



# DEDICAT 6G

**DEDICAT 6G: Dynamic coverage Extension and Distributed Intelligence for human Centric Applications with assured security, privacy and Trust: from 5G to 6G**

Deliverable D7.1  
Initial plan and report on dissemination,  
standardisation and exploitation

### Project Details

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## List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
<b>3GPP</b>	3 <sup>rd</sup> Generation Partnership Programme
<b>5G PPP</b>	5G Public Private Partnership
<b>AI</b>	Artificial Intelligence
<b>AI/ML</b>	Artificial Intelligence/Machine Learning
<b>AIOTI</b>	Alliance for Internet of Things Innovation
<b>AR/VR</b>	Augmented Reality/Virtual Reality
<b>CAGR</b>	Compound Annual Growth Rate
<b>DLT</b>	Distributed Ledger Technology
<b>DoA</b>	Description of Action
<b>ENI ISG</b>	Experiential Networked Intelligence Industry Specification Group
<b>ETSI</b>	European Telecommunications Standards Institute
<b>ESO</b>	European Standards Organization
<b>EUCNC</b>	European Conference on Networks and Communications
<b>IEEE FNI</b>	IEEE Future Networks Initiative
<b>IEEE SA</b>	IEEE Standards Association
<b>IPR</b>	Intellectual Property Rights
<b>KPI</b>	Key Performance Indicator
<b>MANO</b>	Management and Orchestration
<b>MEC</b>	Mobile Edge Cloud
<b>NDM</b>	Nokia Data Marketplace
<b>OSM</b>	Open Source MANO
<b>PoC</b>	Proof of Concept
<b>SDO</b>	Standards Development Organisation
<b>SWOT</b>	Strengths Weaknesses Opportunities and Threats
<b>TSG</b>	Technical Specification Group
<b>UCn</b>	Use Case n
<b>URLLC</b>	Ultra Reliable Low Latency Communications
<b>WG</b>	Working Group (within the 5G-PPP)
<b>WWS</b>	World Wide Streams

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## Executive Summary

The Deliverable D7.1 describes an initial plan for the dissemination and standardization bodies actions to be pursued by the DEDICAT 6G consortium partners. The tools and approaches used to accelerate the project's impact are also described.

The dissemination activities, both already running and planned, are described, details are provided on the target audience, on the devised communication strategy, on the overall dissemination targets, and finally also on the means used to achieve those set targets. Relations with other research projects as well as with the 5G PPP Working Groups are also described.

Standardization bodies in the focus of the project activities are listed, together with the main partners that plan to impact those, as well as the expected contributions.

# 1 Introduction

This deliverable describes both the various approaches the DEDICAT 6G team pursues to accelerate the impact of the project and ensure that the project findings and results, where possible and appropriate, will influence standards. Besides the dissemination, communication and community engagement strategy, the deliverable also summarises the early activities that have been undertaken during the first 6 months of the project.

Furthermore, the deliverable describes the initial establishment of liaisons with relevant standardisation bodies and the plans of both the individual partners as well as the consortium as a whole to exploit the project findings and results.

The structure of the deliverable is as follows: in the remainder of this introductory chapter the actual scope and purpose of the deliverable is outlined, followed by an overview of the strategy the project team has developed to create and accelerate impact, finally a brief initial market analysis on the potential of 6G technology in the future market is included.

In Chapter 2 the initial engagement plan, regarding communication and dissemination, is presented and also the tools to track all project activities that may lead to dissemination or exploitation activities are described.

Chapter 3 provides the more detailed initial dissemination plan split into four categories, of which the first aims at the scientific community to disseminate our novel approaches and results, the second aims at the stakeholders to inform them about opportunities that come along with the scientific findings. The third category is more for the wider community, meaning aiming at anyone who may see benefit in new communication approaches and may want to inform their own technology departments, etc. Finally the project web site and media channels are the fourth, and internal dissemination as the fifth category.

Chapter 4 reports on DEDICAT 6G's engagement with the 5G Public Private Partnership, and Chapter 5 describes the project exploitation plan as well as the exploitation plans and expectations of the various project partners. Chapter 6 outlines the current plans for engagement and inputs to standardisation bodies.

## 1.1 Scope of the deliverable

This deliverable describes the plans and approaches to accelerate the impact of DEDICAT 6G. It provides an overview of the tools that are used to ensure that the project and results gain wide visibility and acknowledgement. For this, the engagement and dissemination plans are provided as well as the exchange and intended interactions with standardisation organisations are described. Finally, the deliverable provides an overview of the activities, dissemination, and standards engagement that has taken place over the first six months of the project. With regards to the ongoing activities, the deliverable only provides a snapshot of what has been achieved during the first 6 months, updates to this will be provided in subsequent deliverables. Likewise, as dissemination and engagement plans develop over time, those plans may also be updated in the future deliverables of WP7.

## 1.2 Impact creation strategy

*Disclaimer: The management and innovation procedures described here follow the methodology defined and applied in all H2020 projects by ATOS Spain. This methodology has been adapted to the characteristics of DEDICAT 6G.*

DEDICAT 6G focuses on exploring applicability of emerging technologies in B5G and 6G systems and contributes to the expected impacts set out in the work programme under the topic ICT-52-2020: 5G PPP – Smart Connectivity beyond 5G. To concretise the value of the project results and better put these to economic and social use, WP7 has defined an impact creation strategy that spans all the tasks and activities of the work package.

WP7 has the objective of maximising the project's impact inside and outside the consortium. Impact can be assessed by the project's innovations, any result that delivers a benefit to someone or addresses a need, being these benefits not only economic but also societal, research, environmental, or educational.

Innovation Management is the process of creating innovation, from the idea to the delivery of the impact or benefit. According to the European IP Helpdesk in its publication "Making the most of your H2020 project"<sup>1</sup>, Innovation Management is the "overall management of all activities related to understanding needs, with the objective of successfully identifying new ideas, and managing them, in order to develop new products and services which satisfy these needs". Therefore, WP7 tasks T7.1 and T7.2 are under the scope of the innovation management activity and they both work together in a coordinated way to ensure optimal performance and impact creation.

DEDICAT 6G impact creation strategy responds to the following reasoning: one of the project's objectives is to exploit the developed project solutions (Objective 7), meaning that the project's results are further used when the project finishes, therefore, partners need to reflect and plan how to make society aware of the project and its benefits (**communication**), how to tell the target audience about the project results and collect their feedback (**dissemination**) and how these results will be accessible in order to be used, by project's partners or third parties, even when the project comes to an end (**exploitation**).

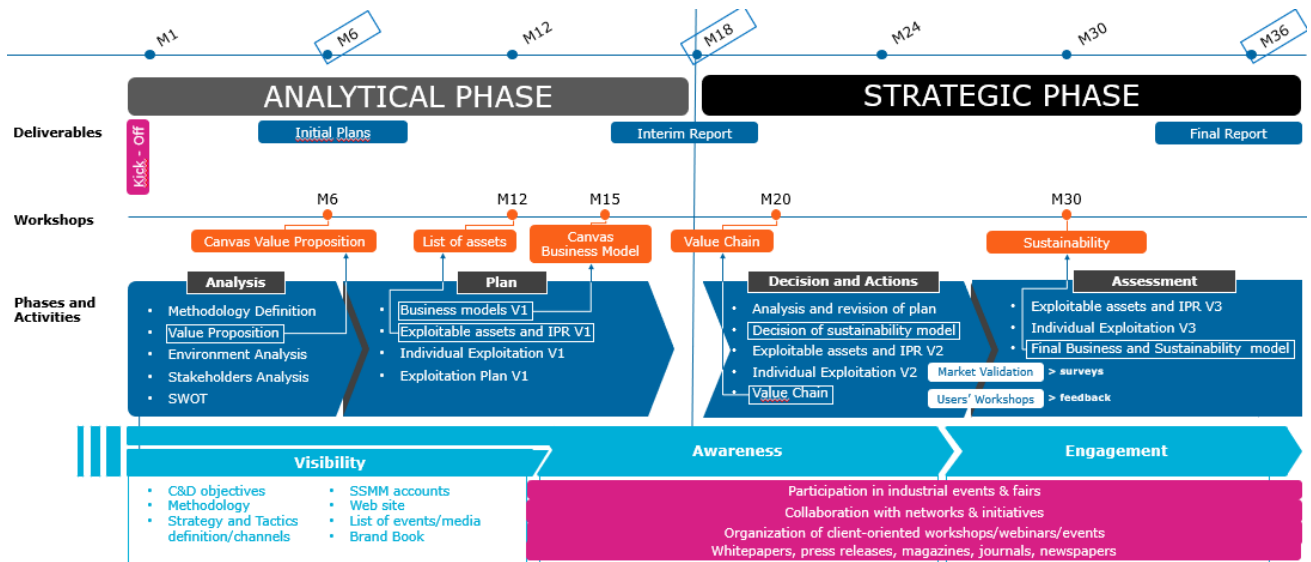
To begin with, as the general approach to draft the communication, dissemination and exploitation plans, partners need to agree on what is meant by the particular project's results. In DEDICAT 6G, we take the definition from the Horizon 2020 programme<sup>2</sup>, considering a result as "any tangible or intangible output of the action, such as data, knowledge and information whatever their form or nature, whether or not they can be protected, which are generated in the action as well as any attached rights, including intellectual property rights". According to this definition, partners have identified DEDICAT 6G results being aware that these results should have the potential to be exploited commercially (maybe not right after the project) or being the basis for further research.

