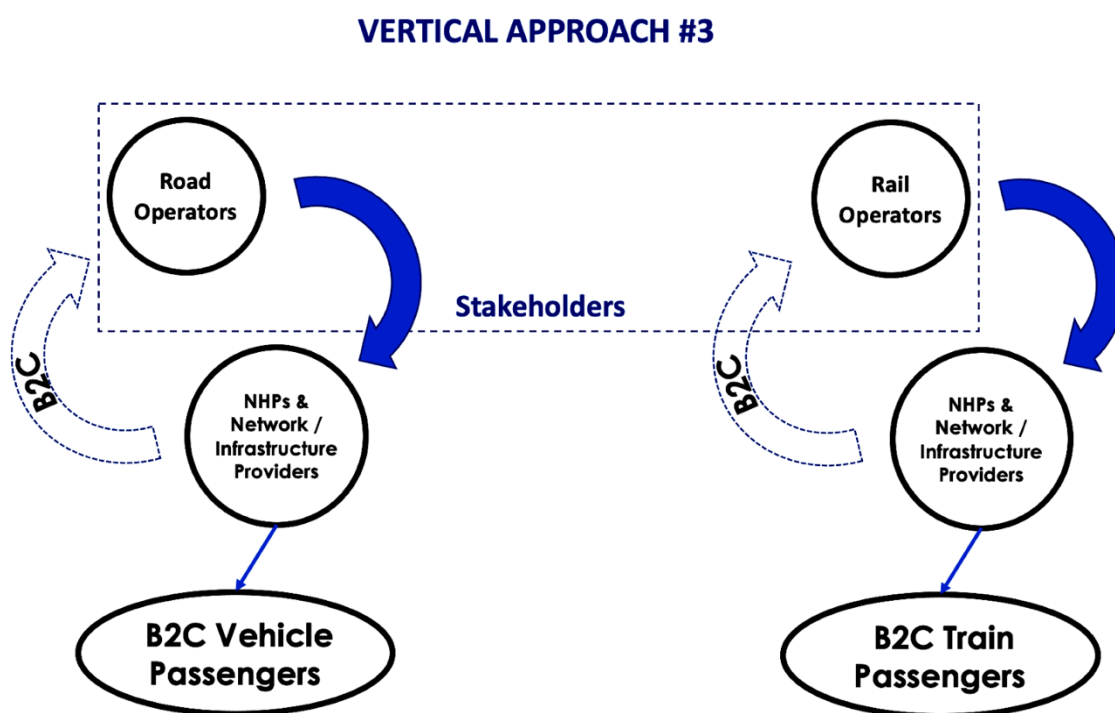


Figure 25 Vertical Exploitation - Business Scheme #3

Such business cases are viable when a major customer cannot cover its special requirements by existing solutions, or the cost of the existing solutions is too high. From a technical perspective, these two business schemes are high correlated with the previous one (2nd business scheme), as an NHP/NIP undertakes to solve all the technical and the spectrum regulations issues. The interesting point from a techno-economic perspective is when, or under which conditions, it is worthwhile the rail and road operators to develop their own cross-border 5G network acting autonomously to deal their needs and the needs of their customers.

## 6.3 Exploitation Plan and Use Cases

In the context of 5GMED, four use case demonstrations have been scheduled as technological proof-of-concepts of the cross-border 5G network constant availability transparent to the network transitions under real conditions. These demonstrations represent development milestones critical to the exploitation plan where each partner contributes based on their role.

From the technical perspective, the demonstrations provide valuable information about the operation characteristics and the cost analysis of the developing services for the aforementioned business models. Thus, the demos will be exploited as MVPs in the deployment of the final business model in D7.2 utilizing the evaluation data from the field in respect with the equipment cost, the operation cost, the reliability of the network in special geographical conditions and the technological risk. Below, we briefly describe each use case demonstration and the expected results that will be exploited, in the context of the technoeconomic analysis.

Apart from this, our intentions are also to highlight the technological innovation by disseminating these results in scientific conferences, journals and forums. More precisely, valuable know-how and exploitable results for all the involved partners, the scientific community, the industrial world and, ultimately, the general public that will be affected by the deployment of effective and secure Cooperative, Connected and Automated Mobility (CCAM) services, are in the priorities of the exportation plan.

### 6.3.1 Use case #1 – Automated driving

Automated driving is one of the most important emerging markets targeted by 5GMED services. The safety is the key for the exploitation of the automated driving benefits. In this direction, the first use case (UC1) demonstrates several services that permit the fully automated driving outside the conventional conditions that an autonomous vehicle is designed to operate. The objective of the UC1 is to ensure the safe recovery from a few emergencies unpredictably conditions.

#### 6.3.1.1 Deployed services

More precisely, the following services will be evaluated:

- Minimum Risk Manoeuvre (MRM): Autonomous vehicle broadcasts an alert and execute a safety MRM.
- Request for Remote Assistance (RRA): The vehicle contacts the Teleoperation Cloud (VTC) for assistance.
- Teleoperation Manoeuvre (ToD/TM): A remote driver operates the vehicle from a remote station.

The combination of the three aforementioned services provides a safe way out from emergency situations that can be occurred in a vehicle at the road. Thus, in such situation the involved vehicle executes an MRM to avoid instantly the danger. After that, it sends an RRA and a remote driver teleoperates (ToD/TM) the vehicle in a safe place. Figure 26 outlines such a scenario.

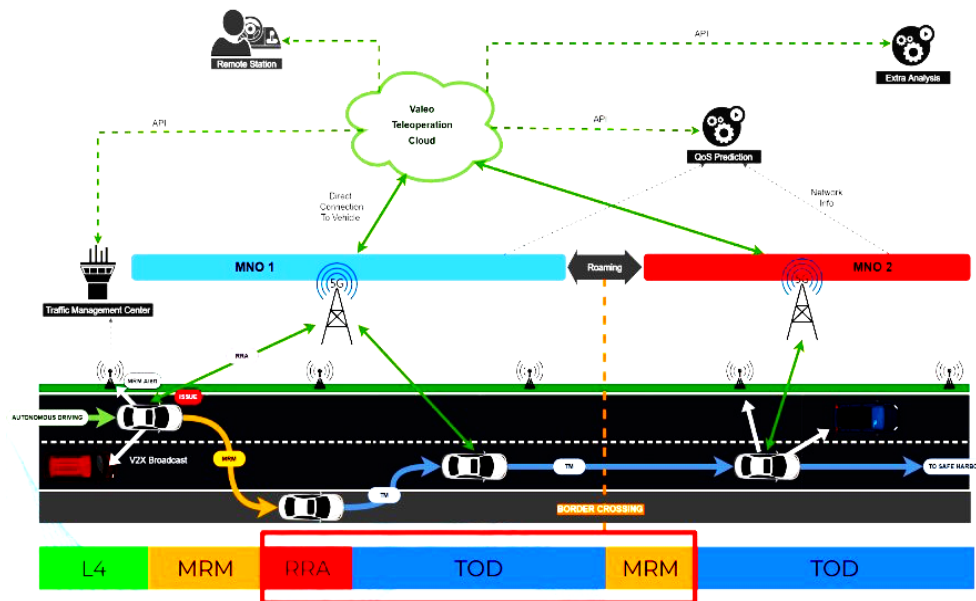


Figure 26 Use Case #1 – Operational Scenarios

### 6.3.1.2 Technological challenges

The technical objectives are the response times for the activation and the execution of the aforementioned services to be short enough relative to the vehicle speed to be considered safe reactions (more details in D2.1). The key issue here is to apply these emergency scenarios to cross-border conditions. This means that the MRM will be activated on one side of the border and the teleoperation will lead the vehicle in a safe place on the other side of the borders. The challenge here is that the deployed solution that will enable the automatic 5G network roaming during the crossing of the borders will not violate the safety timing margins for the stable teleoperation of the vehicle. Thus, even at the network transition instants, the requirements regarding network throughput and latency will be met.

### 6.3.1.3 Expected exploitable results

From a technical perspective, UC1 will produce valuable conclusions about the feasibility of automatic 5G network roaming in neighbouring countries without degradation of the provided quality of service (QoS). The developing solution presupposes the combination of 5G network technologies in a common architecture and the exploitation of specific equipment, the optimal configuration of which is an open issue for the effective development of Cooperative, Connected and Automated Mobility (CCAM) services. These results are expected to be published in the scientific community.

From a techno-economic point of view, it is critical to estimate the cost of developing and operating such a solution. The first estimations will cover equipment and operating costs, including small-scale third-party service costs, as predicted by UC1 trials. In this context, an evaluation of each partner contribution in the development of the solution and the final costs will be implemented. A detailed description by each partner of its involvement and possible claims for its contribution could be an early stage for a possible commercial agreement. Finally, the aforementioned costs will be adjusted on a larger scale based on the projections of automated driving in the coming years at the borders of EU countries, and especially, at the borders of Spain-France. This cost modelling will be the guide for the analysis of the aforementioned business models.



### 6.3.2 Use case #2 - Digitalization of the Road Infrastructure

The digitalization of the road infrastructure that permits the traffic flow management, the handling of emergency conditions and the supporting of the automated driving in highways is the objective of the second use case demonstration (UC2). The aim is to deploy several services in local road level using Multi-access Edge Computing (MEC) stations for direct responses in nearby emergency situations and in wide-area level taking actions from a Central Traffic Management (TMC) observing a large part or the whole highway.

