5GMED

D8.3. First impact report and plan update

WP	WP8
WP Leader	MCWB
Responsible Author	Marta Portalés
Contributors	Marjorie Grassler
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

DOCUMENT HISTORY

Version	Status[1]	Date	Comments	Author
1	Draft	17/01/2022	FMWC	Marjorie Grassler
2	Review		Cellnex	
3	Submission		Cellnex	Raül Gonzalez Prats
4	Draft	07/12/2022	FMWC	Marjorie Grassler
5	Review			
6	Resubmission		Cellnex	Raül Gonzalez Prats

[1]

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

LIST OF ABBREVIATIONS AND DEFINITIONS

DoA	Description of Action
EC	European Commission
H2020	Horizon 2020
GA	Grant Agreement
CA	Consortium Agreement
KPI	Key Performance Indicator
WP	Work Package
CCAM	Connected Cooperative and Automated Mobility
FRMCS	Future Railway Mobile Communication System
FMWC	Fundació Mobile World Capital

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Executive summary

Deliverable 8.3 First Impact report and plan (M18) is related to Work package 8 Impact maximisation. The document aims at presenting the results obtained by executing the dissemination, communication, and exploitation strategy defined in deliverable 8.2 Impact maximization plan (M6).

The communication strategy results describe the activities and its impact on the project. During the period reported, communication tools such as Website, social media, Videos, Newsletter, press release, communication material have been used with the aim of raising awareness and explaining the project to a wide-range of sector-specific stakeholders, as well as society at large, in order to contribute to the acceptance of CCAM/FRMCS technologies. For each tool, the document presents the activities performed and the result obtained through the extraction of data (views, impressions, open rate). The analytics contribute to detect the activities with most impact and to adapt the plan in order to improve 5GMED visibility in the 5G ecosystem.

The dissemination plan results report about the participation in scientific and industrial and describe the dissemination of the results of 5GMED between M6 and M18. The objective of the plan is to reinforce the 5GMED impacts increasing stakeholders' dialogue and acceptance. The results show the need to increase the publication of papers and the participation to scientific conferences.

The document also reports the collaboration opportunities with other European projects and the participation in associations. By establishing communication bridges with the ICT-18 and ICT-53 projects, 5GMED looks at leveraging the experiences and knowledges of the different projects. Future collaboration activities will give the potential to find new synergies between the partners' projects.

The exploitation plan progress description in the deliverable presents each partner's overall and individual progress to the main 5GMED milestones. The main breakthrough is the definition of the 5G network architecture to support large-scale 5G services in the special conditions of the Spain-France corridors with potential extensions to any European cross-border area. The exploitation plan is divided into three phases following the technical development and maturity progress.

1. Introduction

The Deliverable 8.3 First Impact Report and Plan Update compiles, as defined in Work Package 8 (Impact Maximization), all dissemination, liaison and communication activities during the reporting period, including also the results of the monitoring and assessment strategy. Any update in strategy and planned activities will also be provided as appropriate. The preliminary exploitation plan will be provided assessing the first outcomes of the project.

WP8 aims to maximise 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**.**

This report also analyses the progress of dissemination and communication activities to continue and improve the work done so far. All 5GMED partners are involved in supporting the dissemination and communication activities by providing content, participating in events, and promoting project initiatives and outcomes.

Furthermore, the document contents the preliminary exploitation plan results developed under task 8.3, which begun in M16 and led by **Eightbells.**

5GMED
D8.3 FIRST IMPACT REPORT AND PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

2. Impact maximisation plan overview

As described in D8.2, the Impact Maximisation Plan, and the management and the implementation of the communication and dissemination activities is led by **FMWC**, supported by **I2CAT** for the liaison activities (T8.2) and **Eightbells** for the exploitation plan (T8.3)

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

As stated in D8.2, the specific objectives of the 5GMED Impact Maximisation Plan are to

- Create targeted dissemination activities to outreach stakeholders from industry and scientific communities and the public sector,

- Develop a society awareness communication strategy

- Initiate a liaison with 5GPPP and CCAM platforms,

- 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 these specific objectives, three types of strategy have been deployed and described in the D8.2: communication strategy, dissemination activities, and an exploitation strategy.

3. Task 8.1 Dissemination and outreach

3.1. Communication strategy results

At the project level, the impact of the communication strategy has contributed to

- Create 5GMED's brand (Website, logo, videos)

- Raise awareness on the project (e.g., general information on the project available on the website, marketing material),

- Share knowledge on 5G technologies (e.g., 5GMED Lexicon),

- Arouse interest (e.g., Partners' interview) on the project and on 5G technologies

- Address challenges and opportunities to the identified stakeholders (e.g, workshop)

- Leverage the partners' network (e.g., social media)

In the following section, the metrics of the communication tools and channels will be analysed to understand their impact and how they can be improved.

3.1.1 Website

The website, as the main tool to communicate about the project, was updated with new sections in December 2021. A social media (Twitter and Linkedin) contents were created to inform the 5GMED community about the changes. The video that illustrates the copy below is available in the following link. The campaign achieved 1612 impressions across LinkedIn and Twitter.
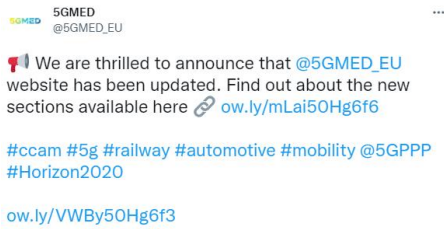
Figure 1 Twitter copy of the new sections of 5GMED website

The new sections added on the website clearly communicate and disseminate the project and its results to the 5GMED community. The website was also improved by adding project material and a better structure to facilitate the finding of said relevant material.
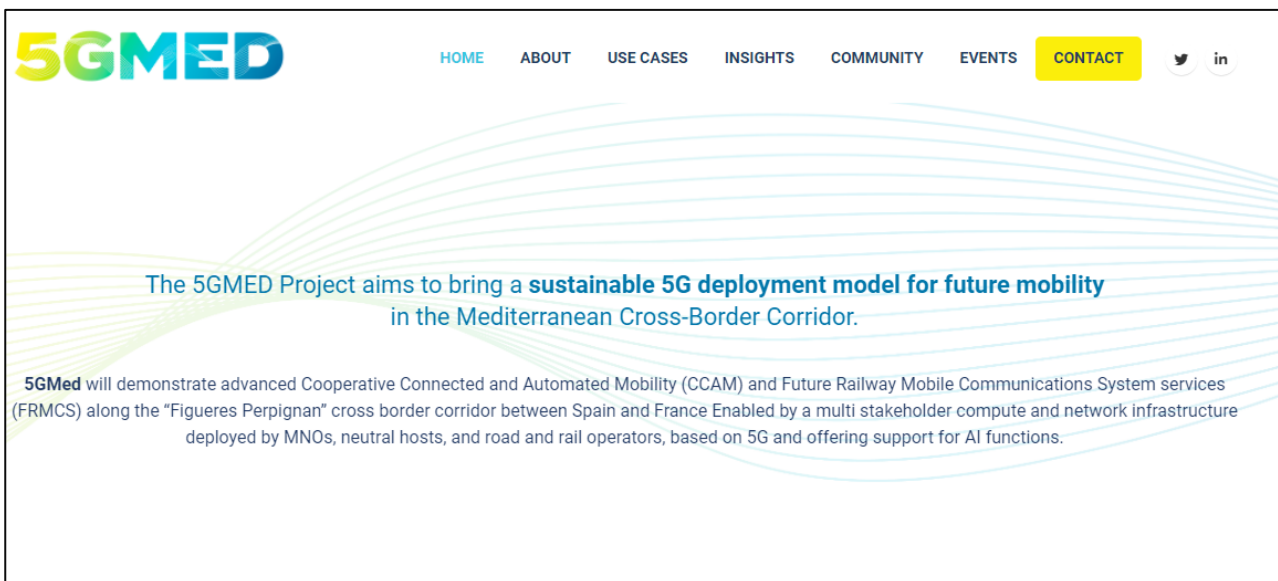
Figure 2 Screenshot of 5GMED website home page

Apart from the Home page, the website is structured into 6 sections and 19 subsections:

- **About (including project presentation):** Methodology: Introduction into how the project will be deployed, as well as the technology and impact objectives; Partners: Map of the partners and their roles in the project; Test sites: Description of the test sites used for the use cases; 5GMED Lexicon: Definition of technologies used in the project

- **Use cases** (including description of each use case): Use case 1, Use case 2, Use case 3, Use case 4

- **Insights** (including articles and relevant resources): Article section: Publications that summarise brochures or articles from ICT, mobility, and telecom sectors related to 5GMED; Deliverables: Publication of the public deliverable; Interview: Promotion of the partners' roles in the project; Newsletter: Newsletters available and shared with the community; Press release: Press releases published by FMWC; Scientific Paper: Scientific publications

- **Community** (list of the communities with which the project 5GMED is associated): Working group: Publication of the work carried out as a result of 5GMED participating in working groups

- **Events (carousel of events):** Event participation: Chronicle or description of project/partner participation in events; Policy-making workshops: Communication about the workshops been held

- **Contact** (including contact form): In-Media: List of the publications that mention 5GMED; Dissemination material: Access to different material such as a brochure, logos, etc.

Since the beginning of the monitoring of the website until January 2022, 5GMED.eu has received 1102 unique visitors and 6672 page views.