The specific plans have been developed according to ATOS Research and Innovation Methodology (Figure 1), leading Innovation Management activity in DEDICAT 6G, and considering two different phases in the project's timeframe: the analytical phase and the strategic phase.

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<sup>1</sup> [https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk\\_en](https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk_en)

<sup>2</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/glossary>



**Figure 1: ATOS Research and Innovation Methodology**

**Analytical phase:** During this phase, the activities focus on analysing relevant stakeholders and elaborating DEDICAT 6G value proposition. Performing an initial market analysis with geographical scope and size, combined with a SWOT analysis updated from the proposal, will help to define DEDICAT 6G market position. Joint dissemination and exploitation plans are being drafted and will evolve, containing the analysis of the proposed solution's added value that stems from the market analysis and competitors. These plans will include the identification and description of the exploitable results and IPR analysis, the definition of DEDICAT 6G business model (in the case of the exploitation plan), as well as the timeline and clear responsibilities of the activities planned. This approach is extended and supported by the corresponding communication strategy (creation of visual identity, promotional activities) to give visibility to the project and raise awareness of early results among the stakeholders' community, formulating the basis of the end-users that will benefit from the project's results. At the same time, during this phase, each partner is working in its individual exploitation and dissemination plans.

**Strategic phase:** In this phase, the strategy will be executed and its results continuously monitored. Communication and dissemination activities will get more intense and their orientation will turn from awareness creation to outcomes' validation and market evaluation to get stakeholders' engagement and facilitating results adoption. Focused individual and joint exploitation plans will be released at the end of this phase to illustrate the concrete process that the consortium will follow to effectively push the project's results into the ecosystem and promote knowledge transfer to stakeholders inside and outside the consortium.

The DEDICAT 6G consortium is committed to implement this impact creation strategy. Additionally, the setting up of the DEDICAT 6G Impact Creation Board (ICB)<sup>3</sup>, with four members<sup>4</sup> and complementary expertise, will support the project to achieve its expected impacts. The

<sup>3</sup> In the proposal we had defined an Advisory Board, however when defining the remit of the board the role was widened to support the impact acceleration for the project.

<sup>4</sup> Topias Uotila (Goodmill Systems), Zivko Bojovic (University of Novi Sad), Markus Mettälä (Finnish Transport and Communications Agency) and Vincent Audebert (EDF R&D)

plans for communication, dissemination and exploitation imply maintaining an open and regular communication among all the partners and also with the ICB members. WP7 task leaders will regularly assess these plans, monitoring progress and evaluating activities based on the project's KPIs and partners' individual expectations. Plans will be adjusted if market needs or interests of potential stakeholders change, or unforeseen results come up. Ultimately, a well-orchestrated impact creation strategy with related plans successfully implemented will help to explain the societal relevance of the EU-funded research; will support future research, ensuring uptake of results within the scientific community; and will foster innovation funding, boosting European competitiveness and growth.

## 1.3 Initial Market Analysis

Following the impact creation strategy, the project has started analysing the environment with the identification of the main stakeholders, market definition, trends, size and growth rates, drivers as well as an initial competition awareness from all the project partners. Understanding the environment lets the consortium identify opportunities from the early stages, keeping individual and joint plans aligned with what the market is looking at. Therefore, monitoring the market is a constant process throughout the life of the project.

In this initial market analysis, we first provide an overview of the different stakeholders, then a market analysis is provided for each use case. Not all stakeholders are involved in all use cases. There are four use cases that are each directed to different target markets. The four use cases are:

- (UC1) Smart Warehousing, with strong emphasis on real-time human machine interaction, computation offloading, and security;
- (UC2) Enhanced Experience, with emphasis on distributed intelligence, computation and caching offloading, dynamic coverage extension;
- (UC3) Public Safety, or Public Protection and Disaster Relief (PPDR) with emphasis on distributed intelligence, dynamic coverage extension, security, human in the loop;
- (UC4) Smart Highway with emphasis on distributed intelligence, computation and caching offloading, dynamic coverage extension, safety, and human in the loop.

The project results will also impact the products and services in relation to the mobile network ecosystem. Therefore, it will also be covered in this initial market analysis.

### 1.3.1 Stakeholders

The first stakeholders to be considered are the **end-users**. In the case of UC1, they are the workers in the warehouse; in UC2, they are the people attending the event or the people of event organizing staff; in UC3, they are the public in the disaster zone or the rescuers intervening in the zone, and in UC4, they are the drivers on the smart highway, or the highway maintenance staff. End-users are not necessarily paying customers, for instance in UC1, it is the warehouse owner who will pay for using the DEDICAT 6G platform, the network and cloud infrastructure.

The second type of stakeholder are the DEDICAT 6G **platform users**, e.g., smart warehouse owners, highway operator, event organizers, public institutions, etc.

The DEDICAT 6G **platform operator** is providing the enablers that make the new services and products possible for the platform users.

The **telecom operator** is providing the network infrastructure that enable communications from the edge network to the cloud.

The **mobile network operator** (MNO) is providing the mobile network infrastructure, including the Radio Access Network (RAN), connected to the edge network. The MNO can be virtual (VMNO), i.e., it rents the underlying infrastructure and exploits it to provide the service to end-users.

Finally, the **edge cloud provider** operates computing capabilities in the edge network, and the **cloud provider** operates data-centers.

### 1.3.2 Target Market for each use-case

#### Smart Warehousing

The global warehousing and storage market attained a value of USD 428 billion in 2020. The market is further expected to grow in the forecast period of 2021-2026 to reach about USD 557 billion by 2026. The major drivers of the industry include rising disposable incomes, increasing population, rising demand for e-commerce, and the rising demand for refrigerated warehousing. The rising trade activity in emerging economies is expected to be a key trend guiding the growth of the industry. From a social standpoint, smart warehousing and logistics are key for the proper preservation of goods and consequently of the public health. Today, real-time tracking of vehicles and goods at the transfer points are much consolidated operations, for both end-users and companies. However, the availability of data as well as functionalities such as AR and remote controlled operations, that can be supported by 5G/6G technologies along the warehousing and logistic supply chain, can enable much more advanced services reducing operational delays and wastes (due to disrupted products which do not reach the consumer market).

#### Enhanced Experience

The global broadcast and media technology market size will grow by USD 116 billion during the forecast period of 2021-2026. With advancements in the communication sector, the world has become more linked. As broadcasting companies aim to provide customers with seamless communication experience, the industry is likely to experience major developments in the coming years. The industry growth can be attributed to factors like increasing on-demand content penetration, live video streaming popularity, increased digital advertising, and evolving network infrastructure. Currently Europe is holding 28% share of the global media and entertainment market as a region and is accounted USD 576.5 billion (2018). In future, it is expected that 5G and AI are driving for the increased market size thanks to connectivity enhancements.

#### Public Safety

The public safety and security market size is expected to grow from USD 277.0 billion in 2017 to USD 532.4 billion by 2022, CAGR (Compound Annual Growth Rate) of 14.0% during the forecast period. The enablers and mechanisms developed in the project will further enable mission critical and business critical organizations and end-users with rich and reliable capabilities, services and applications. The project will contribute to maintain and further develop the industrial partners' leadership thanks to an efficient integration of a variety of devices, services and applications (e.g., device integration with a multimedia apps for AR/VR situational awareness).

## Smart Highway

The global smart highway market size was valued at USD 23.67 billion in 2018, and is projected to reach USD 92.38 billion by 2026, growing at a CAGR of 18.7% from 2019 to 2026. The smart highway market is driven by the growth of the adoption of smart cities, by the need for a cleaner and more sustainable technology for transportation and by the key societal challenges of reducing traffic jams and car accidents.

## Mobile network market

The global telecom services market size was valued at USD 1,658 billion in 2020 and is expected to expand at a CAGR of 5.4% from 2021 to 2028. One of the key factors driving the mobile network market is the deployment of 5G infrastructures in order to meet the appetite of customers for next-generation technologies, services and devices. The other key factors driving the market are the number of mobile subscribers constantly increasing, the growing demand for value-added managed services, and the growing demand for high-speed and low-latency data connectivity.



## 2 Initial engagement plan and tools

While the project developed and now applies its own dissemination approach and strategy, the plan was built in the understanding that all activities will be as close as possible linked to the related activities ongoing within and coordinated by the 5G PPP and eventually the successor initiative. DEDICAT 6G considers this close alignment as one important factor to gain maximum impact.

As part of the project dissemination and impact acceleration activities the consortium identified and started to engage with appropriate communities of interest. This includes the 5G PPP as well as various standardisation organisations and of course the scientific community. Developments and feedback from the various parts of this target community are being collected and considered at the various stages of the project.