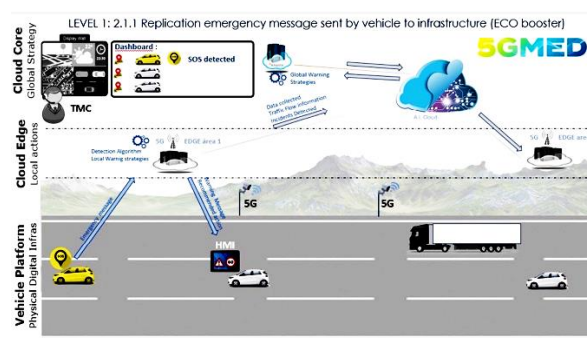
#### 6.3.2.1 Deployed services

Three services will be evaluated in UC2:

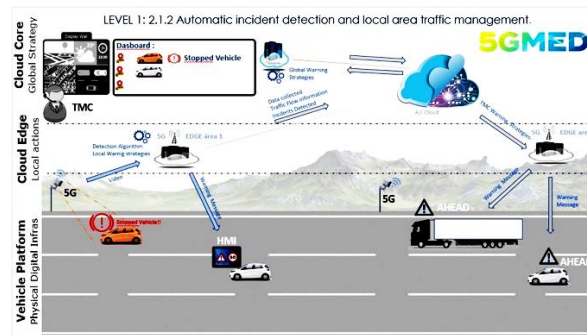
- Relay of emergency messages sent by the vehicle to edge infrastructure: A connected vehicle detects hazards, warning messages sent to the TMC edge through the V2X gateway, TMC edge generates a local traffic strategy and sends it to connected vehicles.
- Automatic incident detection and local area traffic management: Surveillant camera detects an incident analysing locally the video data and TMC edge generates a local traffic strategy, sending warning messages at the approaching vehicles.
- Flow regulation by using a selected group of CAVs: Surveillant camera detects an incident analysing the video data by a centralised TMC that generates emergency regulation rules that are sent to groups of CAV and connected vehicles as recommendations.

Figure 27 depicts the three services.

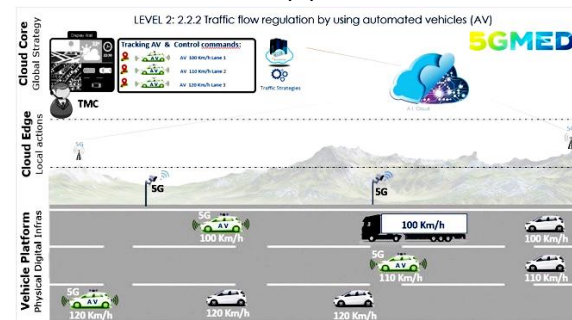
The primary objective is ensuring a direct response to a locally detected danger, propagating warning messages to the approaching vehicles. For safety reasons, this has to be done in a minimum time exploiting the local-edge road computation resources. At the same time, to absorb the consequences of the detected incident in the whole traffic flow, an emergency traffic rule is sent to a specific group of connected vehicles while the unconnected vehicles imitate the guided group.



(a)



(b)



(c)

Figure 27 Use Case #2 – Operational Scenarios

### 6.3.2.2 Technological challenges

The technological challenges in the UC2 are related with the interoperability of monitoring equipment on the road and in CAV vehicles, sensing emergency situations in real time. This is translated to tight time constraints about the event detection and the corresponding reactions considering the source of the event detection and the time for the hazard determination. More precisely, it is required specific time margins from the sensing of an event by a CAV vehicle sensor, for it to be identified by the on-board AI system as an incident and to propagate this information to the edge TMC. Corresponding time constraints are required by the road AI edge systems to analyse from a road sensor (camera) the existence of an event and to take reactions. Respective timing constraints required by the local AI edge MEC system analyse from a road sensor (camera) the existence of an incident and to take reactions.

In the central TMC, constraints are introduced by the fact that the global traffic management on the highway needs to be updated by collecting and processing metadata from the road MEC station and making decisions to guide targeted groups of CAV vehicles. More details about the timing constraints in D2.1.

The respect of the aforementioned constraints becoming more challenging in the cross-border areas, considering the existing of an event close to the borders has to be detected and spread as information in both sides. The enabling of all the aforementioned services either in local actions as warning in the approaching vehicles or in wide area management, presupposes the timing response validation of the 5G Network, including the overhead of the network roaming.

### 6.3.2.3 Expected exploitable results

The main interest in the UC2 is the techno-economic analysis about the cost for the deployment of such services at highways that facilitate the road connection between countries at the cross-border areas considering the 5G roaming conditions. As in previous use case, the cost will be adjusted at the projections about the vehicle traffic and the automated driving in the coming years at the borders of EU countries and especially at the borders of Spain-France. Figure 26 illustrates the expected timelines for the evolution of autonomous driving and developing C-V2X services. Quantitative data will be gathered for the interest cross-border areas combined with data about the required equipment and the follow-up support for the suitable network configurations as derived from UC2 trials.

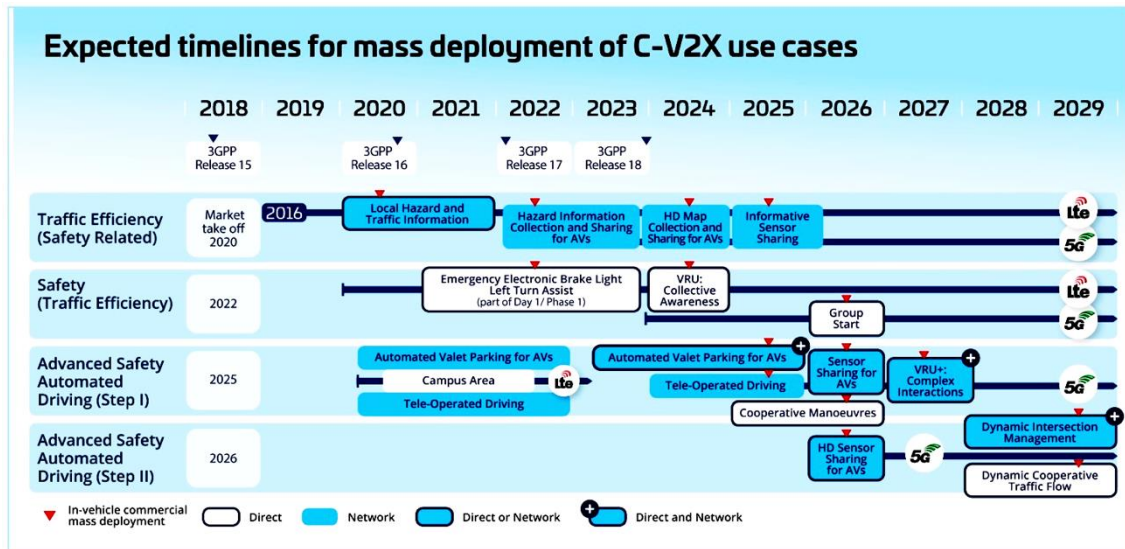


Figure 28 5G ACCA road mapping1

### 6.3.3 Use case #3 - Future Railway Mobile Communication System

FRMCS (Future Railway Mobile Communication System) is the future worldwide telecommunication system designed to digitalize the rail transport supporting a number of services for the train operators and the train passengers. UC3 will demonstrate such services exploiting the 5GMED solution including the special operating environment of the Le Perthus tunnel. The critical difference compared to the previous use cases is that the trains are moving at high-speed increasing the timing responses for the 5G network, while the existence of a tunnel requires the deployment of special equipment in the tunnel.

*15G Automotive Association. A visionary roadmap for advanced driving use cases, connectivity technologies, and radio spectrum needs. Tech. Rep., 2020. [Online]. Available: www.5gaa.org*

#### 6.3.3.1 Deployed services

- **Advanced Sensor Monitoring on Board:** Wireless interconnection of IoT sensors with limited bandwidth needs that provide live monitoring of the infrastructure condition at the ground-based or onboard condition in respect eliminating the need for hardwired communications links.
- **Railway Track Safety - Obstacle Detection:** A Camera/Lidar monitors the rail track parallel to the track followed by the train while an AI module analyses the existence of

potential obstacles in the case that an obstacle is detected, the system notifies a Central Control Center.

- Passenger safety and comfort: AI system identifies thoughts inside and outside cameras critical situations about the passenger safety and non-critical about the passenger comfort for further actions.

Stable High Bandwith Wi-Fi access 1Gbit/s per 1000 passengers.

- Multi-tenant Mobile Service: An onboard neutral-host cell provide access to multi-tenant mobile services.

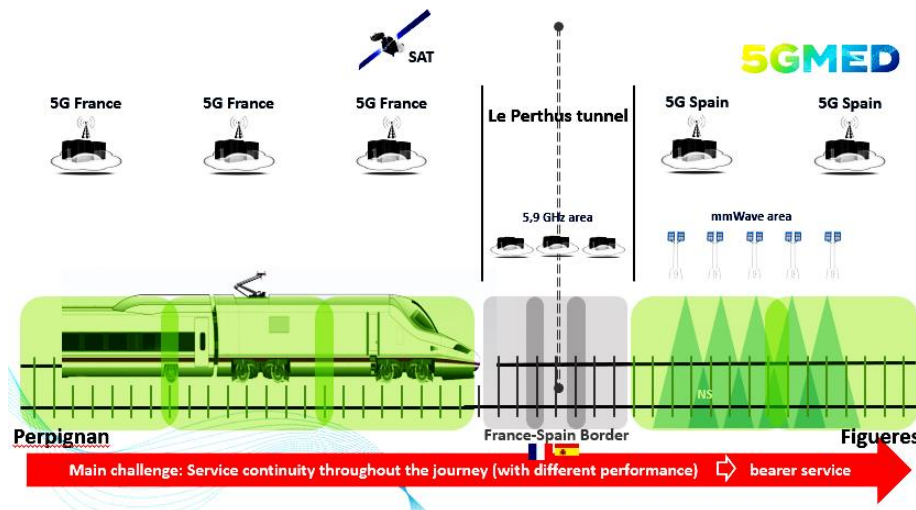


Figure 29 Use Case #3 – Operational Scenarios

### 6.3.3.2 Technological challenges

The main technological challenge of UC3 is to ensure continuity of service leveraging the 5GMED solution under the special operating conditions of the train high speed (up to 300km/h) and the existence of a tunnel. For the first condition, specific network parameter requirements have to be met, while for the second, special equipment will be deployed to cover the tunnel area.