Users	New Users	Sessions	Number of Sessions per User	Page Views	Pages/Session
1,102	1,103	2,188	1.99	6,672	3.05

Avg. Session Duration	Bounce Rate
00:04:01	56.72%
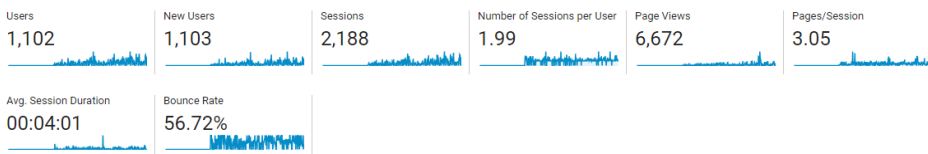
Figure 3 Google Analytics screenshot of the main data for the 5GMED website

English is the main language of the visitors, then Spanish and French. Mainly the visitors of 5GMED website are coming from Spain and the United States, then from France, Greece and Germany.

Language	Users	% Users
1. en-us	383	34.66%
2. es-es	253	22.90%
3. en-gb	103	9.32%
4. es	68	6.15%
5. fr-fr	47	4.25%

Figure 4 Google Analytics screenshot of the visitors' languages

Country	Users	% Users
1. Spain	458	41.00%
2. United States	123	11.01%
3. France	85	7.61%
4. Greece	60	5.37%
5. Germany	49	4.39%

Figure 5 Google Analytics screenshot of the visitors' country of origin

The higher points in the graphic below (which correspond to a rise in visitors) are related to the project's participation in events: In June 2021, 5GMED participated at the Mobile World Congress 2021 and in November 2021, 5GMED's partners presented 5GMED during a panel during the 5G Techritory event.
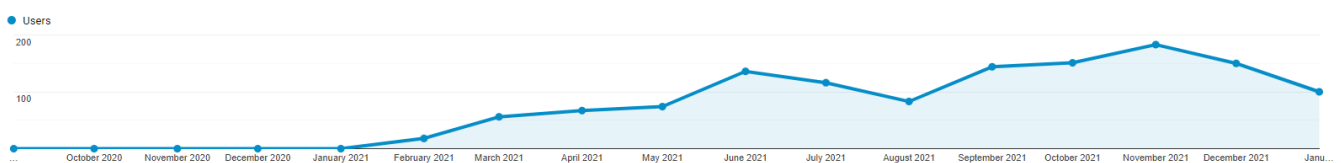
Figure 6 Google Analytics screenshot of the evolution of the website visitor numbers

The following figure represents the ten most visited pages on the website. The first is the landing page with 2166 visits, then the insights page with 565 visits and the third is the page that describes the project with 519 visits.

Page		Page Views	% Page Views
1. /		2,166	32.46%
2. /insights/		565	8.47%
3. /about/		519	7.78%
4. /events2/		361	5.41%
5. /use-case-1/		283	4.24%
6. /use-case-2/		187	2.80%
7. /use-case-3/		186	2.79%
8. /use-case-4/		146	2.19%
9. /category/deliverable/		74	1.11%
10. /5gmed-at-the-mobile-world-congress-2021/		73	1.09%

Figure 7 List of the ten most visited pages of the 5GMED website

Articles are published on the 5GMED website to create awareness of the project. The objective is to create original and relevant content that can be shared with the project's key stakeholders.

Title	Date	View
5GMED at the Mobile World Congress 2021	05/07/2021	73
Cooperation, the key to the future of mobility	06/09/2021	73
5GMED: The future of mobility in the Mediterranean cross-border corridor	16/06/2020	71
The future of the mobility: Future Railway Mobile Communications System	02/12/2021	70
Hispasat, the satellite operator assuring service continuity for 5GMED project	06/25/2021	54
Linea Figueras Perpignan: an infrastructure at the service of the 5GMED project	09/30/2021	49
"5G everywhere": 5GMED presentation in the 5G PPP Webinar	09/11/2020	44
Nearby Computing, orchestration provider for 5GMED	07/12/2021	42
5GMED – First external advisory board meeting	29/09/2021	41
FRMCS will boost the business activities in the railway sector	21/04/2021	41

Table 1 The 10 most visited articles on the 5GMED website

The *Interview* section is dedicated to promoting the partners of the project and their actions within 5GMED. For each partner, banners have been created, as well as a social media campaign

Title	Date	View
Hispasat, the satellite operator assuring service continuity for 5GMED project	06/25/2021	66
Nearby Computing, orchestration provider for 5GMED	07/12/2021	44
CTTC, a contributor to 5GMED architecture and in-vehicle extension	08/12/2021	8
Linea Figueras Perpignan: an infrastructure at the service of the 5GMED project	09/30/2021	56
Eight Bells, 5GMED Innovation Manager	10/22/2021	24

ATC, 5GMED's tourism mobile app developer	01/09/2022	33

Table 2 Partners' Interviews published on the website

The following table indicates the provisional publication date of the interviews with 5GMED partners, to explain their role within the project. This type of communication addresses all sectors.

Provisional title	Provisional Date of release	Partners
Comsa, 5GMED expert in the field of telecommunications, energy, and control.	02/2022	Comsa
SNCF, 5GMED railway developer of advanced applications in cross border situations.	03/2022	SNCF
Valeo, 5GMED System Architecture contributor	04/2022	Valeo
Abertis, 5GMED road operator and end user appreciation expert	05/2022	Autopistas
Cellnex, 5GMED coordinator	06/2022	Cellnex
Atos, developer of the info media infotainement in car services	07/2022	Atos
I2CAT, 5GMED technical partner	08/2022	I2cat
Axbyrd, 5GMED manager of the data plane of the network infrastructure	09/2022	Axbyrd
Retevision, 5GMED small scall testbed responsible	10/2022	Retevision
Vedecom, 5GMED developer of AI-assisted technology	11/2022	Vedecom
Vodafone, 5GMED 5G Base Stations in 3,7 GHZ band along AP7 high-way deployer	12/2022	Vodafone
IRT, 5GMED ICT laboratory expert	01/2023	IRT
FMWC, 5GMED communication expert	02/2023	FMWC
Anadolu, 5GMED telematic control unit installor	03/2023	Anadolu
Armines, 5GMED Lidar deployer	04/2023	Armines

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 website called the *5G lexicon*, which focuses on increasing public awareness of this topic.

Provisional title	Provisional Date of release	Partners
The future of the mobility: Future Railway Mobile Communications System	12/2020	FMWC
FRMCS will boost the business activities in the railway sector	07/2021	FMWC
CCAM	03/2022	FMWC
Edge computing	04/2022	NBC
MANO	10/2021	CCTC
MEC	01/2022	CTTC
Multi-technology QoS-aware Gateway (QoS-GW)	02/2022	Axbryd
5G infrastructure	03/2022	Hispasat
Network slicing	04/2022	Comsa
CV2x	05/2022	Vedecom
Backhaul	06/2022	Cellnex
MNO	07/2022	IRT

5GMED
D8.3 FIRST IMPACT REPORT AND PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

LBO	08/2022	IRT
LTE	09/2022	Vedecom
Mmwave	10/2022	Cellnex
Core network	11/2022	I2CAT
O-ran neutral host	12/2022	Cellnex

Table 4 List of articles about 5G technologies

Other publications

- First in-person consortium meeting of 5GMED partners at the Castellolí Parcmotor 07/14/2021

During the hybrid meeting, the discussions focused on the challenges and the next steps of the project. The conversation helped to shape the actions and the calendar of 5GMED, but also to strengthen the engagement of the partners. A short video (Available on the YouTube channel) and a social media campaign were created.

- 5GMED – First external advisory board meeting 09/29/2021

The coordinator of 5GMED highlighted the essential points that illustrate the project's complexity, such as the network deployment, the different deployment areas, and the project phases. During the meeting, the different members of the advisory board were raising questions about technical aspects of the project that were answered by the individuals responsible for the work packages. A social media campaign was created to share the information with the community.

Assessment: The website has undergone improvements during its first year and will continue to be updated throughout the duration of the project. According to the data, participation in events increases the number of visits to the website. The 5GPPP initiative is another essential source of website traffic, and therefore 5GMED will continue to strengthen its relationship with 5GPPP through the activities defined in t8.2 and t7.1. The Connected Automated Driving database listed the 5GMED project, also bringing in website visitors. In addition to this, social media campaigns bring in a sizeable number of visitors, and will continue to be used until the end of the project. The insights section has been divided into different subsections in order to ensure better access to the content. The new section 5GMED lexicon and the executive summaries of the public deliverables will contribute to the dissemination of the project results. The monthly WP8 meeting as well as the partners' dashboard help to track the partners' participation and to prepare the social media campaigns.