### 2.1 Dissemination strategy

Being a research and innovation action, DEDICAT 6G aims naturally at the scientific and technology stakeholder communities to disseminate the main project results. However, with applications and trial scenarios in various vertical domains (events/warehousing/security and public safety/road traffic), the dissemination activities also target those areas where appropriate. As part of the strategy, the project uses a broad and well-involved community that goes well beyond the project partners. This includes networks operators, vendors, stakeholders related to the project use cases (smart factories, event handling, natural disasters), standardisation groups and relevant bodies, and finally liaisons with other relevant projects aiming to organise joint events like conferences/workshops or joint authorship of papers, or joint editing of special issues in journals.

Concerning the outreach to the wider community, here the project applies the usual means ranging from the traditional project web site (<https://dedicat6g.eu/>), to LinkedIn (<https://www.linkedin.com/in/dedicat6g/>) and Twitter (<https://twitter.com/dedicat6g>) as well as slideshare (<https://www.slideshare.net/DEDICAT6G/>) and (a yet to be established) YouTube accounts and channels.

### 2.2 Opportunity and Activity tracking

DEDICAT 6G uses a spreadsheet-based tracking tool to record dissemination (and standardisation or general engagement) activities and to monitor the whole life cycle from initiation to submission, review and through to publication.

This “tracker” keeps records of all different types of community facing activities from identifying “Dissemination Opportunities”, to issued “Press Releases”, target “Events”, given public and restricted “Presentations and Tutorials”, “Publications” from first submission to final publication (including DOIs linking to the documents), links to “Open data” sets that are used and produced by the project, interactions with “Standardisation” organisations and groups, and finally the “5G PPP Working Group activities”.

The tracker collects all details related to the activities and dissemination events, it is updated continuously and during the regular (monthly) WP7 meetings the updates are confirmed or, where necessary, completed. The following figures (1-8) provide snapshots of the tracker and the different activities that have been locked to date.

### Dissemination Opportunities

DATE (entry added)	Deadline	Title	Type	Involvement	Responsible	Type of involvement	Web site of event	comments
12.02.2021		EUCNC 2021	live conference	co/organiser		presenting/publishing		

**Figure 2: Excerpt from DEDICAT 6G tracker – Dissemination Opportunities**

### Press Releases/Articles/PR Materials

DATE (entry added)	Title	Venue	Partner	Link	Date of publication	comments
07.05.2021	Nokia launches blockchain-powered Data Marketplace for secure data trading and AI models	Company web site	Nokia	<a href="https://www.nokia.com/about-us/news/releases/2021/05/05/nokia-launches-blockchain-powered-data-marketplace-for-secure-data-trading-and-ai-models/">https://www.nokia.com/about-us/news/releases/2021/05/05/nokia-launches-blockchain-powered-data-marketplace-for-secure-data-trading-and-ai-models/</a>	05.05.2021	

**Figure 3: Excerpt from DEDICAT 6G tracker – Press releases**

### Presentations and Tutorials

DATE (entry added)	Title	Type	Authors	Venue/conference/workshop	DOI (where possible)	link to slideshare
16/03/2021	DEDICAT 6G vision and technical challenges	Presentation	V. Stavroulaki	5G PPP webinar "Europe accelerates towards 6G"		<a href="https://www.slideshare.net/DEDICAT6G/dedicat-6g-project-overview">https://www.slideshare.net/DEDICAT6G/dedicat-6g-project-overview</a>
03/10/2021	DIAKINISIS - Research & Technology Projects "5G & 6G in Logistics"	Presentation	L. Manoladis, M. Stamatelatos	Supply Chain Institute "Case studies που δίνουν γνώση"		
06/08/2021	DEDICAT 6G: Dynamic coverage Extension and Distributed Intelligence for human Centric Applications with assured security, privacy, and Trust: from 5G to 6G	Presentation	V. Stavroulaki	Hexa-X - The European 6G initiative workshop, EUCNC 2021		
06/08/2021	The DEDICAT 6G Project: AI and Blockchain for a Smart 6G Connectivity Platform	Presentation	P. Demestichas	Tech Days 2021, Virtual Edition		
9/6/2021 or 10/6/2021 (TBC)	DEDICAT 6G - Dynamic Coverage Extension and Distributed Intelligence for Human Centric Applications with Assured Security, Privacy and Trust: From 5G to 6G	Paper presentation (see also corresponding publication)	V. Stavroulaki	EUCNC 2021		

**Figure 4: Excerpt from DEDICAT 6G tracker – Presentations and Tutorials**

### Event - Organisation - Participation

DATE (entry added)	Title	Type	Involvement	Responsible	Type of involvement	Web site of event	comments	other 5GPPP projects or other projects involved as co-organisers
Date	EUCNC 2021	live conference	co/organiser					
10/05/2021	GSMA MWC Barcelona 2021	Live conference	participant/contributor	Airbus DS SLC	Portfolio presentation / Innovation / Demonstration	<a href="http://www.mwcbarcelona.com">www.mwcbarcelona.com</a>		5GENESIS 5GDRONES 5G-EPICENTRE
10/05/2021	TCCA CCW 2021	Hybrid Live/Online	participant/contributor	Airbus DS SLC	Portfolio presentation / Innovation / Demonstration	<a href="http://www.critical-communications-world.com">www.critical-communications-world.com</a>		5GENESIS 5GDRONES 5G-EPICENTRE
10/05/2021	127TH CNSP France	Live conference	participant/contributor	Airbus DS SLC	Portfolio presentation / Innovation / Demonstration	<a href="http://congres2021.pompiers.fr">congres2021.pompiers.fr</a>		5GENESIS 5GDRONES 5G-EPICENTRE

**Figure 5: Excerpt from DEDICAT 6G tracker – Events**

## D7.1 Initial report on dissemination, standardisation and exploitation.

### Publications

DATE(when added)	TYPE	Authors	Paper/Article Title	Venue	Issue/pages	Publication Year	DOI	Publication status
Date	journal	list all authors: A.Author, A.N.Other		Conference/Journal official name		2021		submitted
9/4/2021 (accepted)	Conference	V. Stavroulaki, E. Calvanese Strinati, F. Carrez, Y. Carlinet, M. Maman, D. Draskovic, D. Ribar, A. Lallet, K. Mošner, M. Tosic, M. Uitto, S. A. Hadwardoyo, J. Marquez-Barja, E. Garrido, M. Stamatelatos, K. Sarayeddine, P. Sanchez Vivas, A. Mammela, P. Demestichas	DEDICAT 6G - Dynamic Coverage Extension and Distributed Intelligence for Human Centric Applications with Assured Security, Privacy and Trust: From 5G to 6G	EUCNC 2021				
09/04/2021	journal	E. Calvanese-Strinati, S. Barbarossa	6G networks: Beyond Shannon towards semantic and goal-oriented communications	Elsevier Computer Networks journal		2021	<a href="https://doi.org/10.1016/j.cnmnet.2021.107930">https://doi.org/10.1016/j.cnmnet.2021.107930</a>	accepted
15/03/2021	journal	Girmay M, Shahid A, Maglogiannis V, Naudts D, Moerman I.	Machine Learning Enabled WiFi Saturation Sensing for Fair Coexistence with 5G	IEEE Access		9	2021 <a href="https://doi.org/10.1109/ACCESS.2021.3066052">https://doi.org/10.1109/ACCESS.2021.3066052</a>	published
22/03/2021	journal	Naudts D, Maglogiannis V, Hadwardoyo S, van den Akker D, Vanneste S, Mercelis S, Hellinckx P, Lannoo B, Marquez-Barja J, Moerman I.	Vehicular Communication Management Framework: A Flexible Hybrid Connectivity Platform for CCAM Services	MDPI Future Internet	13, 81		2021 <a href="https://doi.org/10.3390/fi13030081">https://doi.org/10.3390/fi13030081</a>	published
05/05/2021	Conference	A. Mämmelä and J. Riekkö	Subsidiarity and weak coupling in wireless networks	EuCNC 2021			2021	accepted
05/05/2021	Conference	M. Uitto and A. Heikkinen	Evaluation of live video streaming performance for low latency use cases in 5G	EuCNC 2021			2021	accepted

Figure 6: Excerpt from DEDICAT 6G tracker – Publications

### Open Data

DATE (entry added)	Title	Type	Responsible partner	target users	repository/link	Documentation link	DOI	openly available since/from
Date	ThisSet	data set						