### 6.3.3.3 Expected exploitable results

The main interest for UC3 is the techno-economic analysis to estimate the infrastructure and operating costs to support the aforementioned services. As in the previous use cases, the costs must be adjusted to the forecasts for the train traffic and train passengers in the coming years at the borders of the EU countries and especially at the Spain-France border. Railway pre-pandemic traffic in 2019 in the line Figueres- Perpignan shows an average of 4,4 passenger trains crossing the border per direction per day and an average of 11.000 passengers per day crossing the corridors in both directions. The expected post-pandemic railway traffic trend appears to be an important growth, expecting 11,8 good trains per direction and day for 2026. In addition, passenger train traffic is expected to increase to 10,3 trains per day in 2026. More traffic details will be analysed in D7.1.

### 6.3.4 Use case #4 – Virtual reality Entertainment

The use case 4 (UC4) is a high bandwidth streaming application that will evaluate the availability and the provided quality of services of the 5G network in cars and trains under the

conditions that have investigated at the previous cases studies. The application enables a range of virtual reality services that reflect trends for the upcoming multimedia applications that take advantage of 5G network capabilities. Such applications provide added value by the constant availability of the 5G network.

#### 6.3.4.1 Deployed services

In UC4 will be tested the following services:

- A watch movies/shows together service.
- A Tour Planning Service: This service will deliver high-quality media content to travellers.
- A 360 Virtual Reality (VR) Service: This service will provide E2E immersive (through 360-degree contents) and live streaming experience for end user.

#### 6.3.4.2 Technological challenges

The main technological challenge in UC4 is to evaluate the reliability and quality of service of the 5GMED solution under the demanding high performance and low latency network conditions. As in the previous use cases, specific timing constraints and network resources will be required that will be evaluated in real-world conditions on moving trains and cars crossing the borders.

#### 6.3.4.3 Expected exploitable results

The high-bandwidth and low-latency requirements introduce additional time constraints on 5G Network responses that create stressing situations regarding the reliability and availability of the network in high-speed trains and moving vehicles, which highlights a very interesting case study from a technical point of view.

From a techno-economic perspective it is critical to evaluate the adjustment of the equipment and operational costs of the previous use cases to support such applications at a scale based on the projected passenger traffic by trains and cars in the coming years at the borders of the EU countries and especially on the Spanish-French border.

### 6.4 Exploitation Plan Timeline & Actions

The 5GMED project's exploitation plan is methodically architected across three distinct but interlinked phases, each serving a specific objective, and strategically guiding the project from conception to market launch. The following details offer a more granular look into how the dissemination and exploitation activities will progress as specific project results become available:

#### **Phase I: Exploitation Exploration (M16-M27)**

*Objective: Identify & Develop Innovation Opportunities*

In this initial phase, an exhaustive assessment of the project's first-year results is conducted. This process includes updating the exploitation results of each 5GMED partner to generate a comprehensive view of the project's status and progress. At this juncture, the consortium members initiate an in-depth Market Analysis, linking exploitation results with actual market penetration and development opportunities. This exploration incorporates the insights gained

from the project's first test and validation phase, ensuring that identified exploitation pathways align with real-world feasibility and relevance. In connection with Work Package 7 (WP7) activities, we formulate preliminary business models. The primary goal here is to create avenues for cooperative ventures and unified exploitation of project results. To that end, Task 8.3 leans heavily on the outcomes from Task 7.1& Task 7.2, focusing on market viability studies, business models, and replication plans.

This phase employs a variety of analytical tools such as SWOT, PESTLE, and Porter's Five Forces analysis. These tools offer a comprehensive understanding of the project's position within the larger market context. Concurrently, the Business Model Canvas and Value Network Analysis are applied to enhance the value proposition of 5GMED results. The focus during Phase I is the qualitative analysis of the market and business-defining characteristics, identifying key partners, key activities, and value propositions. While this groundwork forms the basis for Phase II, it also undergoes iterative development based on the results from final testing and validation in the project's third year.

## **Phase II: Exploitation Agreement (M25-M36)**

*Objective: Validate & Align to Market*

Phase II of the 5GMED exploitation plan, spanning from the 25th to the 36th month of the project, is primarily dedicated to consolidating the learning from Phase I and aligning the project with the market dynamics. This phase, aptly named "Exploitation Agreement," is an essential transitional stage, during which the project strategies and activities are calibrated to validate market alignment. At this stage, the project pivots from the initial exploration of opportunities and focuses more directly on the development and refinement of preliminary Business Models. The liaison with WP7, or Work Package 7, is an integral part of this process. WP7 is a pre-defined component of the project that revolves around market analysis and business modelling. Collaboration with WP7 allows the project to leverage the insights garnered through its extensive market research to refine its business models.

In this phase, a closer examination of quantitative aspects, such as cost structures and potential revenue streams, begins. This in-depth examination helps to bring the economic viability and financial sustainability of the project into sharper focus. Market research that was initiated in the first phase continues to be a critical activity in Phase II. It serves as a spotlight, illuminating the market potential and business opportunities that the 5GMED project could exploit. A key outcome of the market research and in-depth financial analysis is the identification of potential synergies between the project partners. The identification of these synergies is a critical precursor to fostering cooperation between the partners. As a multi-partner project, 5GMED thrives on the diverse strengths and capabilities of its partners, and Phase II is where these diverse capabilities are synergistically integrated to amplify the project's potential impact.

A significant aspect of Phase II is the creation of Joint Exploitation Models. These models are collaborative frameworks that provide a structured approach for the partners to jointly exploit the project's results. They not only encourage collaboration but also help to streamline the exploitation of the project's outputs, ensuring that each partner's strengths are utilized efficiently and effectively. Formulating the Go-To-Market (GTM) strategy is another pivotal activity during Phase II. The GTM strategy serves as a roadmap, guiding the project from its current state of research and development towards successful market entry. It outlines the steps that the project will take to reach its targeted end-users, the channels it will use to distribute its outputs, and the marketing strategies it will employ to capture market share. Furthermore, the concept of the Neutral Host is introduced and incorporated into the GTM strategy during this phase. The Neutral Host is an entity that owns and maintains mobile network infrastructure, allowing multiple Mobile Network Operators (MNOs) to use it on a

shared basis. This model increases network coverage and capacity, while reducing costs and minimizing redundant infrastructure. It's a win-win for all parties involved, and importantly, for the 5GMED project, it provides a scalable and cost-efficient pathway to market.

Finally, the GTM strategy incorporates a comprehensive Intellectual Property Rights (IPR) management plan. Given that 5GMED is an innovation-driven project, robust IPR management is vital to protecting the project's innovative outputs and the partners' interests. The IPR management plan outlines the processes for registering and protecting intellectual property, licensing agreements, and handling potential infringements. In tandem with the IPR management plan, ownership agreements among the project partners are also solidified during this phase, ensuring a clear understanding of each partner's rights and responsibilities related to the project's outputs. In conclusion, Phase II of the 5GMED project's exploitation plan is a meticulously designed bridge connecting the project's innovative activities with the market. It ensures that the project is not just producing cutting-edge results but also channelling these results towards creating substantial market impact. The introduction of the Neutral Host concept serves to streamline this path to market, further underscoring the project's strategic approach to exploitation. With the completion of Phase II, the project is well-positioned for a smooth transition to market entry in Phase III.

### **Phase III: Post-project Exploitation (from M37)**

*Objective: Maximize Potential & Launch to Market*

Phase III of the 5GMED project, titled "Post-project Exploitation," begins from the 37th month and signifies the culmination of all the efforts put forth in the previous phases. The objective of this final stage is to maximize the project's potential and successfully launch its innovative results into the market. Given the nature of 5GMED as an Innovation Action, it's understood that the ultimate goal is to drive commercial exploitation of the project's outcomes. This commercial exploitation does not occur in isolation rather, it is the result of a meticulously planned and executed sequence of pre-commercialization activities that ensures the project's innovative solutions find their rightful place in the market.

One of the critical pre-commercialization activities is the establishment of licensing schemes. Licensing is a pivotal aspect of post-project exploitation, enabling the project's innovative solutions to be used by a wider range of stakeholders beyond the immediate project consortium. This broadens the impact of the project while providing an avenue for revenue generation. The licensing scheme would detail the terms and conditions under which the project's outputs can be used, considering factors such as the nature of the license (exclusive or non-exclusive), the territory of use, and the duration of the license. The phase also sees a ramping up of marketing and promotional efforts. Building on the Go-To-Market strategy developed in Phase II, these efforts aim to raise awareness about the project's solutions, highlight their unique selling points, and stimulate interest among potential users and customers. This can involve a mix of traditional and digital marketing strategies, including press releases, participation in industry events, social media campaigns, and targeted outreach to potential customers.

Training activities form another key component of Phase III. These activities aim to equip relevant stakeholders, including the project's end-users and the staff of the project's partners, with the knowledge and skills needed to effectively use and benefit from the project's solutions. Training activities can range from workshops and seminars to online tutorials and user manuals, depending on the nature of the project's outputs and the needs of the stakeholders. Liaison with Regulatory Authorities is another critical pre-commercialization activity undertaken during this phase. Given the innovative nature of the project's solutions and the rapidly evolving landscape of 5G technologies, engagement with regulatory bodies is necessary to ensure the project's solutions comply with current regulations and guidelines. This might

involve obtaining necessary certifications or approvals, as well as advocating for regulatory changes to facilitate the smooth deployment of the project's solutions.

In Phase III, the role of the Neutral Host, as introduced in Phase II, becomes even more critical. By offering a shared infrastructure that multiple Mobile Network Operators (MNOs) can utilize, the Neutral Host model not only lowers the barrier to market entry but also increases the potential reach of the project's solutions. This model aligns perfectly with the project's objective of maximizing its potential in this final phase. To coordinate and guide all these activities, a comprehensive roadmap is created by the end of the project. This roadmap, a capstone of the project's exploitation plan, provides a clear, detailed path to successful exploitation. It outlines the steps and milestones, offers a timeline, and assigns responsibilities, ensuring all project partners know exactly what needs to be done to ensure the project's results reach the market and achieve their full potential.

In conclusion, Phase III of the 5GMED project's exploitation plan encapsulates the journey from the development to the market. It ensures the innovative results of the project do not just stay within the confines of the project but are translated into tangible solutions that can create real-world impact. The neutral host concept is a key enabler in this journey, streamlining the path to market and maximizing the potential reach of the project's solutions.