3.1.2 Videos

A set of 6 explanatory videos will be created during the project's lifetime. The first video, released during the Mobile World Congress 2021, presents the aims of the project and the use cases through a mix of real images and animation, based on the material shared by partners and the use case infographics previously created.
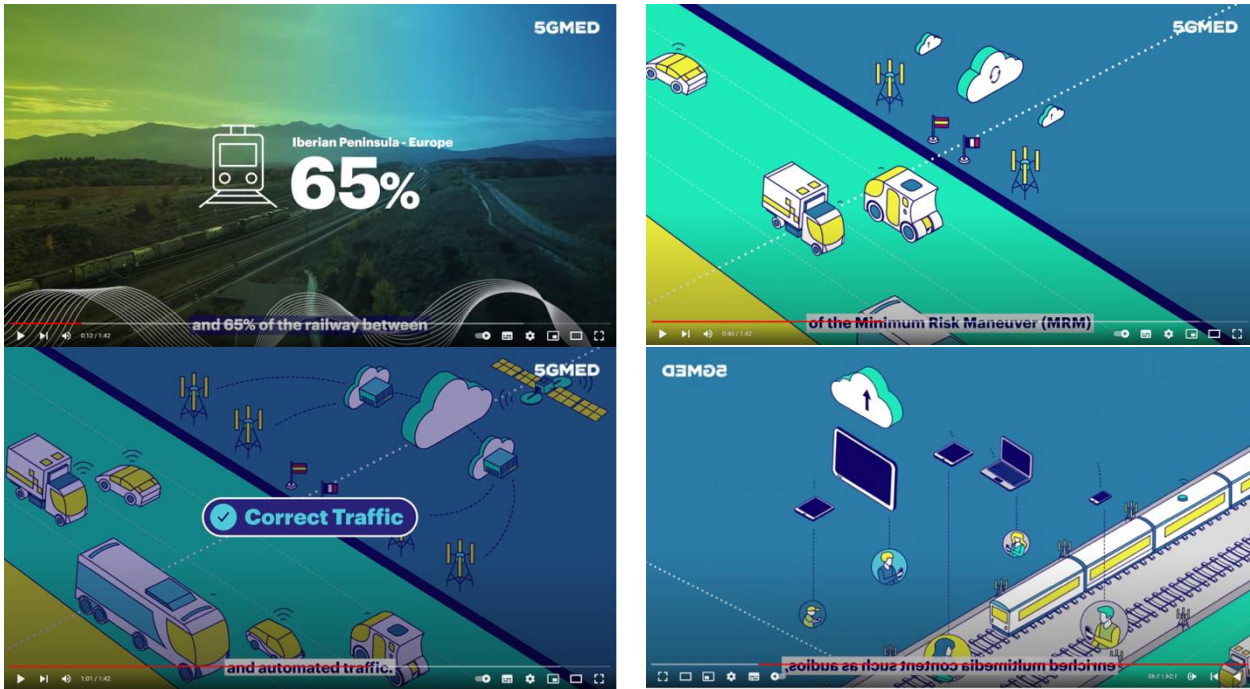
Figure 8 Screenshots of the first 5GMED video

The video was updated with a final sentence: "*5GMED creates future 5G mobility services infrastructures*" in July 2021. Since this date, the video has been viewed 219 times. Another update, which is currently underway, is creating an infographic to demonstrate the wider vision of the project. This represents the project as a whole and will be animated to appear in the current video. This new video will also be showcased during the Mobile World Congress 22, where 5GMED will have a stand. The videos have been uploaded on the 5GMED YouTube channel, the website, promoted on social media through a dedicated campaign, and showcased in different project presentations and events (5GTechritory).
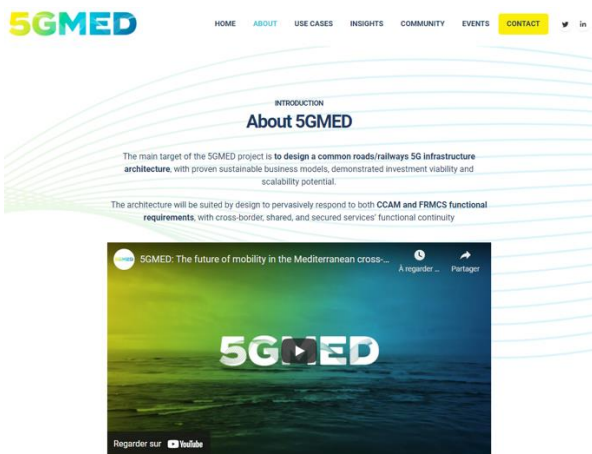
Figure 9 Screenshot of the 'About' section

Figure 10 Screenshot of a twitter post

Assessment: The first video has been updated in order to promote a more general overview of the project. The first version was primarily focused on the use cases and did not reflect enough the complexity of the project. The next version will integrate a more complex animation but also a more global explanation of the project objectives. Four other videos will be produced to disseminate the use

case results. A sixth video will be created to explain all the outputs of 5GMED at the end of the project (M48).

3.1.3. Social media

The Twitter account is followed by 462 people, and 522 tweets (30th o fDecember 2022) have been posted. Lists of contacts have been created in order to use the tool efficiently. Private messages are sent to specific groups of people to inform about events or panels.

Figure 11 Screenshot of 5GMED Twitter account (15/02)

Figure 12 Screenshot of the Hootsuite report about ton the 10 posts with most impressions on Twitter

The LinkedIn account is followed by 205 members who are mainly from the telecommunication sector (53), followed by people in the research (28) and ITS sectors (27), and lastly the Automotive sector (13).

Figure 15 5GMED LinkedIn account
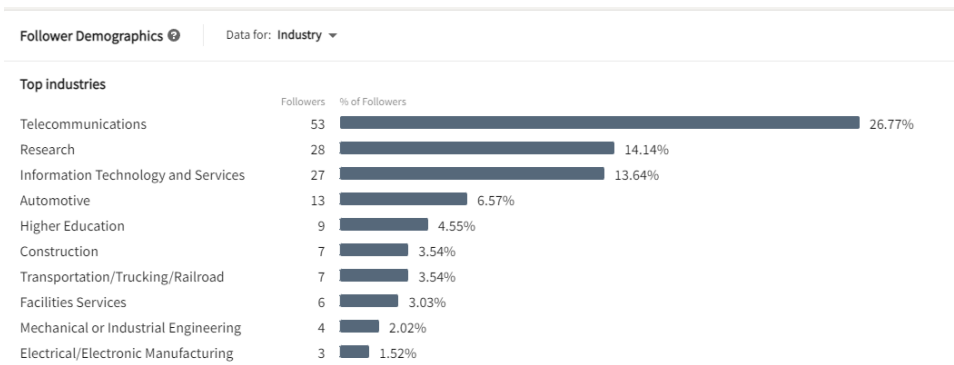
Figure 16 Top industries of the 5GMED LinkedIn profile followers

Communication toolkits are created for the 5GMED partners, for them to share messages on their own social media channels. There are available on redbooth and Teams are usually composed of a series of texts for Twitter and LinkedIn, and visual materials (banners or videos). All material shared can be used by the partners.

Figure 17 Example of communication toolkit shared with the project partners

Social media campaigns are created to promote messages to specific stakeholders: General objective, Website, Impact, Methodology, Partners, Use cases, Newsletter.

> **Assessment:** social media, printed media and related associations monitoring contribute to increasing the 5GMED community. Awareness of the project has been raised through different social media content that have helped to place the project among the 5G ecosystem. The next campaigns will have to be more targeted to reach the specific stakeholders identified in the project.

3.1.4. Marketing material

A one-pager with information about the project has been created and printed. It is available on the website as part of the dissemination material.

Figure 18 One-pager of 5GMED

> **Assessment:** A switch to paperless in-person and also online events has impeded the sharing of this kind of document, however the brochure is available online and for the next events, and will be distributed to the interested stakeholders within the marketing material. During the rest of the project, the brochure will be updated to focus on the general message and in parallel a catalogue of use cases will be created.

3.1.5. Press releases

Press releases are distributed among local, national, and European media and press contacts to spread the word about the milestones achieved by the 5GMED project and its 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. Press clippings have been listed in the website.

Press release Nº	Tentative date	Title
1	1/06/2020	Project presentation
2	TBD	Project participation to relevant event
3	TBD	Demo results
4	TBD	Project participation to relevant event to showcase results
5	TBD	Final project presentation
6	1/09/2024	Final Project Press Release

Table 5 5GMED press release tentative schedule

Assessment: The first press release was successfully shared by the European media and press. The next press release will be related to participation to events and to the demo days results.

3.1.6. Newsletter

The trimestral newsletter includes news items about the project's activities and work, self-published blog articles, information about the project's participation at events and calls for papers. The aim of the newsletter is to bring together project highlights and push out announcements of interest to all target stakeholders.

Newsletter	Date	Open rate
6th Newsletter	07/2022	34%
5th Newsletter	04/2022	50%
4th Newsletter	01/2022	50%
3rd Newsletter	10/2021	47%

Table 6 Newsletter published during the reported period

A newsletter template specific to the 5GMED Project was developed in M1, and can be accessed through the website. The newsletter has 55 subscribers so far.

Newsletter	Date
7th	September 2022
8th	December 2022
9th	February 2022
10th	April 2023
11th	June 2023
12th	September 2023
13th	December 2023
14th	February 2024
15th	April 2024
16th	June 2024
17th	September 2024

Table 7 Tentative calendar of the 5GMED newsletter

A series social media posts were published to invite the interested stakeholders to subscribe, including an engaging short video. A registration form is also available on the website.
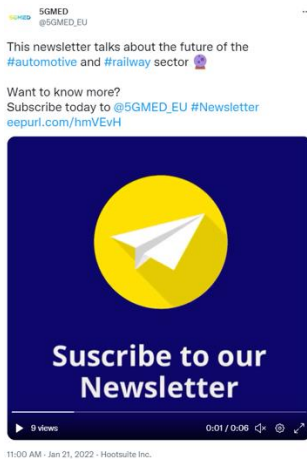
Figure 19 Twitter post of the Newsletter Figure 20 Screenshot of the registration form

Assessment: The newsletter is public and not exclusive. Participation in events is one opportunity to get people to join the community. The newsletter content should also have more information related to the progress of the project. From March 2022 onwards, partners will share their results through an executive summary published on the website and disseminated through the newsletter.

- Communication Materials: 5GMED has prepared printed marketing materials with the goal to engage and communicate to interested audiences the achievements of the 5GMED Project.

- Discussions have started with other ICT-53 EU projects (5GRail, 5G Blueprint, 5G Routes) to create Communication and Dissemination workshops. The first action is the organisation of a workshop together with ICT-18 (5GCroCo, 5GMobix, and 5GCarmen) presented during the EuCNC 2022.

- Workshops on Policymaking: A series of 4-6 workshops will be organised during the second and third year of the project to discuss the main challenges of 5G implementation, understand the European tendencies on 5G mobility policy making, and create a space of conversation/debate about 5G mobility policy making. Task 7.3

Assessment: The discussion started with the other ICT-53 projects will lead to organising a communication and dissemination workshop, with the objective of sharing best practices, but also to establish a calendar to participate together in events. The first policy-making workshop will take place during the Mobile World Congress 2022.