Figure 7: Excerpt from DEDICAT 6G tracker – Open Data

### Pre - Standardisation

DATE (entry added)	Standardsbody/forum	Specific group	Link	Partners contributing	Possible contribution from DEDICAT6G	Plan for contributing	DEDICAT6G WP involved
16.03.2021.	AIOTI	WG DLT	<a href="https://aioti.eu/working-groups/">https://aioti.eu/working-groups/</a>	VLF	Trustworthiness management platform based on DLTS.	Contribute for AIOTI strategy for DLTS applied to secure IoT systems and communication networks and build basis for establishing distributed identity management, trust metrics and automated trustworthiness assessment procedures. VLF will coordinate DEDICAT 6G results from 3GPP, 5G, 3GPP, ensure that	WP5
12.05.2021	5G-PPP	Pre-Standardization WG	<a href="https://5g-ppp.eu/5g-5g-research-with-standardization-potential/">https://5g-ppp.eu/5g-5g-research-with-standardization-potential/</a>	AIRBUS	B5G/6G roadmap creation	Contribute to B5G/6G roadmap technical report,	WP2 WP3 WP4
12.05.2021	5G-PPP	Architecture WG		UoS	System architecture including distributed intelligence and MEC	Contribute to the white paper v5.0	WP2 WP3 WP4 WP5
18/05/2021	IEEE	IEEE Future Networks Initiative (FNI), Systems Optimization working group	<a href="https://futurenetworks.ieee.org/">https://futurenetworks.ieee.org/</a>	VTT	IEEE International Network Generations Roadmap (INGR), Systems Optimization	Contributions to the roadmap and its updates and related workshops and papers	WP7

### DEDICAT6G

#### Standardisation

DATE (entry added)	Standardsbody/forum	Specific group	Link	Partners contributing	Possible contribution from DEDICAT6G	Plan for contributing	DEDICAT6G WP involved
10.05.2021	3GPP	RAN WG4, RAN WG4, CT WG1, SA WG1, WG2, WG3 et WG6	<a href="https://www.3gpp.org/specifications/groups">https://www.3gpp.org/specifications/groups</a>	AIRBUS	Use of virtual Mission Critical Services.	Support standardisation initiative by describing virtual MCS in the context of Dynamic Coverage Extension and Dynamic Shared of Intelligence.	WP2 WP3 WP4
Date	ETSI	ENI	<a href="https://www.etsi.org/technologies/experimental-networked-intelligence">https://www.etsi.org/technologies/experimental-networked-intelligence</a>	Atos	Supporting OSM taking into account Machine Learning / Artificial Intelligence techniques	Attend regular meetings	WP2 WP3 WP4

Figure 8: Excerpt from DEDICAT 6G tracker – Pre-standardisation and Standardisation

### 3 Dissemination plan and early activities

An important target of the DEDICAT 6G project is to disseminate and communicate information about the project, its objectives, the approaches chosen, and its results. The aim is to achieve this in a professional manner, at a very high quality, and via various communication means and channels. Dissemination and communication actions are a core part of any project, as the work and achievements of the project are only of value if the relevant communities are aware of them. While the initial and early adoption of results within the project consortium itself is crucial, the real impact stems from the wider community being informed and taking up the results and findings.

DEDICAT 6G dissemination activities will deal mainly with the distribution of scientific knowledge that is being created through the research and experimentation within the project. The aim is to optimize the dissemination of the scientific and technology results obtained in the project, through publications in journals and presentations in conferences and workshops. In parallel, the communication activities deal largely with raising awareness about the project through various means (as listed in Section 2.1), through interactive and non-interactive means, like the project website and social media channels, newsletter, leaflets and flyers, demonstrations of the DEDICAT 6G use cases, etc. Both types of activities, dissemination and communication, address the whole range of stakeholders including the academic, research and industrial communities.

During the proposal phase, the project team identified and tried to define key performance indicators to quantify the dissemination and engagement activities, the project team considers these targets still as relevant and as being at the appropriate levels. The following table provides these targets and also an indication of the current levels reached for each category (as of June 30<sup>th</sup>).

**Table 1: Dissemination and Engagement KPIs**

Metric	Target	Reached as of 30.06.2021
<b>No. of workshops/webinars</b>	3+	
<b>No. of workshop/webinar participants</b>	300	
<b>No. of attendees in information campaign, peer networking events</b>	> 1000	
<b>Size of the community (incl. Twitter followers, mailing list subscribers, bloggers)</b>	> 1000	69
<b>Media coverage (editorials and clippings)</b>	100	
<b>Social media announcements, e.g. tweets, blog posts, etc.</b>	>100	23
<b>Unique Web visits from outside the consortium</b>	>1000	563
<b>Scientific/technical publications</b>	>15	6
<b>Number of contributions to standardization bodies</b>	>5	1
<b>Number of contributions in commercial and industrial bodies</b>	>3	
<b>Conference presentations</b>	>30	5
<b>No of Companies involved</b>	>50	
<b>Participation to industry fairs</b>	3	

<b>Trust management platform smart contracts to be featured on ChainRider smart contract marketplace.</b>	1	(1)
<b>Technology demonstrations through open PoCs, one per use case per year for the latter 2 project years</b>	8	

For the DEDICAT 6G dissemination and communication action plan, two relevant dimensions are identified: a) the means and channels to be used for dissemination and communication, and b) the target groups and audience to be addressed by these activities. They are described below.

### 3.1 Scientific Community

Aiming at scientists in academia and industry, and as already described in the proposal, DEDICAT 6G will publish (and has already started publishing) its work and results wherever possible in high impact factor journals and magazines (such as IEEE Transactions on Communications, IEEE Network, IEEE/ACM Transactions on Networking, ACM Computer Communication Review, Wireless Networks –Springer, IEEE Communications Magazine, ACM SIGCOMM, IEEE Journal on Selected Areas in Communications) and top peer-reviewed conferences (such as ACM SIGCOMM, IEEE GLOBECOM, PIMRC, European Conference on Networks and Communications (EuCNC), Public Safety Communication Europe (PSCE), IEEE CAMAD, Cigr, Infocom, CIRP, ADEPT). Contributions are also planned to relevant standardization bodies and industry forums, such as 3GPP, IETF, ETSI MEC, ETSI ENI, and the 5G PPP Pre standardisation WG.

### 3.2 Stakeholders and wider community

DEDICAT 6G plans community development through virtual and physical events organization (e.g., targeted workshops/webinars, workshops co-located with relevant conferences, tutorials, panels, special sessions, summer schools, etc.) and participation as keynote speakers/panellists, with the aid of vendors, operators, SMEs, academic organizations and public authorities.

Using this targeted approach along with the (Section 2.1) social media channels, the project aims to establish strong communication channels with the target audiences with clear and effective messages that communicate the project vision and results as well as stimulate interest in the project technology.

Participation in industry fairs for demonstration of technological tools and their innovative capabilities is one option that is being explored.

Community development is also realised through liaisons with other 5G PPP projects and relevant initiatives on related subjects and projects of which the activities will impact the DEDICAT 6G work, contributions to a HEXA-X deliverable are one example. Contacts with these other projects is being established via the 5G PPP or direct links, e.g., through cross partner involvement, aiming to organise joint workshops and/or panels.

Organization of industrial workshops, keynote speeches, and panels on B5G/6G and related business opportunities, dynamic coverage and connectivity extensions, smart migratable computation, public safety enhanced by DEDICAT 6G solutions, trust management, and AI based threat detection distributed/edge computing environments etc.

Promotion through project materials (e.g., project brochures (see appendix I), posters at relevant industrial and expert events, publication of results in partners' innovation portals/web

sites, etc.) and the various social media channels and project web sites complement these efforts.

### 3.3 Web Site

The project web site <https://dedicat6g.eu/> is the central publicity hub of the project. It was created during the first two months after the launch of the project and was officially opened at the end of February 2021. The web site is supported by all project partners, and it provides a shared and common view of the project. The site is updated regularly and with its dedicated twitter and news sections which report on the newest developments within the project.

The DEDICAT 6G website will run throughout the lifetime of the project and will be maintained for a period of at least two years after the end of the project. It is the core communication tool for the dissemination of the project information and activities, all public deliverables, public presentations, and all open access published papers or software will be linked and made accessible from the relevant sub-page.

The landing page is depicted in Figure 9 on the next page.

### 3.4 Internal dissemination

In order to be able to share the main intra-project results with all involved partners, email distribution lists, a file sharing repository server (Teams) and collaboration hub (slack) were established. This enables active discussion between the project partners. Additionally, key project results were shared at work package-internal workshops.

A set of mailing list has been created with a dedicated list for management board ([dedicat-6g-pmt@wings-ict-solutions.eu](mailto:dedicat-6g-pmt@wings-ict-solutions.eu)) and technical project-wide list for the whole consortium ([dedicat-6g-tech@wings-ict-solutions.eu](mailto:dedicat-6g-tech@wings-ict-solutions.eu)). These lists are used by the partners for reporting the status of the WP, arranging conference calls and for discussions on important issues.

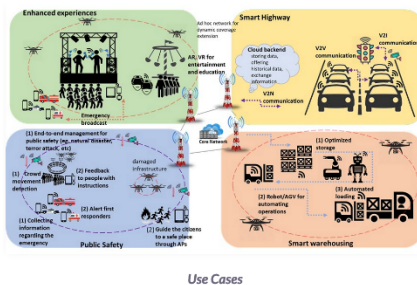
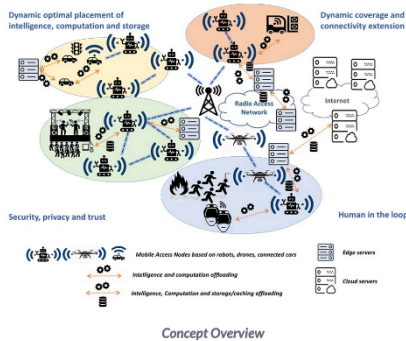
All information, such as documents, deliverables, software, publications, research activity, obtained results and meeting minutes are stored on an internal and members-only access repository created for the project and hosted at VTT (DEDICAT 6G Teams)) Each member of the project was provided with an individual account and all the published content authored by the project members is stored to take trace of the activities. The repository is organized in folders dedicated to each WP and to managerial aspects.