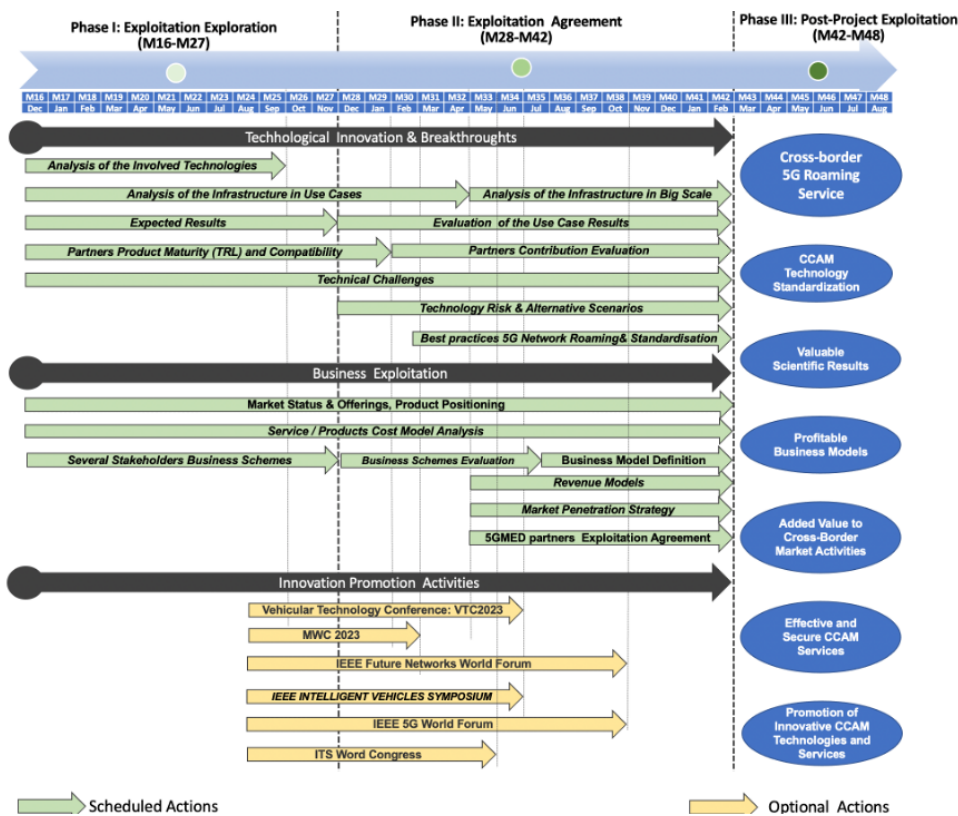


Figure 30 Exploitation Plan Timeline



## 7. Conclusions

The 5GMED Impact Maximization Plan, as defined in Task 8.1 *Dissemination and Outreach of Work Package 8 Impact Maximization*, has been elaborated to address the Mediterranean Cross-Border Corridor context and ensure measurable impacts in a sustainable manner and beyond the project lifetime.

The communication plan will look at developing a society awareness communication strategy through the described series of tools and channels with the collaboration of the partners involved in maximising the project impacts. Their implication will be decisive since their network will be leveraged to reach a larger audience, including final consumers and citizens. The communication activities count with the website as the primary communication tool where content related to the project activities is uploaded. The content is disseminated with the help of a social media strategy and the partners' help.

The scientific impact of the project will be disseminated through the creation of papers submitted to the selected events. In the dissemination strategy, the project topics list is described. The results will also be available on the website with the publication of the public deliverables. Demonstrating the use cases will also be an excellent opportunity for the project to reach a large audience.

In the exploitation plan section, the context of the exploitation strategy of the 5GMED venture was outlined, by describing the scope, the objectives, the key issues and the timeline of the exploitation actions. The goal of the exploitation strategy is to provide complete business models leveraging the most profitable use of technological breakthroughs arising from the four UCs. Finally, the exploitation plan will monitor the progress throughout the duration of the 5GMED project, proposing actions or adjusting existing actions to better promote the new results.

The first results of the impact maximisation plan will be described in the deliverable 8.3 *First impact and plan updated*.

## Annex I – 5GMED Communication and Dissemination Toolkits

### 1. **5GMED Demo Days 2023 Social Media Toolkit**

This social media toolkit has been prepared to disseminate on social media (Twitter and LinkedIn) the 5GMED Demo Days of February 2023:

#### **5GMED proves connectivity beyond limits in mobility cross-border scenarios with 5G**

**Link:**

<https://5gmed.eu/5gmed-proves-connectivity-beyond-limits-in-mobility-cross-border-scenarios-with-5g/>

**YouTube video:**

<https://youtu.be/fAtwT9j6n2U>

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José López Luque, 5GMED Coordinator and Innovation Project Manager at Cellnex


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"#5GMED will deploy a #5G network in the Figueres <sup>ES</sup> & Perpignan <sup>FR</sup> corridor to support automotive & railway use cases" - José López, 5GMED Coordinator from @cellnextelecom.


 Discover how in this video: <http://ow.ly/rIRH50NxmEm>

@i2CAT @Valeo\_Group @Abertis @comsa\_corp @Atos

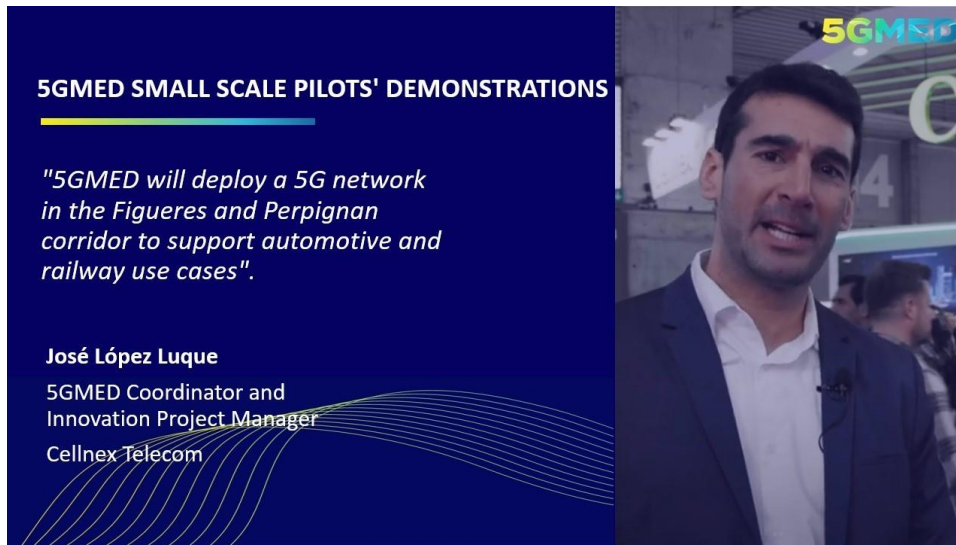
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 "5GMED will deploy a 5G network along the Figueres <sup>ES</sup> and Perpignan <sup>FR</sup> corridor to support different services and #automotive and #railway use cases", said José López Luque, 5GMED Coordinator from @Cellnex Telecom.

 #5GMED proved connectivity without limits in road and railway cross-border with #5G, testing several services and use cases during the Demo Days of February 2023 at Circuit ParcMotor of Castellolí in Barcelona and the @LINEA FIGUERAS PERPIGNAN S.A.

 Watch the video of the demonstrations and the interviews with our partners now: <http://ow.ly/rIRH50NxmEm>

@i2CAT Foundation, @Valeo, @Autopistas, an Abertis company, @COMSA Corporación, @Atos



Francisco Vázquez Gallego, 5GMED Technical Manager and V2X Research Manager at i2CAT Foundation

#### Copy Twitter

"We have two #5G SA networks, the Spanish & the French, to test our use cases in this cross-border scenario" - Francisco Vázquez, V2X Research Line Manager at @i2CAT

🎥 Find out more in the video: <http://ow.ly/rIRH50NxmEm>

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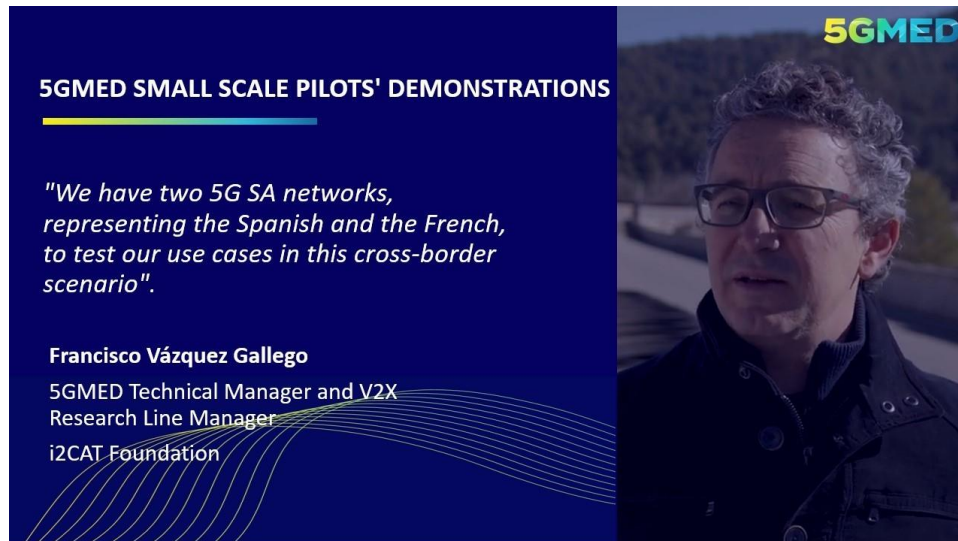
🌐 "We have two #5G SA networks deployed: one represents the Spanish network and the other one is the French, so we are testing our use cases in this cross-border scenario", explained Francisco Vázquez, V2X Research Line Manager at @i2CAT Foundation.