3.2. Dissemination plan results

At a project level, the dissemination plan has helped to:

- Share the project objective and progress (e.g., participation to event)
- Contribute to scientific research related to 5G technologies
- Establish synergy between 5GMED's partners to collaborate on the elaboration of papers
- Detect the topic that will be origin of papers

Globally, the same tools and channels will be used to disseminate the results of the project: website, videos, blog articles, flyers and brochures, event, social media, newsletter. In addition, the project will publish its results in scientific journals and conferences and make the results visible through the publication of the public deliverable on the website.

3.2.1. Event participation

The events that the project has participated in are shared with the 5GMED community on a specific page on the website, describing how 5GMED participates in an event.

Event	Partner	Date	Target group	Participation
Diálogo en torno a las infraestructuras ferroviarias	COMSA	30/10/20	Mobility	Online Oral presentation
"5G everywhere": 5GMED presentation in the 5G PPP Webinar	Cellnex	11/09/20	Telecommunication	Online Oral presentation
23rd EURO Working Group on Transportation Meeting. Addressing Cybersecurity In The Next Generation Mobility Ecosystem With Caramel, 2020	I2CAT	16/09/20	Mobility	Assistance
Digital Transport Days 2020	FWMC	18/11/20	Mobility	Assistance
AMETIC Commission "Connected Vehicle and Sustainable Mobility"	I2CAT	9/02/21	Mobility	Online Oral presentation
La connectivitat 5G. Reptes i oportunitats per a la mobilitat del futur"	Cellnex	11/03/21	Telecommunication	Online Oral presentation
Interactive Symposium on Research & Innovation for Connected and Automated Driving in Europe(EUCAD)	FWMC	20/04/21	Mobility	Online Networking
XX Congreso Español ITS: ITS as a Service.	AAE	15/04/21	ITS	Oral presentation (Madrid)
5G Forum	Hispasat	02/05/21	Telecommunication	Oral presentation (Malaga)
Mobile World Congress 2021	Cellnex, AAE, Vedecom	28/06/21	Telecommunication	Panel (Barcelona/Online)
Webinar "Desarrollos Innovadores en el Sector Ferroviario"	Comsa	15/07/21	Mobility	Online presentation
Trafic	Comsa	02-04/11/21	Mobility	Oral presentation (Madrid)
Smart City Expo Barcelona	AAE	17/11/21	Telecommunication	Oral presentation (Barcelona)

Connected 5G: Europe and Spain facing the challenge of smart mobility	Cellnex	26/11/21	Telecommunication	Panel (Madrid)
5G Techritory	Cellnex, AAE, SNCF	11/11/21	Telecommunication	Online panel

Table 8 5GMED events' participation

Assessment: Partners will continue to participate in events to share the results of the project. Partners have access to material marketing and toolkits to disseminate about the project.

3.2.2. Scientific publications and conferences

Key Performance Indicators	M06	M29	M36
Participation in relevant scientific events	3	10	20
Presentations or demonstrations of 5GMED use cases in industry events	3	20	40

Table 9 Table of scientific publications and conferences KPIs

The following table lists the participation to conference or scientific events:

Event/conference	Date	Partner involved	Target group
5GMED at Infocom Gr 2020	11/12/2020	Eight Bells	Telecommunication
5GMED at the IEEE 5G Summit	05/13/2021	Cellnex	Telecommunication
5GMED at SEMANTIC event	26/01/2022	NearByComp	Telecommunication

Table 10 List of 5GMED participation to scientific events

3.2.3. Dissemination of public deliverables

The 25 public deliverables will be uploaded on the website.

#	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	5G-M ICT architecture and initial design	3	RET	R	PU	M11
D3.3	First release of 5G-M ICT infrastructure	3	VEDE	R	PU	M20
D3.4	Final release of 5G-M ICT infrastructure	3	NBC	R	PU	M32s
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

5GMED
D8.3 FIRST IMPACT REPORT AND PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

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 11 List of the public deliverables

All results that are available and ready to be public will be disseminated through the different channels already introduced in the previous section.

A series of blog posts will be published to present the results obtained for each public deliverable (WP2-WP7). Each publication will be disseminated on the 5GMED social media.

Provisional title	Related deliverable	Partner	Date of release
Introduction to 5GMED use cases	D2.1	IRT	2022
5GMED test cases, deployment options and tools	D2.2	VEDE	2022
Results of the analysis of 5GMED infrastructure requirements and 5G HO between networks & cross-border	D3.1	VDF	2022
5G-M ICT architecture and initial design	D3.2	RET	2022
Final release of 5G-M ICT infrastructure	D3.4	VEDE	2022
Requirements and initial design for Automotive test cases	D4.1	ATOS	2022
Pre-integration apps for Automotive test cases	D4.3	AAE	2022
Final apps for Automotive test cases	D4.4	AAE	2023
Railways application requirement analysis report	D5.1	CMS	2022
Initial design for FRMCS and railways infotainment test cases	D5.2	SNCF	2022
Pre-integration for FRMCS and railways infotainment test cases	D5.3	IRT	2023
Final implementation for FRMCS and railways infotainment test cases	D5.4	ATOS	2023
Test case definitions for the small-scale testbed	D6.1	VEDE	2022
Integration and validation of use cases in small scale testbed	D6.2	CMS	2023
Test case definitions for the cross-border trials	D6.3	RET	2023
Integration and validation of use cases in cross-border corridors	D6.4	AAE	2023
Cross-border market viability and market analysis	D7.1	RET	2022
Business models and replication plans	D7.2	8BLS	2023
Policies, regulations, and standardisation for 5G CAM deployment	D7.3	I2CAT	2023

Table 12 List of blog posts related to the public deliverable

Assessment: In order to reach the KPIs, a monthly scientific meeting has been created together with the scientific partners to identify opportunities to publish papers or to participate in scientific events. The objective is to establish a calendar with publication opportunities.

4. Task 8.2. Liaison's activities results

The activities planned under this task, which has been strategic to maximise the impact of the Project, are meant to focus on collaboration opportunities with other European projects and in the participation in several partnerships and associations, as described below:

- Task force with the other ICT-53 projects created in order to discuss and share joint communication activities. All projects have been engaged. Presentation about its objectives and potential discussions attached (5G4CAM_taskforce.pptx). The objectives are:

- Maximise impact of the ICT-53 projects by identifying joint activities for dissemination and communication

- Share best practices and strategies for the dissemination and communication in the context of CCAM, 5G and cross-border corridors

- Build up joint events and webinars to increase the visibility towards different projects

- A workshop proposal for EUCNC22 was submitted. All ICT-53 and ICT-18 projects from Horizon 2020 were involved (both the first and the second waves of cross-border projects), in a total of 7 Horizon 2020 projects discussing the different transportation modes use cases in 5G cross-border corridors. The feedback received from the conference was that, although the content of the workshop proposal and selection of speakers were promising and suitable for an event of this impact, the scope for such an edition of EUCNC was aimed towards 6G technologies and in addition given the limited number of workshops sessions that could participate, the proposal was rejected. Consequently, a booth space was reserved at the conference in order to give visibility to all ICT-53. The booth was shared with 5GRoutes and 5G-Blueprint. 5GRail was not able to participate since they were engaged for another event. The three projects' members were able to exchange about common challenges, technical aspects, experiences and issues.

Figure 21 ICT-53 booth during the EuCNC22

- A set of own webinars in order to elaborate on the technical achievements of the ICT-53 projects were planned. These webinars were focused on the technical outcomes of the projects and were targeted to other European members that are looking for best practices and policies in the context of the European ecosystem. The set of webinars were planned and a visibility plan announcing them on the website and social media was set. However, after careful consideration and in order to alleviate the workload of the different teams, the approach set for these events is to combine them together and target one or two higher impact events instead of having multiple, lower impact webinars. These higher impact events have already been identified, as explained below.

- Participation at the ITS European Congress 2023 is in progress. A collaborative effort together with the other ICT-53 projects is aimed at preparing a proposal for a Special Interest Session and an additional exhibition booth. The Special Interest Session will be a panel discussion with a representative of each ICT-53 project and will focus on the challenges and joint collaboration opportunities of the different transportation modes and use cases in 5G cross-border corridors. The technical overview of the different projects will be presented at the exhibition booth.

- A tentative tutorial presentation at EUCNC23 has been identified. This tutorial will have a more technical focus on the achievements of the projects and is expected to attract other European members that are looking for best practices on the technical aspects of 5G and cross-border corridors.

- An additional workshop in an event of impact is set to be held in 2023. The selection of the event will be done after evaluating the outcomes of the ITS European Congress.

- A database of contact information and an overview of the progress performed by the different working groups https://5gmed.eu/category/working-group/ through the project has been created. This will be used to sync their different activities and identify future tasks that may result as an outcome of 5GMED. Additionally, the different members are given an ecosystem of European partners and can use this platform to further expand their collaboration opportunities.

- Future activities will include meetings with European associations like CCAM, in order to find common points of interest for collaboration with strategic associates. Furthermore, once the first CCAM projects from Horizon Europe are running (which is expected around September 2022), contacts will be established for collaboration activities.

5. Task 8.3. Exploitation plan

The exploitation actions of 5GMED will be performed in the context of Task 8.3, aiming at transforming the project's outcomes into assets that will be readily exploited by the consortium as a whole and by their identified owners. The identification of the targeted market and specifically the identification of the needs of the various market segments related to the targeted value chain are of great importance to the project and should follow the technology and market evolution. In addition, the generation of clear exploitation plans (for both the use and commercialization of the new technologies and systems) is essential for the targeted access to market and for the creation of the appropriate synergies among stakeholders for the promotion of the proposed solution to the CCAM market.