In order to improve the communication between partners, a channel-based messaging platform (slack) has been set up ([https://join.slack.com/t/slack-zx03359/shared\\_invite/zt-pm0o05p1-zF0DrE\\_uKIA68dJHCAGciA](https://join.slack.com/t/slack-zx03359/shared_invite/zt-pm0o05p1-zF0DrE_uKIA68dJHCAGciA)). A Slack workspace is where people can work together, connect all their software tools and services, and find the information they need to do their best work.

Each WP leader organizes either bi-weekly or monthly (depending on the WP status) calls among the WP participants to organize the work and to monitor the status of both technical and non-technical aspects. The activities and main information relevant to all project participants are made available on the mailing lists and the call minutes are stored in the repository. In addition to the WP calls, monthly calls including management board partners are also set up.

Because of the COVID-19 pandemic, in-person meetings were not possible in 2021 and it is still not foreseeable when the consortium can get together to a general assembly in person again. For this reason, the general assemblies in January and July of 2021 were held as online events.

## Vision



In future 6G wireless networks, it is imperative to support more dynamic resourcing and connectivity to improve adaptability, performance, and trustworthiness in the presence of emerging human-centric services with heterogeneous computation needs. DEDICAT 6G aims to develop a smart connectivity platform using artificial intelligence and blockchain techniques that will enable 6G networks to combine the existing communication infrastructure with novel distribution of intelligence (data, computation, and storage) at the edge to allow not only flexible, but also energy efficient realisation of the envisaged real-time experience.

DEDICAT 6G takes the next vital step beyond 5G by addressing techniques for achieving and maintaining an efficient dynamic connectivity and intelligent placement of computation in the mobile network. In addition, the project targets the design and development of mechanisms for dynamic coverage extension through the exploitation of novel terminals and mobile client nodes, e.g., smart connected cars, robots, and drones. DEDICAT 6G also addresses security, privacy, and trust assurance especially for mobile edge services and enablers for novel interaction between humans and digital systems. The aim is to achieve (i) more efficient use of resources; (ii) reduction of latency, response time, and energy consumption; (iii) reduction of operational and capital expenditures; and (iv) reinforcement of security, privacy, and trust.

DEDICAT 6G will focus on four use cases: Smart warehousing, Enhanced experiences, Public Safety and Smart Highway. The use cases will pilot the developed solutions via simulations and demonstrations in laboratory environments, and larger field evaluations exploiting various assets and testing facilities. The results are expected to show significant improvements in terms of intelligent network load balancing and resource allocation, extended connectivity, enhanced security, privacy and trust and human-machine interactions.



DEDICAT6G Retweeted  
5G-PPP 10 Jun

Don't miss the #5GPPP Phase 3 projects brochure, just released and discover the activities and achievement delivered by each of them!

Download it here  
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#5G @NetTechEU @DigitalEU #6G @AIOTI\_EU @BDVA\_PPP @5GAmericas @core\_nect @NGIoT4eu @one6GGlobal @EuCNC

25 24 Twitter



#DEDICAT6G Project Coordinator Vera Stavroulaki from @wings\_ict will be presenting the vision and methodology of DEDICAT 6G in the @EuCNC session "6G Enabling Technologies II", Thursday, 10 June 2021, 16:00-17:30 CEST @5GPPP #6G #H2020

2 6 Twitter



Mikko Uitto @VTTFinland, leader of #DEDICAT6G Enhanced Experiences use case, will be talking about "Evaluation of Live Video Streaming Performance for Low Latency Use Cases in 5G" in the @EuCNC session "Operational Experiences and Use Cases Enabled by 5G", 9 Jun 2021, 16:00-17:30

4 Twitter

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This project has received funding from the European Horizon 2020 Programme for research, technological development and demonstration under grant agreement n° 101016499 - DEDICAT6G

Figure 9: DEDICAT 6G Project web site (landing page)

## 4 Interactions with the 5G PPP

DEDICAT 6G consortium is committed to actively contribute to the 5G PPP<sup>5</sup> and 5G IA<sup>6</sup> to maximise the programme’s impact and ensure a common and strong European leadership capable of addressing the challenges of the next generation communication infrastructures.

In this section, the consortium reports on the activities of DEDICAT 6G project in relation to the 5G PPP programme. This covers the participation of DEDICAT 6G partners in different working groups, as well as in the activities of the 5G PPP steering and technical boards (SB and TB) to coordinate with the overall 5GPPP activities and guidelines.

### 4.1 Representation of DEDICAT 6G in 5G PPP

Apart from the SB and TB, and based on the project scope, the relevant WGs selected, and the partners appointed to represent DEDICAT 6G in these groups are included in the following table.

**Table 2: 5G PPP Involvement - DEDICAT6G representatives in the WGs**

5G PPP working group	Name (partner)
Architecture	Haeyoung Lee (UoS)
Vision and Societal Challenges – BVME SG	Esther Garrido (ATOS)
Trials	Vera Stavroulaki (WINGS)
Pre-standardisation	Vera Stavroulaki (WINGS)
Test, Measurement and KPIs Validation	Evangelos KosMATOS (WINGS)
Communications	Klaus Mößner (TUC)
Steering Board	Vera Stavroulaki (WINGS)
Technical Board	Aarne Mämmelä (VTT)

### 4.2 Ongoing activities and interactions with 5G PPP WGs

Although the project is in an initial stage, some activities and interactions with the various 5G PPP working groups can already be reported.

#### **Architecture**

DEDICAT 6G representative has been attending all the meetings of the group since the beginning of the project.

During the period from January 2021 to June 2021, the meetings have been based on participant projects’ presentations and discussions about the white paper v4.0 on 5G Network Architecture. For ICT-52 projects (where DEDICAT 6G is included), the group has discussed about these projects needing more time to produce technical innovations valuable for the

<sup>5</sup> <https://5g-ppp.eu/>

<sup>6</sup> <https://5g-ia.eu/>



WG, thus their participation will be expected from 2nd half of 2021 for the next version of the white paper (v5.0).

The possible contribution that the project foresees to this WG is related to DEDICAT 6G system architecture, including distributed intelligence and MEC, that is being designed in WP2.

Besides, during February 2021 the WG prepared a proposal for EuCNC21 "Architectural Evolution toward 6G Networks: A European View", that was finally rejected.

### **Vision and Societal Challenges – BVME subgroup**

The subgroup is working on a white paper entitled "5G ecosystems". DEDICAT 6G representative has followed all the meetings of the subgroup. For this white paper, the stakeholders of the 5G ecosystem have been extracted from the last version of the 5G PPP Architecture white paper and, from that point, new stakeholder and roles have been identified. DEDICAT 6G has provided input in this respect, mainly from the UC1 point of view. Besides, the project has collaborated to the content of the white paper by sharing some of the challenges that verticals face when joining the ecosystem. The white paper has not yet been finalised, it will be sent to 5G IA steering group for review at the beginning of July 2021 with an expected publication date of September 2021, along with the MeditCom<sup>7</sup> conference. Some of the sections of the white paper were already presented on the 21<sup>st</sup> of May during the 5G PPP Technical Board Workshop.

### **Pre-standardisation**

AIRBUS is active in this WG for some time now and has participated in the consultation to produce the B5G/6G roadmap technical report, with relevant standardization and regulatory topics for 5G, so it is possible that they will take some DEDICAT 6G to the definition of the roadmap. DEDICAT 6G partner WINGS will also follow this WG from the second half of 2021. The underlying idea is that, by participating in the WG meetings representing DEDICAT 6G, it will be possible to influence pre-standardization on 5G and related R&D from the project developments.

### **Test, Measurement and KPIs Validation**

The participation of DEDICAT 6G in this WG, attending the regular meetings, will allow the project to consider the experiences of longer running 5G projects in Service performance measurement methods over 5G experimental networks, for when the project sets up the pilots and reaches the testing and validation phase. From that moment onwards, opportunities for concrete contributions to this WG may arise.

### **Communications**

DEDICAT 6G is following the 5G PPP social media channels and has contributed to the 5G PPP Phase 3 Project Brochure (logo, project info sheet)<sup>8</sup>.