Vázquez was interviewed at Circuit ParcMotor of Castellolí in Barcelona and the @LINEA FIGUERAS PERPIGNAN S.A. facilities during the 2023 Demo Days of #5GMED, in which our partners gathered to test in small scale our use cases, representing the Spanish-French cross-border corridor.

🎥 Find out more in this video: <http://ow.ly/rIRH50NxmEm>

@Valeo, @Autopistas, an Abertis company, @COMSA Corporación, @Atos, @Cellnex Telecom

#futuremobility



Judit Bastida Raja, 5GMED WP3 Leader and Innovation Project Manager at Cellnex

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"We can test the roaming & the interruption times, & we can attach to different networks with different SIM cards" - Judit Bastida, Innovation Project Manager at @cellnextelecom.

Watch her interview here <http://ow.ly/rIRH50NxmEm>

@Valeo\_Group @Abertis @comsa\_corp @Atos @i2CAT

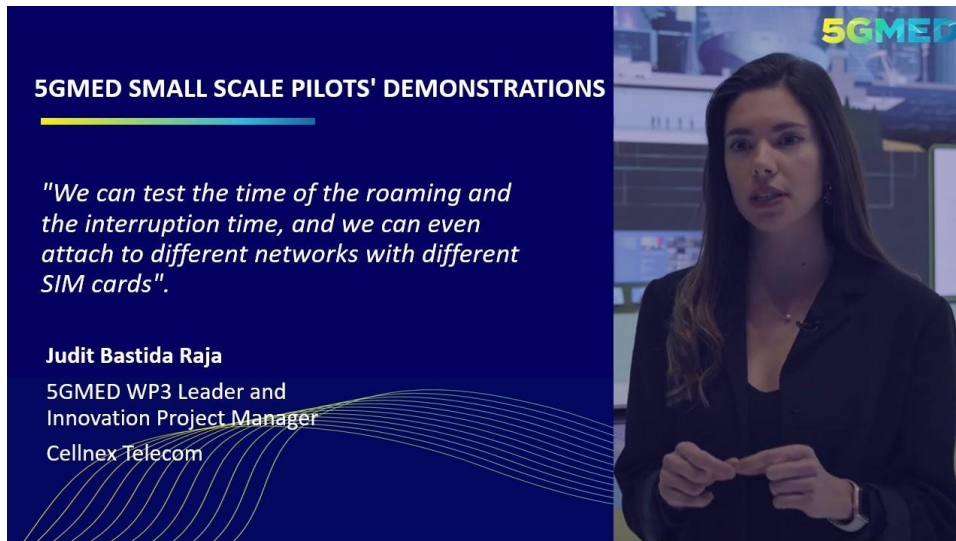
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🕒 "We can test the time of the roaming, the interruption time we are encountering, and we can even attach to different networks with different SIM cards", clarified Judit Bastida Raja, Innovation Project Manager at @Cellnex Telecom.

🗣️ She described how the #5GMED partners replicated at the Demo Days of February 2023 all the challenges we might have later in the large-scale cross-border corridor between Figueres and Perpignan.

Watch her interview here to learn more <http://ow.ly/rIRH50NxmEm>

@i2CAT Foundation, @Valeo, @Autopistas, an Abertis company, @COMSA Corporación, @Atos



Philippe Adrianavalona, Software Engineer at Valeo

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🌐 "#5G networks help a lot for #teleoperation, because they can send more data & videos, reducing latency" - Philippe Adrianavalona, Software Engineer at @Valeo\_Group.

Watch his full interview now 📄 <http://ow.ly/rIRH50NxmEm>

@Abertis @comsa\_corp @Atos @i2CAT @cellnextelecom

#### Copy LinkedIn

🌐 "#5G networks help a lot for teleoperation, because thanks to their bandwidth, we can send more data and videos, and we can also reduce latency, so it is more comfortable for teleoperating cars", highlighted Philippe Adrianavalona, Software Engineer at @Valeo.

#Teleoperation with 5G provides many benefits in terms of increased reach, enhanced safety, increased efficiency, improved accuracy and cost savings.

📄 The #5GMED partner was speaking about it at the Demo Days 2023, in which we tested our #automotive and #railway uses cases representing the Mediterranean Cross-Border Corridor at Circuit ParcMotor of Castellolí in Barcelona and the @LINEA FIGUERAS PERPIGNAN S.A. facilities.

Watch his full interview now 📄 <http://ow.ly/rIRH50NxmEm>

@i2CAT Foundation, @Cellnex Telecom, @Autopistas, an Abertis company, @COMSA Corporación, @Atos



David Porcuna, Project Manager of Innovation and Transformation at Autopistas Abertis

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🚗 "With the use case #RoadInfrastructureDigitalisation, we will ensure safety & fluent mobility in high risk with mixed traffic" - David Porcuna, Project Manager at @Abertis.

Access his interview <http://ow.ly/rIRH50NxmEm>

@Valeo\_Group @comsa\_corp @Atos @i2CAT @cellnextelecom

#### Copy LinkedIn

🚗 "The objective of the Use Case 2 Road Infrastructure Digitalisation is to ensure safety and fluent #mobility in high risk with mixed traffic, where connected and automated vehicles co-exist with conventional, non-connected cars", stated David Porcuna, Project Manager of Innovation and Transformation at @Autopistas, an Abertis company.

🌐 #5G guarantees the necessary infrastructure for the efficient collection, analysis and dissemination of messages in real-time, including in cross-border scenarios, as the #5GMED project proved at the Demo Days 2023 with our partners @i2CAT Foundation, @Cellnex Telecom, @Valeo, @COMSA Corporación, and @Atos.

Access his interview here to discover more <http://ow.ly/rIRH50NxmEm>

#futuremobility



Juan Agustí Moreno, Project Manager at COMSA Corporación

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🗨️ "We showcase five #FRMCS-like services" - Juan Agustí, Project Manager at @comsa\_corp.

Watch his interview to discover which are these five services the #5GMED partner mentions

👉 <http://ow.ly/rIRH50NxmEm>

@Valeo\_Group @Abertis @Atos @i2CAT @cellnextelecom

#futuremobility #5G

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🗨️ "We showcase five #FRMCS-like services", mentioned Juan Agustí, Project Manager at @COMSA Corporación.

Two of them are innovative #IOT system and obstacle detection on the track based on LIDAR images.

Watch his interview to discover which are the rest of the services the #5GMED partner enumerates 👉 <http://ow.ly/rIRH50NxmEm>

@i2CAT Foundation, @Cellnex Telecom, @Valeo, @Autopistas, an Abertis company, @Atos.

#futuremobility #5G



Rodrigo Peces, Software Developer at Atos

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"If users are moving, services will follow" - Rodrigo Peces, Software Developer at @Atos

#5GMED's will deploy a #5G network in the esFigueres-PerpignanFRcorridor to guarantee limitless online entertainment: <http://ow.ly/McR650Nxo1V>

@cellnextelecom @i2CAT @Abertis @comsa\_corp

### Copy LinkedIn

"If the user is moving, the services will follow", illustrated Rodrigo Peces, Software Developer at @Atos.

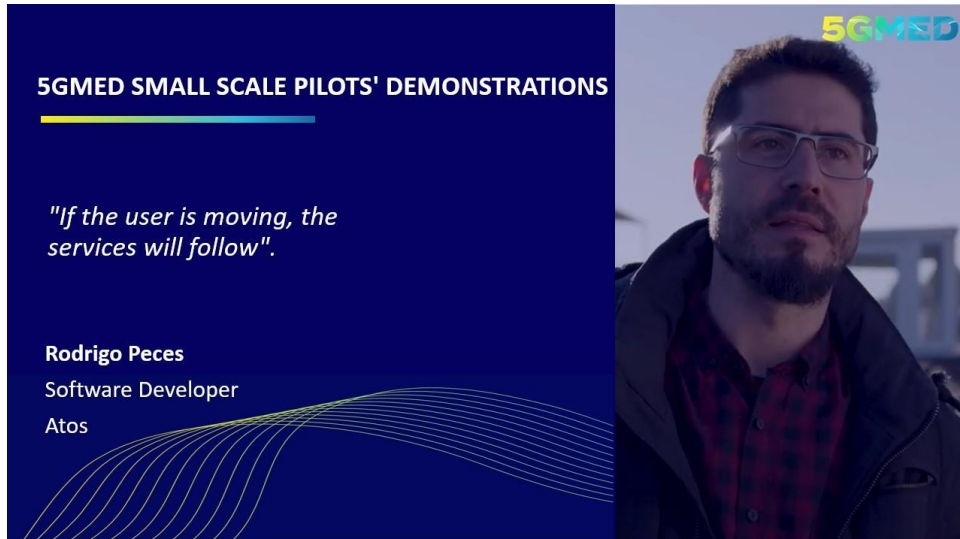
Did you know that #5GMED's objective is to deploy a #5G network in the esFigueres-PerpignanFR cross-border corridor to support automotive and railway use cases?

📍 Last February 2023, 5GMED partners gathered at Circuit ParcMotor of Castellolí in Barcelona and the @LINEA FIGUERAS PERPIGNAN S.A. to carry out small scale pilots to demonstrate how 5G can provide connectivity beyond limits when crossing borders by road or railway. Peces was speaking about how 5GMED is working on offering passengers an enjoyable road or railway experience with limitless online entertainment.