The above constitute the main pillars of the 5GMED exploitation strategy, which will be collectively developed and regularly updated by the consortium following a set of specific exploitation activities that comprise:
- The identification of the innovative exploitable assets, whether these are technological offerings, research oriented (such as algorithms, models, etc.) or added value services (consulting, training services, etc.) which the project will deliver through its results to its target users.
- The conduction of a thorough market analysis (which will comprise an initial and a final analysis) that will aim at the clear identification of the market towards which 5GMED is targeted.
- The documentation of an analytical IPR management strategy based on the principles outlined in the project CA concerning ownership of results, which will guide joint and individual exploitation capabilities of the project partners.
- The analytical definition of all possible commercial and non-commercial exploitation models, which have been preliminary identified and outlined.
- The validation of exploitation activities through the relevant 5GMED use cases.

5.1. Methodology and phases

The exploitation activities in 5GMED are split into three Phases as shown in Figure 23.
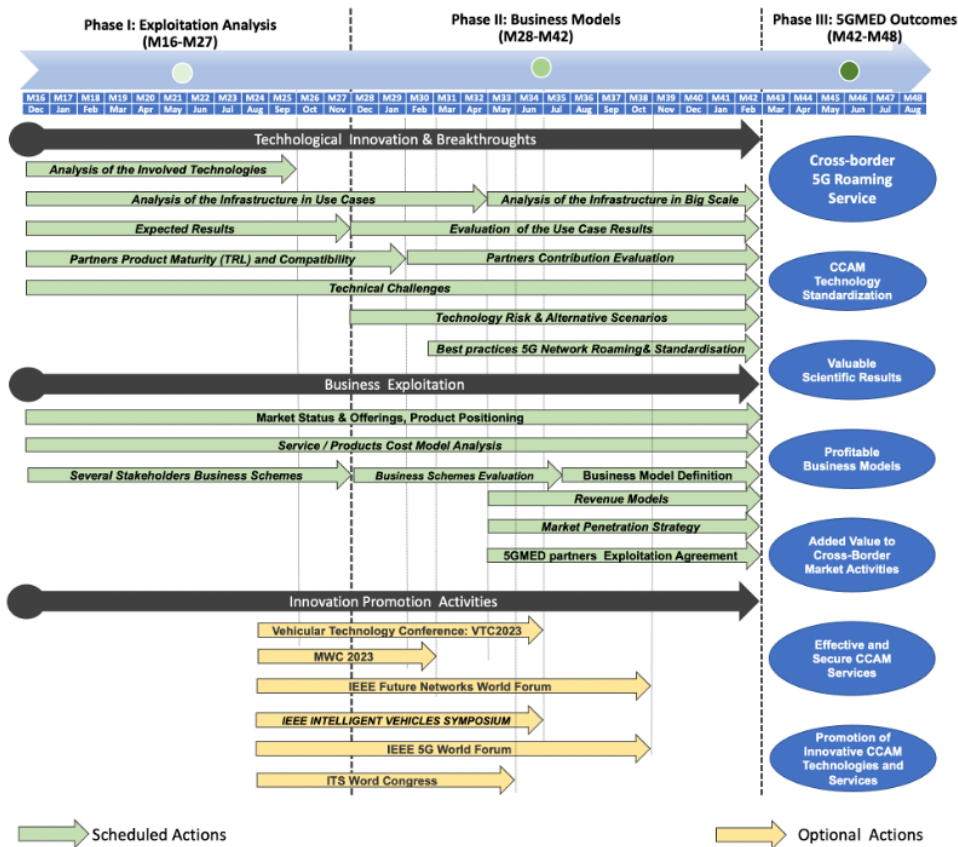
Figure 22 5GMED planning of exploitation activities

Phase I: Exploitation Analysis (M16-M27)

Objective: Identify & Develop Innovation Opportunities

During Phase I we will initially assess the results from the first year of the project by updating the individual exploitation results of each 5GMED partner.

At a second stage, the consortium members will explore specific exploitation paths that are generated from a thorough Market Analysis, providing the link of the aforementioned exploitation results with real-world market penetration and market development opportunities, also taking into consideration the results from the first test and validation phase of the project. In liaison with WP7 activities, the preliminary business models will be developed aiming to enable co-operative ventures and joint exploitation of results. More specifically, Task 8.3 will make use of the results from Task 7.2 which focuses on market viability studies, business models and replication plans. The methodology for the market analysis includes several tools such as SWOT, PESTLE and Porter's Five Forces analysis while tools such as the Business Model Canvas and Value Network Analysis will be used to describe the models that will strengthen the value proposition of 5GMED results. Phase I activities will focus on the qualitative analysis of market and business defining characteristics such as the key partners, key activities and value proposition. The work will continue also during Phase II in the form of iterative cycles of development. Results generated in the third year of the project, during final testing and validation, will be used to refine the initial exploitation paths and definition of business models.

Phase II: Business Model (M28-M42)

Objective: Validate & Align to Market

During Phase II the Exploitation Plan foresees the further development of the preliminary Business Models also in liaison with WP7, going into further detail focusing on quantitative aspects such as cost and revenue streams. In this direction it will be investigating several corroboration schemes of the involved stakeholders considering each partner's business and technical contribution. Such cooperation will be based on Joint

Exploitation Models and Go-To-Market strategy which will include a solid IPR management and ownership agreements.

Phase III: 5GMED Outcomes (M42-M46)
<u>Maximise potential & Launch to Market</u>
With 5GMED being an Innovation Action, commercial exploitation is foreseen to take place at the end of the project. The plan for Post-project Exploitation comprises the preparation of activities for successful market entry and the provision of the project's results to the targeted end users. Such pre-commercialisation activities include licensing schemes, marketing, promoting, training as well as interactions with Regulatory Authorities to ensure the smooth deployment of the proposed solutions. A roadmap for the above-mentioned activities will be provided by the end of the project.

5.2. Progress so far

This subsection presents the overall progress and contribution of each partner to the project's milestones. In this direction, the definition of the 5G network architecture is the main outcome of the partners' synergies that is expected to bring the 5G project to a new phase of development. Meanwhile, each partner also acts individually to develop its part that will gradually be integrated into the final solution

The following paragraphs outline the synergies of the 5GMED consortium and the exploitation progress of each individual partner.

5GMED Consortium Synergies: The main innovative breakthrough of the 5GMED consortium synergies is the definition of the 5G network architecture that will support the requirements of CAM and FRMCS use cases in cross-border scenarios and could be the main infrastructure to support large-scale 5G services in any European cross-border area. The proposed network structure includes six layers (namely, network infrastructure layer, MEC layer, orchestration layer, slice management layer, cloud layer, and data analytics layer) and four dedicated interfaces for the management of cross-border connectivity. To define this architecture all involved partners have contributed based on their role at each level of development. It is noted that the proposed architecture has been published in a prestigious conference with a high score.

All partners are combining their efforts to test, refine and evaluate the proposed network architecture under real-world conditions with the main highlight being the planned demonstration of the 4 use case scenarios in Castelloli and the Spain-France cross-border corridor. In this direction all use case owners are in close collaboration with the main infrastructure provider Cellnex by developing and testing in parts the proposed architecture providing valuable measurements from the field and suggesting corrections and improvements of the current deployed infrastructure. The main effort of 5GMED partners is to achieve the highest rate of network integration as soon as possible by overcoming all technical issues and defining the optimal and cost-effective processes to transform a conventional 5G infrastructure into a flexible network that will adapt to the dynamic conditions of cross-border areas. In addition, each partner focuses on their individual role achieving progress that contributes to the overall development of the project. The next subsection describes the individual progress of each partner.

Partners Exploitation progress: A detailed Exploitable Results (ER) form (table 13) is followed in order to highlight the progress of individual partner in the overall exploitation progress

Exploitable Result		
General Information		**Instructions**
Name		*Short name*
Description		*Describe the item*
TRL (existing)		*Existing TRL of the Item*
TRL (at the end of the project)		*Foreseen TRL at the end of 5GMED*
How it will be used		*Further Research; Consultancy; Participation in Research projects; Scientific papers; PhD theses; Teaching; Product development; Competence building; Service development; other*
Time plan for use		*Month that will be ready*
Related 5GMED Deliverables		*Deliverables that describe that item*
Related publications		*Existing or future publications related to the Item*
IPR		
Owner(s)		*Owner of the Exploitable Item*
Other beneficiaries involved		*Other partners that are involved (if any)*
Licence		*Licences related to the Exploitable item (e.g. Open source, commercial, etc.)*
Background Information Used (type and owner)		*Background IPR that is used in the Exploitable Item*
Dependencies		*Describe any dependencies with other items (within or out of 5GMED)*
Patents		*Related existing patens or planned to submit (if any)*
Form of exploitation		*(e.g. direct industrial use, patenting, technology transfer, licence agreement, publications, standards, etc.)*
Market (initial)		
What problems it addresses		*What are the needs of potential users that covers?*
Potential Users		*Users that you foresee that can use it (e.g. MNOs, Road/Rail operators, vehicle manufacturers, SMEs, etc)*
Main competitors (companies/other projects)		*Known competitors*
Competitive products (name, link)		*Name of competitor solutions (if available provide URL)*
Competitive advantages over competitors		*What are the advantages of the Item compared to competition*
Innovations compared to existing products/services		*What are the innovations that are introduced?*
Market Feedback (if any)		*Any contact with possible clients? Showed demo? Discussions? Other?*

Figure 23 5GMED Exploitable Results template

The first part of the form contains general information about the ER i.e., the name, short description, technology readiness level (TRL) as well relations in the context of 5GMED as a whole. The second part relates to the ownership of results and is a preliminary stage of the general IPR strategy that will be implemented throughout the duration of the project. The third part is an initial attempt to characterise the market segment that the specific ER can address by evaluating the potential users, the main competitors as well as competitive advantages.