The project representative participated in the 10th of May 2021 meeting where the new projects were welcomed. Main focus of this meeting was on re-iterating the 5G-PPP brand and the use of the logo, as well as the communication tools available, including social media platforms such as the (5G-PPP) YouTube channel, LinkedIn and Twitter. With the move from H2020 to Horizon Europe, and the fact that the research topics tackled by the 5G PPP move from 5G to B5G and 6G, the re-branding of the Partnership has been triggered. DEDICAT 6G

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<sup>7</sup> <https://meditcom2021.ieee-meditcom.org/>

<sup>8</sup> [https://5g-ppp.eu/wp-content/uploads/2021/06/5GPPP\\_Phase3\\_Brochure\\_v7.2-web.pdf](https://5g-ppp.eu/wp-content/uploads/2021/06/5GPPP_Phase3_Brochure_v7.2-web.pdf)

reported also to the group on its intended activities for the EuCNC conference to share with the other projects' representatives.

### **Steering Board**

DEDICAT 6G project coordinator is participating in the 5G PPP SB meetings and the related activities.

At the beginning of the project, with the provision of first information on DEDICAT 6G on representatives for SB and TB, as well as the content for the 5G PPP website<sup>9</sup> and the collection of signed partner forms for 5G PPP Collaboration Agreement. DEDICAT 6G has followed 5G PPP webinar "New 5G Core Technologies Innovation Projects" on the 16th of February 2021 and has given a presentation at the 5G PPP ICT-52 webinar in March 2021 "Europe accelerates towards 6G". Additionally, DEDICAT 6G has contributed to the sixth edition of the European 5G Annual Journal<sup>10</sup>. The project is also uploading the deliverables to the 5G-PPP BSCW repository.

### **Technical Board**

DEDICAT 6G has been represented in the TB meetings since the beginning of the project and has collaborated in all the activities required by the group. This includes, in March 2021, the contribution to EC H2020 5G Infrastructure PPP - PPP T&Ps Summary Table, a document that summarizes all up-to-date information on PPP Phase 2 and Phase 3 Projects Trials & Pilots inputs. Additionally, DEDICAT 6G has provided information for the TB cartography including verticals (i.e., use cases allocated to verticals), KPIs, and platforms capabilities of the use cases.

## **5 Exploitation plan**

The EC Research & Innovation Participant Portal<sup>11</sup> considers exploitation as "*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*". Attending to this definition, the objective of the DEDICAT 6G exploitation plan is to put in value the generated results and experience gained by each partner through the lifetime of project and contribute to the project's overall sustainability facilitating interested partners and stakeholders to benefit from these results.

From the relevant stakeholders in the 5G ecosystem that DEDICAT 6G is most oriented towards (see 3.2 section) the consortium covers a wide range of them: operators, vendors, IT providers, verticals and research partners. The utilisation of the project's results will vary depending on each profile, and accordingly, the exploitation plan will have four main axes:

- **Scientific:** building the scientific community around the B5G/6G software networks domain, strengthen the collaboration with leading European and National industrial players with follow-up research projects and initiatives, as well as academic purposes.
- **Contribution to Open source:** with active involvement and contribution to related Open Source Software projects to ensure the sustainability of the project results and uptake by third parties.

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<sup>9</sup> <https://5g-ppp.eu/dedicat-6g/>

<sup>10</sup> <https://bscw.5g-ppp.eu/pub/bscw.cgi/d424095/5G%20European%20Annual%20Journal%202021.pdf>

<sup>11</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/glossary>

- **Contribution to Standards:** fostering collaboration with standardisation bodies, which influence the trends and technologies that will drive market leadership.
- **Commercial:** focusing on the roadmap to commercialization and deployment of the overall solution, as well as incorporating individual research results into partners' already existing portfolio.

To define a credible plan, T7.2 leader has collected internal information from the partners to understand their motivation and their expectations with respect to the results that they are developing and, accordingly, place them in one or more of the four axes. Besides, the details provided by the partners are relevant to know about the different paths for exploitation: individually, for the results that they own in their full, and jointly, for results that are owned by several partners and where agreements that permit the joint exploitation will have to be reached. The means to collect this information has been a template that can be consulted in Annex I, thanks to which the partners have provided this initial and homogeneous view of expected results, targeted stakeholders and exploitation intentions.

Another important aspect to consider in the exploitation plan is external to the project, the market analysis. Both individual, as well as joint plans, should be aligned with the insights taken from this analysis to ensure that all project activities remain relevant within the global context and maintain a high level of innovation. In this deliverable, the consortium has initially reflected upon DEDICAT 6G environment, including market, key stakeholders, trends, technologies, needs and opportunities. As the project progresses and results become mature, the market analysis will be updated to keep pace with the evolution of trends and competitors.

Last, but not least, it is worth highlighting that the exploitation plan is going hand in hand with the communication and dissemination plans, to be able to attract stakeholders in the design, future use and investment for further development of DEDICAT 6G results.

## 5.1 Project wide exploitation

The project's joint exploitation is a core activity and aims at building the path for commercialization, benefiting from the multidisciplinary expertise of the partners.

Following DEDICAT 6G impact creation strategy (see Section 1.2), exploitation activities have started from the beginning of the project with a general environment (see Section 1.3) and stakeholders (see Section 3.2) overview to have a glimpse of the opportunities that can be observed in these first months of the project. In parallel, main results of the project are being identified in order to start drafting DEDICAT 6G value proposition that is the first step in the definition of DEDICAT 6G business model.

### 5.1.1 DEDICAT 6G main results

For exploitation purposes, deriving from the input collected through the Partners' motivation and expectations template and also from WP2 activities, T7.2 is collecting the main results of the project: DEDICAT 6G platform and its demonstration in real case scenarios. Discussions among the partners are serving to unify the name of the components and delimit their ownership. These results are being included in an Excel file that will be evolved along the project duration, containing important information about rights for others to use, as well as the dependencies among the different components needed for the delivery of the solution.

#### DEDICAT 6G platform

Taken from the DoA, DEDICAT 6G platform will be a *"smart connectivity platform that uses artificial intelligence and blockchain techniques that will enable 6G networks to combine*

*the existing communication infrastructure with novel distribution of intelligence (data, computation and storage) at the edge to allow not only flexible, but also energy efficient realisation of the envisaged real-time experience”.*

### **DEDICAT 6G platform implementation in four use cases**

The four use cases of the project that are being implemented to validate DEDICAT 6G platform will showcase the platform's functionalities and will be another path for joint exploitation as early adopters of the technology. Apart from the platform, the partners involved are providing other components and technologies needed for the demonstration. Although the project is now in an early stage, and we cannot give concrete details about this, the project use cases have a clear business potential. End-users are in some cases part of the consortium with a business case in place and the other partners involved are interested in the use case exploitation. To facilitate the debate, T7.2 leader is proposing what-if business scenarios. The main highlights of the use cases' business discussions are reflected below.

#### UC1: Smart Warehousing

This UC is the most relevant one at this moment, from the business perspective, as the platform user is directly involved (DIA).

As logistics and warehousing stakeholder, DIA is constantly exploring application of innovative smart warehousing solutions for improved efficiency and performance of the warehousing processes. If the pilot's results are satisfactory in line with DIA's strategy, DIA would be interested in elaborating an adoption plan which will include provision in small-scale, deployment, testing in different warehouses and hubs, and, in future, a gradual expansion to larger scale.

DIA is committed to lead necessary activities towards identification and execution of this business opportunity based on the DEDICAT 6G systems applied and validated in the Smart Warehousing use case. In this respect, DIA will coordinate the necessary partners (tech and telco providers) to further challenge the solution in additional warehouses, featuring different capabilities and restrictions and following different scenarios. Respective warehouses could be selected (own/shared-network) in the context of the gradual expansion to larger scale approach.

WINGS and VLF will closely support DIA in this effort: VLF, seeking to specialize its IoT platform (with SmartAccess360 and BLEMAT indoor positioning services) for smart warehousing and logistics (supply chains) applications, believes that DEDICAT 6G elements will enable this specialization. WINGS, for its part, will deal with the improvements required in the adoption plan, as the company is interested in exploiting project outcomes towards enhancing its solutions (hardware and software components). Delivering an enhanced solution that supports smart warehousing and logistics (supply chains) applications at a larger scale, is totally aligned with its strategy.

As NOKIA's Data Marketplace (NDM) can be adopted for supply chain management, NOKIA will be willing to materialise the business opportunity. Depending on the outcome of the exploitation agreements, if NOKIA leads the opportunity to be implemented in DIA's premises, the other UC partners will be asked to bring their technologies if needed for the wider solution. If NOKIA does not lead the opportunity but NDM is needed for commercial use, then standard Nokia licensing for the product will be applied.

Other partners of the consortium will be also needed for the adoption of this UC, and this is valid also for the other use cases. This will be clarified as the project progresses with specifications and development of the DEDICAT 6G system (WP3, WP4, and WP5 are providing key

system components needed for proper instantiation of the DEDICAT 6G solution) while joint exploitation activities will determine under what conditions. The consortium will advance in this direction and will give more details in next WP7 deliverables.

In case that proper business opportunity cannot be executed by participating partners, a strategy for technology transfer will be derived.

- WINGS maintains a strong collaboration with its vertical transportation & logistics partners. Through this network, WINGS can investigate their potential interest in adopting projects business opportunities.
- NOKIA works with Ultraviolet Consult (<https://ultraviolet.rs/>), an European supplier for NDM and WWS (World Wide Streams) project development. They are well versed in NOKIA technology and can operate the deployments.