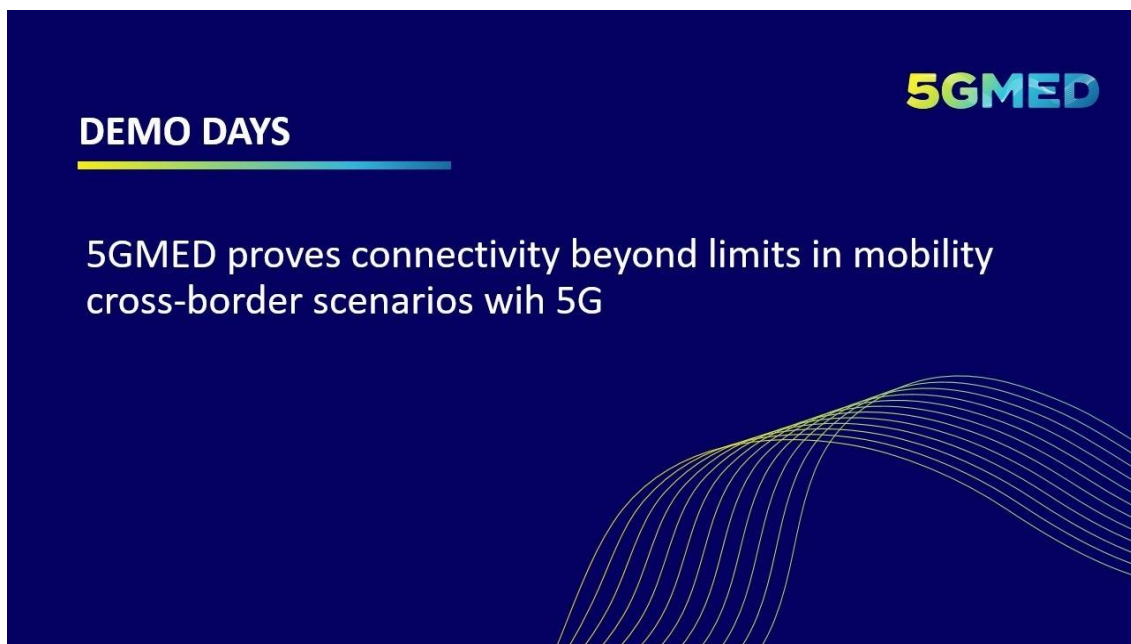
👉 Watch the video of the Demo Days to discover how, and listen to our partners' interviews here: <http://ow.ly/rIRH50NxmEm>



@Cellnex Telecom, @i2CAT Foundation, @Valeo, @Autopistas, an Abertis company, @COMSA Corporación



2. **BANNER**



3. **CONTACT**

For any questions or more info, contact:

**Marjorie Grassler**, 5GMED Impact Manager at Mobile World Capital:  
[mgrassler@mobileworldcapital.com](mailto:mgrassler@mobileworldcapital.com)

2. **5GMED Panel Discussion at MWC23 speakers interviews dissemination toolkit**

This communication toolkit has been prepared to share on social media (Twitter and LinkedIn), the interviews of the speakers of 5GMED panel “Europe and Spain facing the challenge of connected mobility” at Mobile World Congress 2023:

**José López Luque, 5GMED Coordinator from Cellnex** – <http://ow.ly/WvHv50NmJxR>

**Laura Sanz, CCAM Strategy Lead at i2CAT** – <http://ow.ly/pnwj50NmJWe>

**María Paula Caycedo, Head of Innovation Hub South at EIT Urban Mobility** – <http://ow.ly/ZBUx50NmK6I>

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##### 5GMED

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- **Web:** [5gmed.eu](http://5gmed.eu)

##### MWCapital

- **Twitter:** [@MWCapital](https://twitter.com/MWCapital)
- **LinkedIn:** [Mobile World Capital Barcelona](https://www.linkedin.com/company/mobile-world-capital-barcelona)
- **Hashtag:** #MWC23
- **Web:** [mwcapital.com](http://mwcapital.com)

##### EIT Urban Mobility

- **Twitter:** [@EITUrbanMob](https://twitter.com/EITUrbanMob)
- **LinkedIn:** [EIT Urban Mobility](https://www.linkedin.com/company/eit-urban-mobility)
- **Web:** [eiturbanmobility.eu](http://eiturbanmobility.eu)

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- **Twitter:** [@i2CAT](https://twitter.com/i2CAT)
- **LinkedIn:** [i2CAT Foundation](https://www.linkedin.com/company/i2cat-foundation)
- **Web:** [i2cat.net](http://i2cat.net)

## 2. COPIES

### **José López Luque Interview**

#### **Twitter**

🌐 How is #5GMED providing seamless services in #mobility between countries in cross-border scenarios?

José López Luque, 5GMED Coordinator from @cellnextelecom, has the answer in this interview!

👉 Watch it now: <http://ow.ly/WvHv50NmJxR>

#5G #futuremobility #connectedmobility

#### **LinkedIn**

🌐 How is the #5GMED project providing seamless services in roads and railways between different countries in cross-border scenarios?

👆 José López Luque, 5GMED Coordinator from @Cellnex Telecom, has the answer in this interview!

👉 Watch it now: <http://ow.ly/WvHv50NmJxR>

#5G #futuremobility #connectedmobility #remotedriving

### **Laura Sanz Interview**

#### **Twitter**

🎧 How is the #5GMED partner @i2CAT participating in the project?

👆 Laura Sanz, Cooperative, Connected and Automated #Mobility #CCAM Lead, explains what they do to disrupt #futuremobility with #5G connectivity and more!

Listen to her interview now! 🎧 <http://ow.ly/pnwj50NmJWe>

#### **LinkedIn**

🎧 How is the #5GMED partner @I2CAT Foundation participating in the project?

👆 Laura Sanz, Cooperative, Connected and Automated #Mobility #CCAM Lead, explains what they do to disrupt #futuremobility with #5G and more!

Discover why 5GMED is an example of connectivity with 5G in real projects!

🎧 Listen to her now: <http://ow.ly/pnwj50NmJWe>

### **María Paula Caycedo Interview**

#### **Twitter**

🚗 Why is it essential to accelerate #mobility startups?

📌 María Paula Caycedo, from @EITUrbanMob, highlights the importance of the #startup ecosystem to improve #urbanmobility for citizens & speaks about #5GTurbo accelerator!

👉 Watch her interview: <http://ow.ly/ZBUx50NmK6I>

## LinkedIn

🚗 Why is it essential for our cities to accelerate #mobility startups?

📌 María Paula Caycedo, from @EIT Urban Mobility, highlights the importance of the #startup ecosystem to improve #urbanmobility for citizens and speaks about the #5GTurbo accelerator!

👉 Watch her interview to learn more: <http://ow.ly/ZBUx50NmK6I>

#5G #futuremobility

## 3. CONTACT

For any questions or for more information, please contact:

**Marjorie Grassler**, EU Projects Communication Executive at Mobile World Capital  
Barcelona

[mgrassler@mobileworldcapital.com](mailto:mgrassler@mobileworldcapital.com)

## 3. **5GMED Panel Discussion at MWC23 chronicle dissemination toolkit**

This communication toolkit has been prepared to share on social media (Twitter and LinkedIn), the chronicle of the 5GMED panel at Mobile World Congress 2023 "Europe and Spain facing the challenge of connected mobility":

Chronicle link:

<https://5gmed.eu/5gmed-disrupting-the-mobility-of-the-future-safe-efficient-digital-connected-and-sustainable/>

It contains the following CONTENTS:

**Social media handles**

**Copies**

**Pictures and videos**

**Contact**

## 1. SOCIAL MEDIA HANDLES

### 5GMED

- **Twitter:** [@5GMED\\_EU](https://twitter.com/5GMED_EU)

- **LinkedIn:** [5GMED](#)
- **Web:** [5gmed.eu](#)

#### MWCapital

- **Twitter:** [@MWCcapital](#)
- **LinkedIn:** [Mobile World Capital Barcelona](#)
- **Hashtag:** #MWC23
- **Web:** [mwcbarcelona.com](#)

#### EIT Urban Mobility

- **Twitter:** [@EITUrbanMob](#)
- **LinkedIn:** [EIT Urban Mobility](#)
- **Web:** [eiturbanmobility.eu](#)

#### Cellnex

- **Twitter:** [@cellnextelecom](#)
- **LinkedIn:** [Cellnex Telecom](#)
- **Web:** [www.cellnex.com](#)

#### i2CAT

- **Twitter:** [@i2CAT](#)
- **LinkedIn:** [i2CAT Foundation](#)
- **Web:** [i2cat.net](#)

## 2. COPIES

### Copy Twitter

💬 How would you describe [#futuremobility](#)?

Last week at [#MWC23](#), [#5GMED](#) hosted a panel about the challenges Spain & Europe face in [#connectedmobility](#)

👤 Experts agreed that the [#mobility](#) of the future is safe, efficient, digital, connected & sustainable 📄 <http://ow.ly/9fuX50NbY2b>

### Copy LinkedIn 1

💬 Which terms would you use to describe [#futuremobility](#)?

🚗 Last week, at [#MWC23](#) in Barcelona, [5GMED](#) hosted a panel discussion about the challenges Spain and Europe face in [#connectedmobility](#), moderated by [Marjorie Grassler, PhD](#), from [Mobile World Capital Barcelona](#).

👤 [Laura S.](#), from [i2CAT Foundation](#); [María Paula Caycedo](#), from [EIT Urban Mobility](#); and [José López Luque](#), from [Cellnex Telecom](#), agreed that the [#mobility](#) of the future is safe, efficient,

digital, connected and sustainable.

👉 Read the full chronicle and watch the streaming video on the [#5GMED](https://www.5gmед.com) website:  
<http://ow.ly/6Iby50NbY2a>

### 3. PICTURES AND VIDEOS

You can download the pictures and videos of the panel [here](#), or check the pictures on [5GMED Flickr](#).

### 4. CONTACT

For any questions or for more information, please contact:

**Marjorie Grassler**, EU Projects Communication Executive at Mobile World Capital  
Barcelona

[mgrassler@mobileworldcapital.com](mailto:mgrassler@mobileworldcapital.com)

### 4. 5GMED Scientific Articles on Zenodo social media toolkit

This social media toolkit has been prepared to share on social media (Twitter and LinkedIn) 9 scientific articles by the 5GMED partners published on Zenodo.

## 1. Standardization Initiatives and Market Approaches in Edge Federation

### Twitter

#6G + #EdgeComputing + network virtualization motivate the concept of Telco Edge Platform.

The Operator Platform Group has been introduced towards the interconnection and federation of the TEPs.

Learn more in the paper by #5GMED partner @nearbycomputing: <http://ow.ly/cU8I50NzKnc>

### LinkedIn

🌐 The #6G mobile communications + #EdgeComputing + network virtualization motivate the concept of Telco Edge Platform (TEP).