Exploitable results by stakeholder group
In the following tables the gathered information is presented, categorized by stakeholder group.

Vehicle Manufacturers/OEMS			
General Information	**ER1**	**ER2**	**ER3**	**ER4**
Name	Connected Vehicle	Remote Vehicle (RV)	Valeo Teleoperation Cloud	Valeo TCU - Vulcano 5G
Description	8-meter Electric Bus Connected to 5G Network	This is an automated vehicle (level 3 SAE) going out of its Operating Design Domain (ODD) and request for Teleoperation Driving (ToD) to handle the next driving situations.	A Public Cloud hosted solution that orchestrates data streams and data API calls across multiple endpoints like vehicles, third-party services and remote control stations. The solution includes a dedicated teleoperation service application server for managing remote driving operations.	For this project we develop a prototype TCU that is capable of 5G (Rel 15 and possibly Rel 16) and CV2X.
TRL (existing)	3	3	5	7
TRL (at the end of the project)	7	7	7	9
How it will be used	Participation in Research Projects	Service development	Product development; Competence building; Service development	Product development
Time plan for use	End of the project	November 2022	June 2022	April 2022
Related 5GMED Deliverables	D2.1,D2.2,D3.1,D3.2,D3.3,D3.4,D4.1,D4.2,D4.3,D4.4,D6.1,D6.2,D6.3,D6.4,D7.1,D7.2,D7.3,D8.1,D8.2,D8.3,D8.4	D4.1 / D4.2 / D4.3	D4.1 / D4.2 / D4.3	D4.1 / D4.2 / D4.3
Related publications	NA	NA	NA	NA
IPR	**ER1**	**ER2**	**ER3**	**ER4**
Owner(s)	Anadolu ISUZU	Valeo	Valeo	Valeo
Other beneficiaries involved	Valeo, CTTC	None	IRT / ARMINES / AUTOPISTAS (involved for complementary 3rd party modules, complementary to but independent from VTC solution)	ISUZU / SNCF
Licence	-	RTMaps, ADTF, Marben, ADASIS, Electrobit	Commercial	Commercial
Background Information Used (type and owner)	-		None	None

5GMED
D8.2 IMPACT MAXIMIZATION PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

Dependencies	-	Valeo Teleoperation Cloud Gateway V2X Connected Vehicle	Remote Vehicle Remote Station Mobility Hub QoS Predition Module Environmental Analysis Module	Remove Vehicle V2X Gateway Connected Vehicle Train
Patents	-	None	None	NA
Form of exploitation	Direct Industrial Use	Direct industrial use, patenting, publications, standards	Direct industrial use, patenting, publications, standards	Direct industrial use, patenting, publications, standards
Market (initial)	**ER1**	**ER2**	**ER3**	**ER4**
What problems it addresses	Rich infotainment content during road travel	Extension of autonomous functions	- Conducting remote operations on vehicles without (or with only partial) autonomous driving capabilities. Example: moving a vehicle blocking an access; driving a vehicle out of a factory into a parking space - Assisting remotely vehicles with autonomous driving capabilities in case of operational problems. Example: fault on some lidar sensor impairing full AD; unusual situation where AD is unable to proceed alone (road works) - Providing convenience services for end users of connected vehicles. Example: valet parking service at an airport; delegated driving for long night trips	The TCU provides both Uu (4G and 5G Rel 15/16) and V2X (DSRC/C-V2X) connectivity to the automated vehicle so that the CAV is capable of teleoperated in case if one of the ADAS sensors fails.
Potential Users	Commercial Bus Users, Commercial Bus drivers and Road Operators	MNOs, Road/Rail operators, vehicle manufacturers, end-users	- Operators of shuttle fleets, robotaxis, car leasing - OEMs - End-Users	OEMs, ToD service providers, ToD technolgy providers
Main competitors (companies/ other projects)	King Long / Baidu	5G CroCo, Phantom Auto	Phantom.auto, Designated Driver, DriveU.auto, Ottopia, GetUgo	Standard Tier 1s

Competitive products (name, link)	https://apollo.auto/	None	https://phantom.auto/solution https://designateddriver.ai/technology/ https://driveu.auto/platform/ https://ottopia.tech/ https://www.getugo.com/	Regular TCUs
Competitive advantages over competitors	European Union Tested Solution	Augmented perception, on-cloud perception computing	Valeo is an automotive Tier-1 manufacturer that already provides vehicle sensors, ECUs, ADAS controls and Telematics. ToD is an added solution on top of it. Additionally ToD can be coupled with AD sofware to provide Advanced ADAS for ToD operations.	Early mover advantage of trying out new technologies in research projects.
Innovations compared to existing products/services	-	None	To be investigated	Early integrator of 5G Rel 16 modems. Advanced V2X communication module supporting a variety of use cases.
Market Feedback (if any)	-	Yes. Confidential.	None	NA

Table 13 Exploitation Results of Vehicle Manufacturers/OEMs

Telecom Operators/Neutral Host Providers				
General Information	**ER5**	**ER6**	**ER7**	**ER8**
Name	70Ghz track to train 300km/h validation	TUC	70Gbps TUC integration	Non critical 1Gbps based services knowledge
Description	Validation of 1Gbps connectivity between track and train at 300km/h based on 70Ghz mmWave solution	Multi-bearer system is a smart rules-based autonomous solution that interfaces directly with a number of wireless technologies to intelligently select the most suitable bearer based on availability and customer-defined requirements and aggregate when more than one available	Integration of the mmWave train to track solution into the multi-bearer system for non-critical traffic.	The experience to be gained will allow COMSA to install, integrate, support and operate an Infrastructure's Manager network and the train communications network for the provision of the following services: 1Gb throughput train to track connectivity with low latency via 70Ghz radio solution, Train geolocation by GPS

				over the 70Ghz network, High Quality Passenger Wi-Fi
TRL (existing)	TRL7 at 180km/h train, 200km/h circuit cars	TRL3		
TRL (at the end of the project)	TRL7 at 300km/h trains	TRL7	TRL6	TRL6
How it will be used	Participation in Research projects, Product Development, Competence Building, Service Development, Commercial agreement with supplier solution	Participation in Research projects, Product Development, Competence Building, Service Development,	Participation in Research projects, Product Development, Competence Building, Service Development,	Participation in Research projects, Product Development, Competence Building, Service Development,
Time plan for use	Q4 2023	Q4 2023	Q4 2023	Q4 2023
Related 5GMED Deliverables				
Related publications				
IPR	**ER5**	**ER6**	**ER7**	**ER8**
Owner(s)	Solution supplier	AXBRYD, COMSA	COMSA	COMSA
Other beneficiaries involved	COMSA to make a direct industrial use via comertial agreement			
Licence	Commercial	Commercial		
Background Information Used (type and owner)	Background IPRs are not owned by 5GMED beneficiaries	Basic Mobility Server functionality capable of keeping the sessions across multiple train to track mmWave connections. This background is shared with AXBRYD. COMSA 25% & AXBRYD 75%		
Dependencies	NA			
Patents	NA			
Form of exploitation	COMSA to make a direct industrial use via commercial agreement	Direct Industrial use. Others TBD	Direct Industrial use	Direct Industrial use
Market (initial)	**ER5**	**ER6**	**ER7**	**ER8**

5GMED
D8.2 IMPACT MAXIMIZATION PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

What problems it addresses	Guaranteed 1Gbps low latency train to track connectivity.	Cooperation between multiple railway telecom and public telecom networks. Compatibility between main lines and regional lines. Cost optimisation. Traffic protection.	Guaranteed 1Gbps low latency train to track connectivity in main and regional lines. Cooperation between multiple railway telecom and public telecom networks. Compatibility between main lines and regional lines. Cost optimisation. Traffic protection.	High Quality Passenger Wi-Fi and train location by GPS. Need for guaranteed low latency train to track connectivity for commercialization of additional services to train operators (video, etc…) and mobile operators/OTT
Potential Users	Infrastructure managers as providers of service. Transport operators, MNOs and Train manufacturers as customers.	Infrastructure managers as providers of service. Transport operators, MNOs and Train manufacturers as customers.	Infrastructure managers as providers of service. Transport operators and MNOs as customers.	Infrastructure managers as providers of service. Transport operators and MNOs as customers.
Main competitors (companies/other projects)	5GNR rel 18 supplier vendors	Autonomous Communication Systems manufacturers, Hitachi, Siemens, Alstom Kontron. X2Rail Projects.	Autonomous Communication Systems manufacturers, Hitachi, Siemens, Alstom Kontron. X2Rail Projects.	
Competitive products (name, link)				
Competitive advantages over competitors	5GNR Rel 18 products not to be available until 2026 . Unlicensed band. Low energy requirement to allow self energy powering. Simpler solution as a bearer service.	10Gb traffic support	Products with comparable throughput not to be available until 2026. Unlicensed band. Low energy requirement to allow self-energy powering. Simpler solution as a bearer service.	Existing services from Mobile operators cannot provide the same service levels (throughput, latency) nor cost per Gigabit to Train operator/Mobile Operator/OTT
Innovations compared to existing products/services	Existing train to track 802.11 based solutions do not use 70Gbps band nor beamforming self-steering		802.11 based solutions do no provide more than 400Mbps	Existing services need to be provided by a Mobile Operator with spectrum, require complex transport technology dependant on a Core. Proposed service can be provided without a spectrum license by any stakeholder in the railways industry and its a basic low capex and Opex backhauling service between train and track.
Market Feedback (if any)	Need to support FRMCS critical services. Need to be competitive against extension of MNO services to the track.	Need to support critical traffic	Need to support FRMCS critical services. Need to be competitive against extension of MNO services to the track.	Need to support FRMCS critical services. Need to be competitive against extension of MNO services to the track.