This option will be evaluated before the end of the project in order to follow a successful alternative business plan afterwards. The process will be facilitated by promoting the positive feedback received

by DIA during piloting activities.

### UC2: Enhanced Experience Pilot

For this use case, two different scenarios were discussed.

The project has finished, and the pilot has been implemented and evaluated in a public event at VTT / University of Oulu premises with very positive feedback from the participants in the event. The event has been organised by VTT. VTT has done the promotion and has invited mobile industry partners in Finland. VTT is not allowed to make money with the system but, as use case leader and organiser of the public event, it is the first step in a potential opportunity for a deployment at a larger scale. We imagine that one of these contacts of VTT (mobile industry that attends the public event at Oulu) has a potential customer (events' organizer) that is looking for a similar solution. The mobile industry talks with the events' organizer about the pilot they have seen, and the events' organizer is eager to run a similar pilot in one of its events.

In this setting, VTT would be the contact point between the mobile industry and the rest of the partners in the consortium for running the next pilot in the events' organizer selected environment. UC2 pilot comprises several sub-solutions from the partners, which means that not necessarily all of them are of the interest of the mobile industry or the events' organizer, instead, probable refinements will be needed. VTT will charge the mobile industry to cover costs. Most likely, the first piloting demo organised by VTT could be free of charge, but after that, price will be formed according to the work effort required. The multicast "base" software in 5G test network context is third-party software and company mention is required for demonstrating purposes. VTT has also launchpad programme<sup>12</sup>, aiming at supporting not only in spinning off but also for discussing of VTT researchers on IPRs issues.

OPTIN, for its part, will take part in the discussion to see what is required in terms of enhancements or changes to the smart glasses or SW application and will estimate the appropriate NRE (Non-Recurring Engineering) and delivery schedule. If commercial discussions are successful, OPTIN will work to deliver the solution required. UoS can organise remotely technology transfer session for the mobile industry about the intelligent coverage extension mechanism using mobile access points - MAPs (for the mobile industry's customised communication

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<sup>12</sup> <https://www.vttresearch.com/en/vtt-launchpad>

solutions for outdoor events). Since UoS solution might have dependency of the mobile industry's commercial network, interfaces for actual implementation can be discussed so that the solution can be customised or manipulated for different types and sizes of events. In exchange, UoS would ask the mobile industry to acknowledge UoS part in the solution and mention UoS and this collaboration in their marketing communications.

In a second possible scenario, ORANGE, as telco operator and verticals-oriented industry, sees that this pilot could be of interest of their business units because they already have potential clients of the solution. ORANGE needs some information from the project partners to decide if this could be a commercial opportunity and then engage with the correspondent business unit at the company.

VTT would have a first discussion with ORANGE if a tailored solution is needed and which would be the interesting parts of the solution. OPTIN indicates that if the smart glasses and SW application are used as is (same as for DEDICAT 6G project without any changes), there is no NRE and ORANGE will only be charged for the number of smart glasses needed for the demonstration. The SW application will be free of charge for demonstration purposes, but if used for a commercial deployment, a nominal license fee will be charged. Similar to the first scenario, UoS can share its resource management solution for intelligent coverage extension using MAPs. Regarding dependency of network structures, the necessary interfaces would be further discussed and depending on the agreed or negotiated level of support, UoS will charge the mobile industry or ask them to acknowledge UoS part in the solution and mention UoS and the collaboration in their marketing communications.

### UC3: Public Safety Pilot

The context to set the discussion among the partners is the following: The project has finished, and the pilot has been implemented and evaluated in AIRBUS premises with very positive feedback. End-users (first responders, events organizers) have been involved in the final demonstration of the pilot and they are eager to run a PoC in a in a small-scale drill. The idea after the PoC is to deploy the solution at a larger scale.

AIRBUS would be willing to lead such business opportunity as it is totally aligned with their business strategy. AIRBUS DS Secure Land Communications is the European leader for mission critical and business critical communication and collaborations solutions, with 30 years in this domain. AIRBUS DS SLC offers advanced communication and collaboration solutions, compliant with the highest standards of security and reliability, both for mission and business critical users. AIRBUS DS SLC is at the forefront of Professional Mobile Radiocommunication (PMR) evolution to smart solutions and services, leveraging technologies such as 4G/5G, IoT, AI, AR/MR/VR, Android ecosystem and innovative devices. AIRBUS DS SLC provides a multimedia mission critical communication and collaboration platform for public safety and TUI users, providing voice (MCPTT), data (MCData), video (MCVideo) and location and map-based services, and enabling integration of a variety of services, applications and devices.

AIRBUS DS SLC products and solutions serve over 2 million first responders and business critical users, across 80 countries. From a mission critical perspective, several hundreds of tactical solutions for critical coverage have been deployed in order to support critical communications for crisis management after a natural or manmade disaster or during large events. Most of their customers are interested in new capabilities to enhance their efficiency and safety, therefore, AIRBUS is interested in the opportunity as DEDICAT 6G outcomes will be of interest to them.

For NOKIA this opportunity will be also attractive. NOKIA works in many domains and is developing projects in the area of public safety. Especially in the domain of transportation and vehicle tracking and management, two NOKIA products can be combined: Nokia Data

Marketplace and World Wide Streams. NDM and WWS can be operated only by NOKIA, so if AIRBUS would need to incorporate them in the solution for commercial purposes, then standard NOKIA licensing will be applied.

NOKIA would also be willing to lead the opportunity. Nokia has established a delivery process, and in particular for the NFaaS (Network Functions as a Service) team that is leading NDM and WWS products, delivery goes through Nokia cloud called NESG. Instances of NDM or WWS (depending on the UC need) would be deployed and would be used as a platform to model the UC and build the vertical application on top.

The rest of the use case partners are also committed to pursue the opportunity. For example, VLF is interested in joining the business opportunity with its SmartAccess 360 solution for context aware access control and actuation enhanced with DEDICAT 6G enablers. UoS is also interested to provide its crowdAnalysis solution that allows the detection of suspicious crowd movements. The mechanism would be through a licencing scheme. This scheme will come in time, after the developed solution has been compared to the state of the art in that matter. If the solution performs well enough, UoS will think about how to establish this licensing and on which ground.

In the case this business opportunity does not materialise like described above, AIRBUS may not sell DEDICAT 6G tools or technologies as such, but the collaboration developed with the other partners of the project might lead to other common business opportunities. In any case, the project's outputs will nurture AIRBUS products and solutions roadmap. For that, they can count on VLF, that is willing to make their enhanced SmartAccess 360 solution an integral part of the DEDICAT 6G offering for events and public safety challenges.

#### UC4: Smart Highway Pilot

Both local research centres, (TUC, IMEC) consider inviting industry partners / public authorities of their ecosystems to a final demonstration of the pilot. In fact, TUC is planning to showcase the final demo to the partners of the SRCC (Smart Rail Connectivity Campus partnership), and then also invite attendees from Saena (the Energy Agency for the state of Saxony) and regional industry players. Likewise, IMEC is considering automotive, telco, and road authority stakeholders to be involved in the demonstrations.

The scenario partners play with is that the pilot has been implemented and demonstrated in the two sites (Germany and Belgium) with very positive results. After attending the final demonstration, we imagine that an automotive Original Equipment Manufacturer (OEM) belonging to TUC and IMEC's industry network of partners respectively is interested in further demos that can lead to a bigger scale PoC. What would the partners do? As TUC provides internal support to exploit any commercial cooperation or spin out opportunities, if this would be the case, TUC would make use of those support mechanisms. IMEC, for its part, is also interested in further demonstrations, so future collaborations will be setup by the business development and research valorisation team of IMEC. At the moment, it is not clear that TTI will create a business line involving autonomous cars. It is being explored, though, and, as the pilots will not be demonstrated in TTI's footprint, it would be helpful to produce some videos of the demonstration so that they can add some features, making it easier to sell it to a potential customer. CEA, as research centre, does not propose business development activities, but it acknowledges that, to integrate their dual RAT 5G platform in a bigger scale PoC, this platform will need further development.

If UC4 partners were asked to facilitate the exploitation of their technology by a third party, it would depend on the situation but, generally speaking, CEA does not allow the use of the platform outside the project boundaries. IMEC tends not to transfer the result to partners, but

they would rather sell the knowledge as a consultant or would join the business opportunity if aligned with their strategy. TTI normally exploits its own technology and does not transfer licences, so it would either ask to be part of this new opportunity as a partner or would sell the technology as a supplier.

### 5.1.2 Next Steps in the DEDICAT 6G Exploitation plan

In the following months, the consortium will continue working with the excel file to better identify the different components and functionalities that form DEDICAT 6G platform, set the owners of the IP and the rights for others to further use these results (IPRs).

The platform will be studied in the light of its implementation in the four use cases so as to understand its target market (who will be willing to pay for it). The Value Proposition Canvas tool will be used to refine the profile of the potential customers, understanding their pain points in relation with DEDICAT 6G business idea. Only then, the consortium will be able to establish DEDICAT 6G value proposition, a simple statement that summarizes why someone would choose what we are offering, communicating the clearest benefit that they will receive.