Recently, the Operator Platform Group (OPG) has been introduced towards the interconnection and federation of the TEPs.

👉 Read this paper written by the #5GMED partner @Nearby Computing to learn more:  
<http://ow.ly/cU8I50NzKnc>  
#futuremobility

**Banner****2. Impact of Network Densification on Joint Slicing and Functional Splitting in 5G****Twitter**

📖 The virtualization of #5G Radio Access Network #RAN, which distributes the Next Generation Node B functions between a Central Unit and a Distributed Unit, pose new challenges.

📄 Read this paper by some #5GMED partners to discover the challenges: <http://ow.ly/4iMW50NzKZp>

**LinkedIn**

The virtualization of #5G Radio Access Network #RAN, which distributes the Next Generation Node B (gNB) functions between a Central Unit (CU) and a Distributed Unit (DU), pose new challenges.

📖 One of these challenges is the management of the joint slicing and allocation of appropriate distribution of functions between CU and DU, known as functional split.

In this scientific paper written by some of the #5GMED partners, a discussion on the challenges and open issues of joint slicing and functional splitting is posed.

📄 Read it now: <http://ow.ly/kjs850NzKX7>


[#futuremobility](#)


## Banner




### 3. 5GMED Architecture for Automotive and Railway Communication Services in Cross-Border Scenarios


#### Twitter

 Cooperative, Connected and Automated Mobility [#CCAM](#) and Future Railway Mobile Communications System [#FRMCS](#) use cases pose challenges in the design of [#5G](#) network architectures in cross-border scenarios.

 Discover how [#5GMED](#) faces these challenges: <http://ow.ly/8Y1a50NzLqz>

#### LinkedIn

 Cooperative, Connected and Automated Mobility [#CCAM](#) and Future Railway Mobile Communications System [#FRMCS](#) use cases pose challenges in the design of 5G network architectures in cross-border scenarios.

 The [#5GMED](#) project proposes a novel [#5G](#) network architecture for the Mediterranean Corridor cross-border between Spain and France, where the challenges imposed by CCAM and FRMCS in cross-border scenarios are addressed.



In this paper, we describe cross-border challenges and present the 5GMED network architecture that will be deployed and evaluated in large-scale trials.

👉 Are you curious about it? Read the scientific paper here: <http://ow.ly/YH4A50NzLe2>  
[#futuremobility](#)

[i2CAT Foundation](#), [Centre Tecnològic de Telecomunicacions de Catalunya \(CTTC\)](#), [IRT Saint Exupéry](#), [Cellnex Telecom](#), [Nearby Computing](#), [Athens Technology Center](#)

### Banner



### 4. Faster Software Packet Processing on FPGA NICs with eBPF Program Warping

#### Twitter

Ever heard about FPGA NICs?

📖 They can improve packet processing performance, however, programming them is difficult, and we address the issue with program warping.

📄 Have a look at the paper written by our partners from [@axbryd](#): <http://ow.ly/7KU850NzMeB>  
[#futuremobility](#)

#### LinkedIn

Have you ever heard about FPGA NICs?

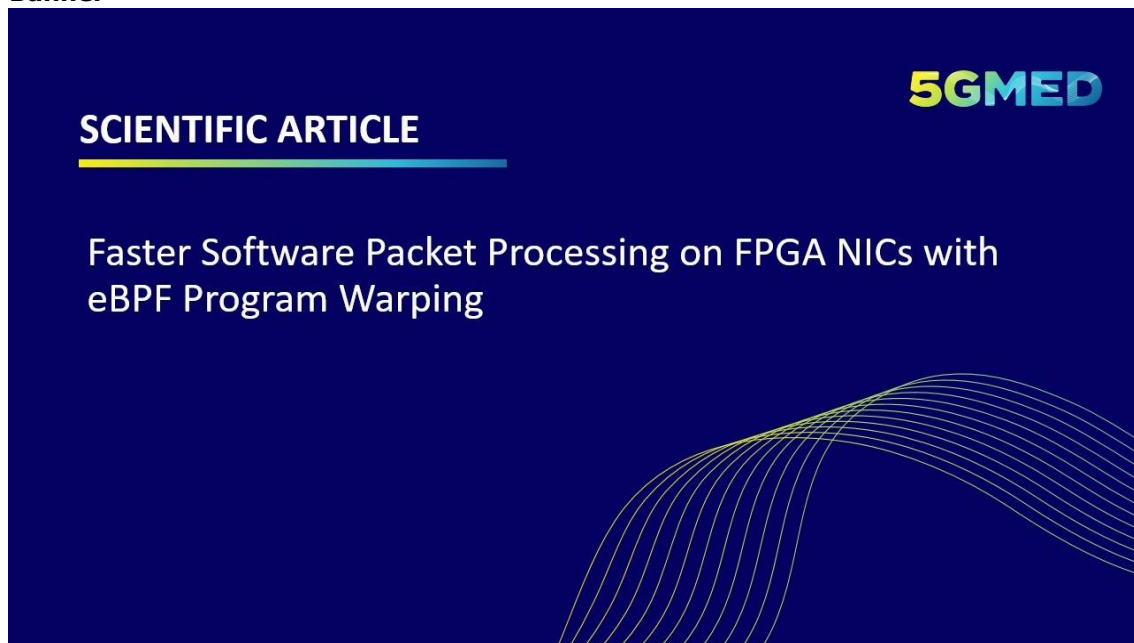
❑ They can improve packet processing performance, however, programming them is difficult, and existing solutions to enable software packet processing on FPGA either provide limited packet processing speed, or require changes to programs and to their development/deployment life cycle.

☑ We address the issue with program warping, a new technique that improves throughput replacing several instructions of a packet processing program with an equivalent runtime programmable hardware implementation.

📄 Have a look at the paper written by our partners from [Axbryd](#) to find out more about it: <http://ow.ly/nZEz50NzM5L>

[#futuremobility](#)

#### Banner



#### 5. 5GMED Connected and Automated Mobility and Future Railway Mobile Communication Use Cases in the Mediterranean Cross-Border Corridor

##### Twitter

🌐 [#5GMED](#) will demonstrate advanced [#CCAM](#) & [#FRMCS](#) use cases in the Mediterranean Cross-border Corridor, between Figueres and Perpignan, and several large-scale trials will be conducted.

Find out more: <http://ow.ly/Hs2T50NzNc0>

[@i2CAT](#) [@irtSaintEx](#) [@CttcTech](#) [@cellnextelecom](#)

### LinkedIn

The [#5GMED](#) project will demonstrate advanced Cooperative, Connected and Automated Mobility [#CCAM](#) and Future Railway Mobile Communications System [#FRMCS](#) use cases along the Mediterranean Cross-border Corridor.

Between Figueres and Perpignan, we will enable the uses cases by a multi-stakeholder compute and network infrastructure based on [#5G](#) and offering support for [#AI](#) functions, and deployed by MNOs, neutral hosts, and road and rail operators.

Several large-scale trials will be conducted to evaluate the capabilities of 5G to meet the requirements of the use cases in the cross-border [#mobility](#) scenario.

Find out more in this paper: <http://ow.ly/hIrC50NzMSq>

[i2CAT Foundation](#), [IRT Saint Exupéry](#), [Centre Tecnològic de Telecomunicacions de Catalunya \(CTTC\)](#), [Cellnex Telecom](#)

### Banner



## 6. eHDL: Turning eBPF/XDP Programs into Hardware Designs for the NIC

### Twitter

A complex task for network programmers is scaling network packet processing performance to meet the increasing speed of network ports with [#software](#) programs to leverage the network devices' [#hardware](#) features

We solve this issue in the paper by [@axbryd](#) <http://ow.ly/Y51P50NzQN1>

### LinkedIn

🌐 A complex task for network programmers is scaling network packet processing performance to meet the increasing speed of network ports with [#software](#) programs to carefully leverage the network devices' [#hardware](#) features.

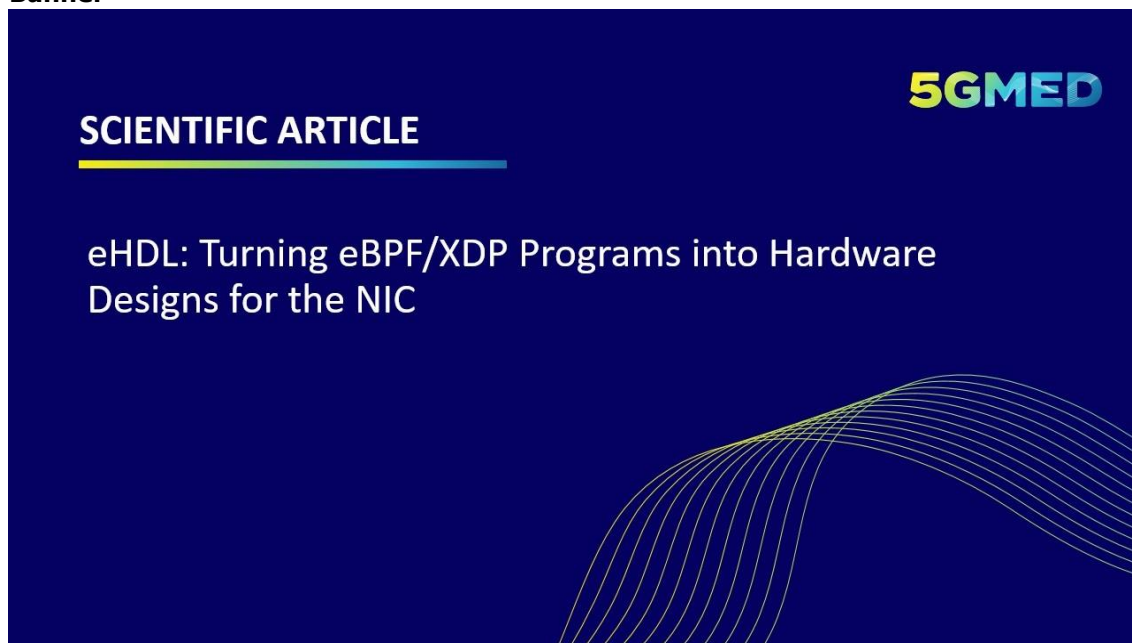
📖 They need to deal with the heterogeneity of device architectures, and re-think their software to leverage them.