Table 14 Exploitation Results of Telecom Operators/Neutral Host Providers

Road and Rail Operators	
General Information	**ER9**
Name	Knowledge and evaluation of 5G technologies in railways environment

Description	The project will enable SNCF to acquire knowledge and to evaluate, for example: • the potentialities of 5G networking technologies in railways environment • the continuity of connectivity services when switching from one technology to another and when crossing the border • the use of different onboard technologies (small cell vs Wifi for example)
TRL (existing)	
TRL (at the end of the project)	TRL 6
How it will be used	Participation in Research projects, Competence Building, Product or Service Development for example for new types of business and performance applications (for example : follow-me entertainment)
Time plan for use	M36
Related 5GMED Deliverables	
Related publications	
IPR	**ER9**
Owner(s)	SNCF
Other beneficiaries involved	
Licence	
Background Information Used (type and owner)	
Dependencies	
Patents	
Form of exploitation	
Market (initial)	**ER9**
What problems it addresses	To improve services (services dedicated to passengers or for SNCF use) and to guaranty continuity of these services (seamless services) while switching from one technology to another and while crossing the border
Potential Users	SNCF, SNCF end users (passengers)
Main competitors (companies/other projects)	SNCF competitors
Competitive products (name, link)	
Competitive advantages over competitors	

5GMED
D8.2 IMPACT MAXIMIZATION PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

Innovations compared to existing products/services	
Market Feedback (if any)	

Table 15 Exploitation Results of Road and Rail Operators

Large Companies	
General Information	**ER10**
Name	Enjoy Media Together (EMT Service)
Description	EMT is an immersive Media service (composed by 3 modules) with certain nomadicity features (i.e. is migrating the VNFs at the Edge following the user movements) that are able to adapt to 5G network (lower latency) to exploit dynamically the Edge Computing capabilities synchronising flows as part of more general Infotainment capabilities. Video streaming 360 and optimised conferencing.
TRL (existing)	3
TRL (at the end of the project)	6
How it will be used	Further research and Enhance product features
Time plan for use	M30
Related 5GMED Deliverables	D4.1
Related publications	
IPR	**ER10**
Owner(s)	ATOS
Other beneficiaries involved	none
Licence	TBD (likely open-source Apache v2,0)
Background Information Used (type and owner)	ATOS, for streaming engine. OS libraries.
Dependencies	yes, with the Analytics Module and Edge Orchestrator
Patents	-
Form of exploitation	technology transfer
Market (initial)	**ER10**
What problems it addresses	Enhance Quality of Experience for video end user (Keep service session continuity when there is a transfer in a cross-border corridor)
Potential Users	Entertainment End users of CCAM

Main competitors (companies/other projects)	(any OTTs with WedRTC optimised 5G capabilities)
Competitive products (name, link)	-
Competitive advantages over competitors	Keep service continuity in 5G multi-operator transfer
Innovations compared to existing products/services	Keep service continuity in 5G multi-operator transfer
Market Feedback (if any)	Still exploratory / prospect

Table 16 Exploitation Results of Large Companies

Small & Medium Enterprises			
General Information	ER11	ER12	ER13
Name	Tour Planning Service	QoS-GW	NearbyOne Orchestrator v2
Description	A tourism mobile application, which is a complete solution for turning a trip into an experience through personalized tours, in order to offer a mixed reality (MR) mobile application for visitors to virtually explore suggested and customized thematic tours of different contexts.	The QoS-GW is an IP gateway implementing per-application independent QoS-aware policy routing with support for IP mobility and session continuity. The QoS-GW is responsible for transparently intercepting data packets sent by end user devices, forward them through the proper RAN according to a forwarding policy DB and preserve the application sessions upon handovers.	End-to-end cross-domain orchestration platform encompassing all layers, from the Edge to the Cloud.
TRL (existing)	TRL 2 – technology concept formulated	3	6
TRL (at the end of the project)	TRL 7 – system prototype demonstration in operational environment	7	7
How it will be used	Product development; Service development;	(1) Future Research: the QoS-GW may leverage novel programmable Smart NIC to accelerate a subset of the network functions (2) Scientific Papers: the QoS-GW represents an advancement in the state of the art of innovative FRMCS technology. (3) Product Development: the QoS-GW once consolidated and brought to a higher TRL level could create a good market opportunity for Axbryd. (4) Participation in Research projects: the QoS-GW could be an asset for other research activities, including future EU RIAs and IAs	Further Research, Participation in Research projects, Product Development, Competence building
Time plan for use	CI/CD until the end of the project	2 dates: (i) at the end of the small-scale tests (TRL 6); (ii) at the end of the project (TRL 7)	M24
Related 5GMED Deliverables	D2.1, D2.2, D3.1, D4.1, D4.2, D5.1, D5.2, D6.1	D5.1, D3.2	D3.2

Related publications		TBD	N/A
IPR	**ER11**	**ER12**	**ER13**
Owner(s)	ATC	Axbryd	Nearby Computing S.L.
Other beneficiaries involved		COMSA	None inside 5GMED
Licence	Commercial	Commercial	Commercial
Background Information Used (type and owner)			Commercial by Nearby Computing
Dependencies	There are no dependencies with other components, meaning that it can be developed independently. Nevertheless, in the context of 5GMED it needs the networks infrastructure for the use cases.		N/A
Patents			PCT/EP2018/068367 FOG COMPUTING SYSTEMS AND METHODS (filed)
Form of exploitation	Direct industrial use	Direct industrial use, license agreement, publications	Direct Industrial use, Patenting
Market (initial)	**ER11**	**ER12**	**ER13**
What problems it addresses	Tourist Information Technologies. Aims to serve high quality content (HD video, 360 video and Virtual reality video).	define how different applications are forwarded when multiple mobile radio access networks are available	Orchestration of all layers, from infrastructure, network functions and applications from Edge up until Cloud using a single pane of glass.
Potential Users	The target of the application are the tourists but high-quality content can be provided by countries, cities etc. and thus promoting the application.	MNOs, Rail Operators, system integrators	MNOs, MVNOs, Different verticals (private network owners) such as Transport, Smart Cities, Manufacturing companies, Entertainment, Tourism and Retail
Main competitors (companies/other projects)	There are no known competitors at the timing of writing.		HPE, Netcracker, Rafay, Mobile EdgeX, AlefEdge
Competitive products (name, link)			1. **HPE** https://www.hpe.com/psnow/doc/a50001643enw 2. **NetCracker** https://www.netcracker.com/portfolio/solutions/automated-operations-and-orchestration/ 3. **Rafay** https://rafay.co/ 4. **Mobile EdgeX** https://mobiledgex.com/product/ 5. **Alef's Private Edge Platform** https://www.wearealef.com/
Competitive advantages over competitors	One of the few applications serving high quality content that can be used from public authorities to attract tourists.		1. Automated Edge Orchestration offering traffic offloading and Edge node Discovery 2. Automated Infrastructure Configuration 3. Role-based access control for security and authentication 4. Application LCM in a multi-cloud environment. 5. Various container platform support

| Innovations compared to existing products/services | Will be able to use 5G technologies since it is designed for this purpose. Furthermore, it will facilitate the "Follow-me" concept by being deployed in cloud but also in edge computing. | | 1. Orchestration of applications at the network edge
2. Automated Node Discovery
3. Real time telemetry with automation control loops allowing monitoring KPIs and performance
4. Platform awareness enabling SRIOV and accelerators when needed
5. Placement advisor based on resource and location |
| Market Feedback (if any) | | | Positive, more than 10 PoCs already performed or in course. Pattern ecosystem create |

Table 17 Exploitation Results of Small & Medium Enterprises

Research Institutions/Others			
General Information	**ER14**	**ER15**	**ER16**
Name	On board neutral host Small Cell	Forwarder Module	AI Module for disruptive situation detection
Description	Small Cell deployed inside train providing wholesale connectivity services to MNOs operating in the country being traversed by the train. The Small Cell is optimised to support cross country operation, being able to seamlessly change carrier frequency and moving connected UEs upon crossing country borders.	Application module deployed in RSUs to perform Layer 2 forwarding techniques between ITS-G5/C-V2X radio interfaces and remote V2X Stacks on IP nodes, managing modulation and coding schemes and serializing packets to maintain secured V2X end-to-end traffic on the highest performance and reliability.	AI-based Module capable of detecting disruptive or tense situations that happen inside the train, such as people fighting. The module will analyse the audio stream of several CCTV Cameras located inside the train and trigger an alarm to the Control Center when necessary.
TRL (existing)	2	2	2
TRL (at the end of the project)	5	5	5
How it will be used	This result will be used as part of UC3	This module will be used as part of UC2	The Module will be used as part of 5GMED UC3
Time plan for use	TBD	To be defined	To be defined
Related 5GMED Deliverables	D5.1, D5.2	D4.1, D4.2	D2.2, D5.1, D5.2
Related publications	None available yet	None available yet	None
IPR	**ER14**	**ER15**	**ER16**
Owner(s)	i2CAT	i2CAT	i2CAT
Other beneficiaries involved	IRT, COMSA	VEDECOM	None
Licence	Not defined	Not defined	To be defined

Background Information Used (type and owner)	RAN Controller. RAN Multi-vendor management element supporting different base station and small cell vendors	Not defined	To be defined
Dependencies	Not defined	Lacroix commercial RSU equipment vendor.	To be defined
Patents	Not defined	Not defined	To be defined
Form of exploitation	Not defined	Not defined	To be defined
Market (initial)	**ER14**	**ER15**	**ER16**
What problems it addresses		This module focuses on distributed road side architectures, where a middleware layer is needed to forward vendor-transparent hardware on the RSU side towards an Edge Compute orchestrating a set of V2X services, including a V2X Protocol Stack, without having knowledge on the radio technology.	It addresses the problem of automatically detecting tense situations inside a train and triggering an alarm, so that a proper action can be taken as soon as possible. It also enables to store a piece of video for a future analysis of the situation by the responsible authorities.
Potential Users	Railway operators	Road Operators	Train manufacturers, Railway operators, local authorities
Main competitors (companies/other projects)	The proposed service delivery model, i.e. through neutral host small cell onboard in the train is not yet available in the market, so no competitors are not yet identified	NA	No commercial products for this specific use case have been found yet, but further research is needed.
Competitive products (name, link)	Not applicable	NA	To be defined
Competitive advantages over competitors	Not applicable	NA	To be defined
Innovations compared to existing products/services	Not applicable	NA	To be defined
Market Feedback (if any)	Not available yet	NA	The idea has been introduced to "Ferrocarrils de la Generalitat de Catalunya" (FGC). No feedback available yet.

Table 18 Exploitation Results of Research Institutions/Others

General Information	ER17	ER18	ER19
	Research Institutions/Others		
Name	Automotive Hazard Detection Sensor	Vehicular PC	Transport Network Slice Manager
Description	The AHD sensor combines Deep learning (YOLO framework), Kalman filtering and a depth camera to provide hazard detection for automotive applications in real time.	Software suite able to receive standard V2X messages and forward them to a remote node via UDP (ASN.1 format) or MQTT (JSON format). In addition, this suite includes a script capable of displaying the real time location of the vehicles. The map also shows the location of hazard events: broken car, accident, etc. and instructions to the driver for avoiding the event.	The Transport Network Slice Manager is an essential element in the 5GMed architecture and is responsible for controlling the transport data plane, considering multiple transport technologies. In this project, the availability of high-capacity optical fibre plays a big role since 5G NR requires low-latency and high-bandwidth links. Alternatively, cell sites can be backhauled through mmWave connections. This technology ensures fast and low-cost deployment, yet it may not meet the transport network requirements, depending on the weather conditions and presence of obstacles. Finally, satellite backhauling will also be provided by Hispasat.
TRL (existing)	2	2	2
TRL (at the end of the project)	5	5	5
How it will be used	Further Research, Participation in Research projects, Scientific papers	Further Research, Participation in Research projects, scientific papers	Further Research; Consultancy; Participation in Research projects; Scientific papers; PhD theses
Time plan for use	M21 May 2022	M21 May 2022	24
Related 5GMED Deliverables	D4.2	D4.2	D3.2
Related publications	AHD Sensor Soft Tracking Algorithm Description (Future)	Sedar R, Vázquez-Gallego F, Casellas R, Vilalta R, Muñoz R, Silva R, Dizambourg L, Fernández Barciela AE, Vilajosana X, Datta SK, Härri J, Alonso-Zarate J. Standards-Compliant Multi-Protocol On-Board Unit for the Evaluation of Connected and Automated Mobility Services in Multi-Vendor Environments. Sensors. 2021; 21(6):2090. https://doi.org/10.3390/s21062090; Deliverable D 3.1 5GCroCo https://5gcroco.eu/images/templates/rsvario/images/5GCroCo_D3_1.pdf	TBD
IPR	**ER17**	**ER18**	**ER19**
Owner(s)	CTTC	CTTC	CTTC

Other beneficiaries involved	Possibly Isuzu (In the case they wish using the smart sensor in their vehicles).	VEDECOM	
Licence	Open Source	Partially Open Source	open source
Background Information Used (type and owner)	YOLO Framework (Open Source), Kalman Filtering, Depth camera API(Open Source)	Eclipse Mosquito (Open Source) , Paho MQTT (Open Source), API ITS-OBU4 (Commsignia Propietary), Streamlit (Open Source), OpenStreetMaps (Open Source)	none
Dependencies	The smart sensor depends on the Vehicular PC to connect to the infrastructure.	The VehicularPC depends on the smart sensor to receive the hazard warnings	none
Patents	The potential of a patent will be studied and submitted, if feasible.	The potiential of a patent will be studied and submitted, if feasible.	none
Form of exploitation	patenting, publications	publications, technology transfer	publications, standards
Market (initial)	**ER17**	**ER18**	**ER19**
What problems it addresses	Allow the detection of hazards in the road using AI and Depth camera technology, providing a more complete model of the surroundings to the infrastructure.	Transmit V2X messages to an external unit (e.g. Mobile Edge Computing) and display hazard events and driving instructions to reduce accidents and traffic jams	Transport slice provisioning.
Potential Users	Vehicle manufacturers (Izusu and Atos from the project) and road operators (e.g. Autopistas).	Vehicle manufacturers (Izusu and Atos from the project) and road operators (e.g. Autopistas).	Network operators
Main competitors (companies/other projects)	Deep Sort algorithm	ibertrónica	Other transport slice orchestrators, such as https://openslice.readthedocs.io/en/stable/
Competitive products (name, link)	Not known competitors	https://ibertronica.es/blog/car-pc/carpc/	Not known
Competitive advantages over competitors	NA	V2X Manager (transmission both ASN.1 and JSON messages). Display harzard warnings	Faster development,
Innovations compared to existing products/services	Faster performance with a higher FPS rate than deepsort.	Combine transmission of V2X messages with HMI functionalities with warning and driving instruction notifications	Inclusion of Satellite control
Market Feedback (if any)	NA	NA	none

Table 19 Exploitation Results of Research Institutions/Others

6. Conclusions

Next, deliverable 8.4 will reflect the progress of the impact maximisation plan, which will detail the action to be taken from February 2022 to September 2024. The 5GMED first impact report and strategy have been elaborated to share the results obtained by executing the communication, dissemination, and exploitation plans.

The communication plan looks at developing a society's awareness communication strategy through the described series of tools and channels with the collaboration of the partners involved in maximising the project impacts. The restructuring of the website was critical in bringing new visitors to discover the project. However, according to the statistic, traffic is also due to participation in events and reporting on social media. The report shows that the content produced, such as 5GMED Lexicon definitions or partners' interviews, has been seen and contributed to disseminating the project. The content created for the social media and the associated tools (videos, newsletter) gives satisfactory results to enhance the project's activity, increase the social media community, and participate in society's awareness of 5G technologies.

The scientific impact of the project is disseminated through the creation of papers submitted to selected events. Regular meetings with the scientific partners are essential to ensure the continuity of the ongoing work. By following this line of work, the 5GMED project can leverage the synergy produced by the partners. Participation in events will be crucial in the following months of the project and until its end to present the innovative and exploitable results obtained.

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.

5GMED

D8.2 IMPACT MAXIMIZATION PLAN

Funded by the Horizon 2020
Framework Programme of the
European Union

7. Annexes

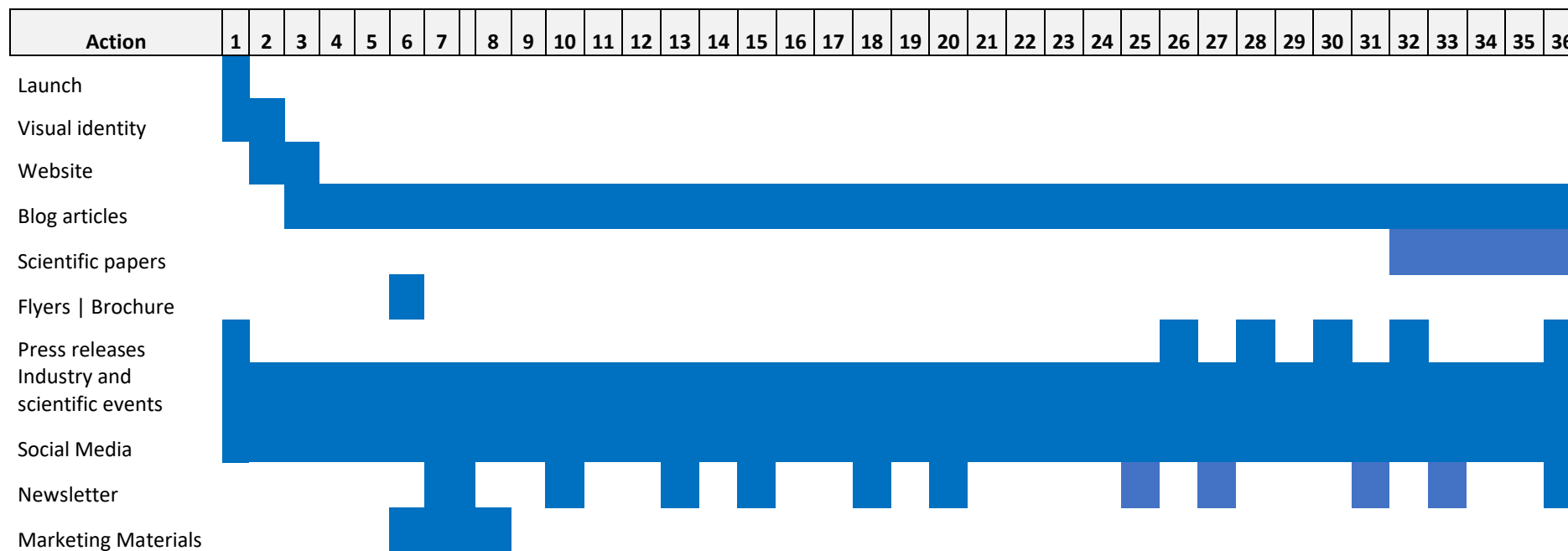| Action	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Launch																																				
Visual identity																																				
Website																																				
Blog articles																																				
Scientific papers																																				
Flyers | Brochure																																				
Press releases Industry and scientific events																																				
Social Media																																				
Newsletter																																				
Marketing Materials																																				

Figure 24 Tentative timeline for impact maximization action