⚡ In this paper, we make the first steps to reverse this design process, enabling the automatic generation of tailored hardware designs starting from a [#network](#) packet processing program. We introduce [#eHDL](#), a high-level synthesis tool that automatically generates hardware pipelines from unmodified Linux's eBPF/XDP programs.

📄 Discover more by reading the scientific paper here: <http://ow.ly/X1KW50NzNvt>  
[#futuremobility](#) [#5GMED](#)

[Axbryd](#)

### Banner



## 7. Demo: Interoperability between Cellular and V2X Networks (802.11p / LTE-PC5) under a Cloud Native Edge Scenario

### Twitter

📄 By leveraging wireless communication and [#edgecomputing](#), Cooperative Intelligent Transport Systems will improve safety and traffic management in [#mobility](#) use cases.

📄 Read this paper by [@i2CAT](#) to learn how to address this with [#5G](#), [#V2X](#), and more: <http://ow.ly/37O050NzRMF>

### LinkedIn

📄 By leveraging the use of wireless communication technologies and [#edgecomputing](#) capabilities, Cooperative Intelligent Transport Systems C-ITS aim to improve safety and traffic management in [#mobility](#) use cases.

🌐 However, the deployment of [#C-ITS](#) poses some critical challenges. Specifically, in heterogeneous systems, it is necessary to guarantee interoperability among the various available wireless technologies.

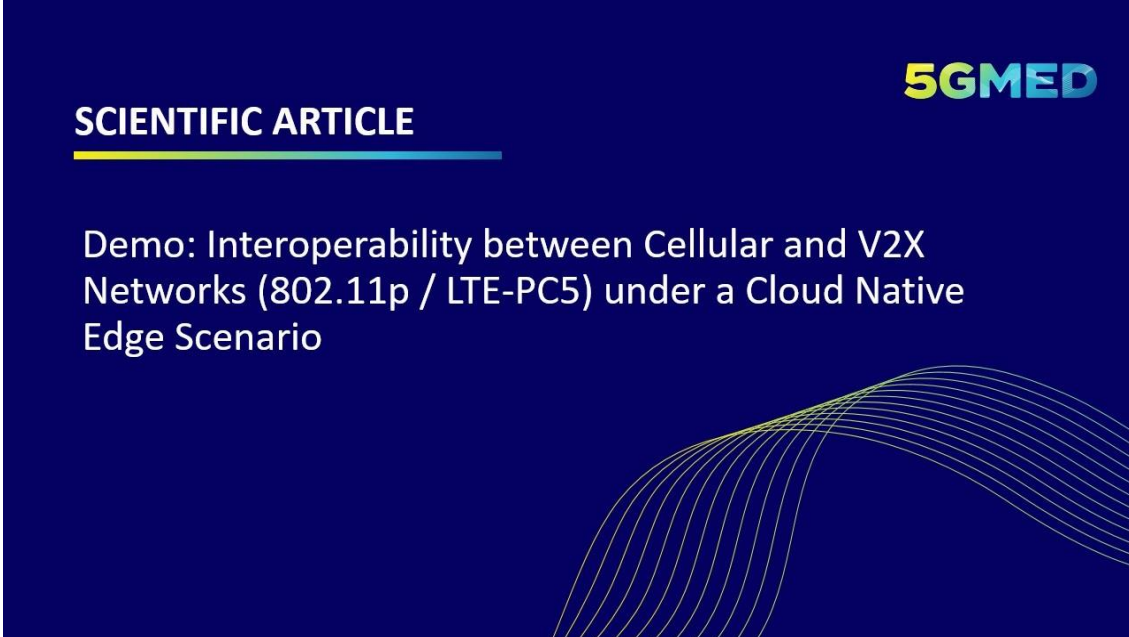
📄 This paper presents a cloud native infrastructure architecture for [#vehicularcommunications](#) that guarantees the interoperability between cellular technologies (4G/[#5G](#)), and specific Vehicle-to-Everything [#V2X](#) communication technologies, such as LTE- PC5 and IEEE 802.11p wireless communications standards.

🔗 Find out more here: <http://ow.ly/xi8J50NzRMH>

[#futuremobility](#)

[i2CAT Foundation](#)

### Banner



**5GMED**

**SCIENTIFIC ARTICLE**

Demo: Interoperability between Cellular and V2X Networks (802.11p / LTE-PC5) under a Cloud Native Edge Scenario

## 8. Adaptive Messaging based on the Age of Information in VANETs


### Twitter

💬 A challenge in 802.11p based vehicular ad hoc networks [#VANETs](#) is that the cooperative awareness messages [#CAMs](#) tend to experience collisions.


👤 Our partner from [@i2CAT](#) and other researchers propose an adaptive CAM messaging algorithm based on [#AoI](#) 📄 <http://ow.ly/BgWu50NzSZT>

### LinkedIn

💬 Did you know that a significant challenge in 802.11p based vehicular ad hoc networks [#VANETs](#) is that the cooperative awareness messages [#CAMs](#) tend to experience collisions?

 Our partners from [i2CAT Foundation](#) and other researchers propose an adaptive CAM messaging algorithm based on the emerging methodology of the age of information [#AoI](#).

Their objective is to minimize an age-penalty function in a trajectory prediction application.

 In their design, each vehicle will compute a local penalty which serves as an indicator on whether the CAM messaging frequency is appropriate for its [#mobility](#) status. It also calculates an appropriate penalty associated with all its neighbours which serves as an indicator regarding the impact of network congestion on the trajectory prediction quality.

 Learn more here: <http://ow.ly/aAwS50NzSZS>

[#futuremobility](#) [#5GMED](#)

### Banner




The banner features a dark blue background with the 5GMED logo in the top right corner. On the left, the text 'SCIENTIFIC ARTICLE' is displayed in white, underlined with a horizontal bar. Below this, the title 'Adaptive Messaging based on the Age of Information in VANETs' is written in white. The bottom right of the banner is decorated with several thin, white, curved lines that sweep across the space.


### 9. Evaluation of AI-based Smart-Sensor Deployment at the Extreme Edge of a Software-Defined Network


#### Twitter

 [#5GMED](#)'s partners [@CttcTech](#) & [@i2CAT](#) propose an [#AI-based](#) smart- sensor solution able to be deployed at the extreme edge of the network: on the vehicle.

 The architecture for the connected vehicle is presented, together with accuracy results here: <http://ow.ly/E9uL50NAf81>

#### LinkedIn

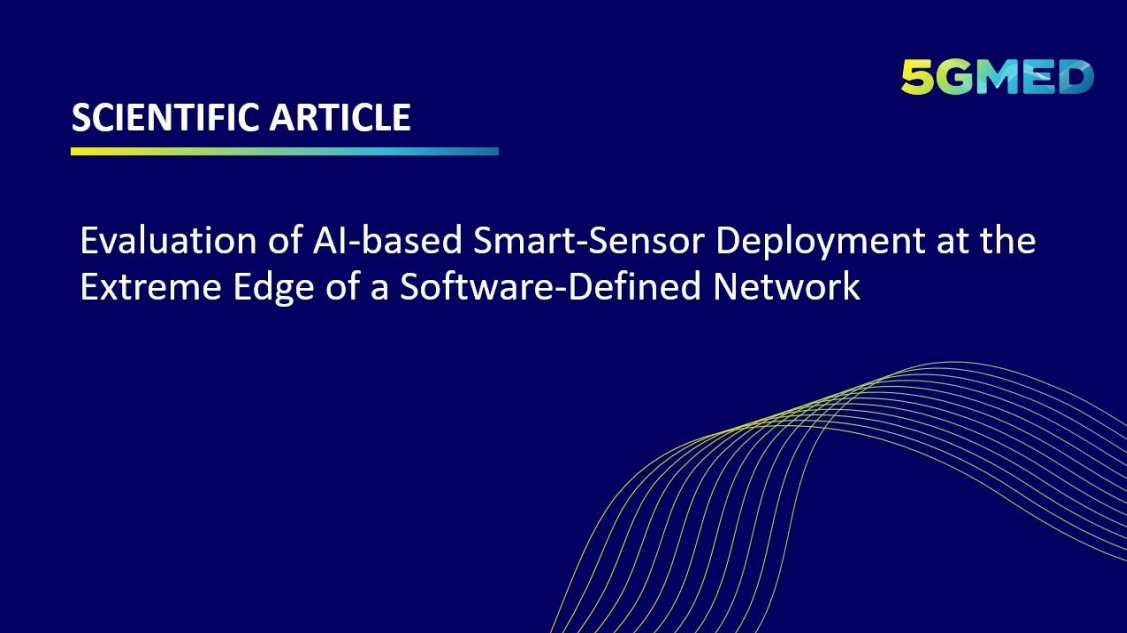
 The [#5GMED](#) partners [Centre Tecnològic de Telecomunicacions de Catalunya \(CTTC\)](#) and [i2CAT Foundation](#) have proposed an [#AI-based](#) smart- sensor solution that is able to be deployed at the extreme edge of the network: for example, on the vehicle.

 The architecture for the connected vehicle is presented, and accuracy results are provided for the proposed smart sensor in the scientific article below.

 Read it now: <http://ow.ly/uwp550NAf80>

[#5GMED](#) [#futuremobility](#)

### Banner



The banner features a dark blue background with the 5GMED logo in the top right corner. On the left, the text 'SCIENTIFIC ARTICLE' is displayed in white, underlined with a horizontal line. Below this, the title 'Evaluation of AI-based Smart-Sensor Deployment at the Extreme Edge of a Software-Defined Network' is written in white. The bottom right of the banner is decorated with several thin, white, wavy lines that create a sense of motion or data flow.

### CONTACT

For any questions, doubts or more info, contact:

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[mgrassler@mobileworldcapital.com](mailto:mgrassler@mobileworldcapital.com)