A more exhaustive market and competitor analysis will permit the refinement of the draft SWOT analysis included in the project's proposal, as this external environment will be key to recognize opportunities and threats.

The project will progress with the definition and evaluation of the business model for DEDICAT 6G platform, for which the business model canvas tool will be used. Aligned with their individual strategies, the partners will position themselves in the organization of the business opportunity, that can materialize in the context of the use cases (as early adopters) or in any other setting, thanks to the partners' dissemination and communication activities.

## 5.2 Individual exploitation plans

Partners have used the template included in Annex I to provide their first ideas around their individual exploitation plans. Changes are foreseen to adapt these plans to a constantly evolving environment and future evolution of the project's results. In subsequent WP7 deliverables, next version of the exploitation plans, as well as initiated activities, will be reported.

### 5.2.1 WINGS

#### **Strategy in the project**

WINGS focuses on the development of software and hardware solutions for various vertical sectors (namely, water, energy, smart cities, food safety, health, transportation, finance) through advanced wireless, cloud/IoT, big data and security technologies. Through DEDICAT 6G, WINGS plans to exploit the outcomes of the project, especially the ones related to Smart Warehousing and Public Safety, towards enhancing the company's solutions with cutting edge solutions aiming to address real-life needs of the corresponding vertical industries. WINGS will also exploit the technical enablers for intelligence distribution, coverage extension and security and trust to extend the supported set of connectivity options and to be able to offer its platforms services over a wide area connectivity offering, with certain quality and trust guarantees. All these solutions will enrich the WINGS product portfolio. Through B5G/6G technologies and the innovation developed in the context of DEDICAT 6G, WINGS will be



enabled in maturing its products and consequently expanding its portfolio and becoming more efficient in its offerings. WINGS will strive to pursue valuable synergies with vendors and operators, to set up a collaborative infrastructure that will enable the delivery of the mentioned advanced services.

## **Results expected**

### **Type**

Solution, software and hardware components

### **Description**

Smart Warehousing solution: Remote controlled AGV operation by a human operator, Automated Guided Vehicle (AGV) autonomous mobility within a complex warehouse environment to improve warehousing operations, autonomous coordination of the AGV with other AGVs and humans in the vicinity, to avoid work-place accidents Indoor positioning and asset tracking,

- Off the shelf hardware will be exploited: AGV - TurtleBot3 Waffle-Pi: 360° LiDAR for SLAM, Camera, 3-Axis gyroscope, accelerometer, and magnetometer, OpenCR controller board 4 degree-of-freedom robotic, laptop for computing.
- Software: Platform for integration and mechanisms including image processing (e.g., for quality assurance) and decision making on positioning of Mobile Access Points for dynamic coverage extension, Computation Offloading to MEC/Edge. Human-centric application for remote controlled AGV operation.

Public Safety solution: WINGS STARLIT platform integrated with network coverage extension functionalities and Mobile Access Points (MAPs) on robots/drones, comprising among others data analytics capabilities for the detection of an event jeopardizing public safety, alerting first responders and providing enriched communication between first responders to guide citizens to a safe place. This includes human centric applications for first responders and citizens.

- Mechanisms for dynamic distribution of intelligence (design, algorithms, software)
- Mechanisms for dynamic coverage and connectivity extension including MAPs based on connected cars, robots, and drones (software, hardware)
- Security, privacy, and trust assurance especially for mobile edge services (design, software)

### **WP related**

Mainly WP3 and WP6

### **Other partners involved**

In the Smart Warehousing use case, the project partners DIA, WINGS, ORANGE, NOKIA and VLF are involved. In the Public Safety use case, the following partners are involved: WINGS, NOKIA, ATOS, AIRBUS, OPTIN, VLF, CEA, UoS, and CEA.

While WINGS aims to work closely with partners in the scope of the use cases, it is not foreseen at this point to share ownership of WINGS developed solutions with another partner.

**Targeted to**

- **Smart Warehousing:** The stakeholders that can benefit from this result are manufacturers (in the sense that similar solutions can be applied in factories), 3PL operators, warehousing companies, last mile (courier) operators due to increased automation, process improvement (in times of reducing time, optimising staff allocation, etc.), increasing safety.
- **Public Safety:** The stakeholders that can benefit from this result are first responders, law enforcement organisations, private security companies through Increase of operational efficiency of public safety, Reduction of emergency response time, Increase of public safety user quality experience.
- **Network operators** can benefit by applying DEDICAT 6G concepts to enhance network planning and operations, maximise network utilisation, reduce operational expense and enhance their service portfolio.

**Background used**

Any background that will be exploited is fully owned by WINGS.

**TRL expected at the end of the project**

TRL5 -TRL6

**Exploitation****Exploitation paths**

The solutions aim to supplement WINGS portfolio in the smart warehousing/logistics and public safety areas through the commercialisation of the corresponding solutions. These solutions and the corresponding know how will also be exploited in new, future projects and initiatives beyond DEDICAT 6G.

**Plan to follow your exploitation path**

The exploitation path for WINGS platform can roughly be split in three different phases: a) promotion and awareness, b) pre-sales: customized solutions and pilots, c) sales. It should be noted that these phases are not necessarily sequential and may also run in parallel (for different customers).

Phase 1: promotion and awareness. Initially the focus will mainly be on promoting the results derived through DEDICAT 6G and their performance/innovation comparing to currently existing solutions to relevant stakeholders. This will allow WINGS to attract stakeholders' interest and possible customers. Promotion and awareness activities will take place before the end of the project as part of WINGS dissemination and exploitation activities within the project.

Phase 2: pre-sales: customized solutions and pilots. The customers attracted during the "promotion and awareness" phase may be interested either in the exact solutions that were designed and tested during the project and will be offered as PaaS/SaaS or to similar solutions that need to be adjusted to their needs. This phase involves all those actions that will allow the customization of the solutions to the customers' needs. These may include but are not limited to: identification of new requirements; adjustment of mechanisms; further testing and validation in a lab environment; and pilots of the enhanced mechanisms in real environments under MoUs/small contracts, depending on the client needs.

Phase 3: Sales. This phase refers to the selling of the mechanisms and the services derived both from the project and the Phase 2 to specific customers.

Based on our current commercialisation experience we estimate to have a first set of collaborations/contracts for selling the solutions within 1-2 years after the end of the project.

## **Innovation**

### **Key innovations as having value to create impact for the project**

- Mechanisms for dynamic distribution of intelligence
- Mechanisms for dynamic coverage and connectivity extension including MAPs based on connected cars, robots, and drones
- Security, privacy, and trust assurance especially for mobile edge services
- Smart Warehousing solution
- Public Safety solution

### **Competitors identified so far**

- Smart Warehousing: real-time tracking of vehicles and goods at the transfer points are very consolidated operations, for both end-users and companies. However, the availability of data that can be acquired by sensors and devices along the logistic supply chain can enable much more advanced services reducing operational delays and wastes (due to disrupted products which do not reach the consumer market). DEDICAT 6G will deliver innovative services enabled by dynamic coverage extension, intelligence distribution, Automated Guided Vehicles (AGVs), AR, IoT, cloud computing and blockchain technologies. AGVs for coverage extension and at the same time empowered by AI and combined with cloud-based data analytics, allow for the realisation of affordable minimal-infrastructure smart systems with enhanced coverage and unlimited computing capacity, significantly increasing the efficiency of warehousing.
- Public Safety: currently, emergency services are based on predefined emergency action plans, lacking the flexibility to address scenarios under dynamics and to offer a more contextual response (e.g., personalized evacuation). While a massive number of sensors and connected devices such as smartphones, tablets, wearables etc., are available, they are not currently used in emergencies. Location and profile-based services, use of unmanned aerial vehicle or drones, AR assisted guidance could help in this direction but pose very strict latency requirements, additional bandwidth and new services based on analytics and artificial intelligence. DEDICAT 6G will pursue a public safety use case where the regular network infrastructure maybe broken down or not sufficiently working and thus drone/robot/car-based coverage and connectivity extension is utilised. Such 6G capabilities will enable yet another step compared to 4G/5G for mission and business critical transformation to ubiquitous, resilient, real time and very high-capacity services.

## **5.2.2 VTT**

### **Strategy in the project**

DEDICAT 6G topic is part of VTT's long term research plan and it fits well in the evolution of 5G test network in Oulu. VTT has several ideas for improving the state of the art in optimizing and controlling resource usage in the network, e.g., placement of computation in cloud and edge servers for realizing the computation-communication trade-off and dynamic cover-

age and control. Real-life use cases in this project either by simulated, emulated or actualised in the real environment will help to gain new knowledge of the B5G/6G requirements and reveal possible bottlenecks in the system. VTT has long experience with the EU funded projects and realizes those are good projects for establishing long-term partnerships and continuation with the future proposals as well.

## **Results expected**

### **Type**

Solution, knowledge

### **Description**

- Resource optimization and dynamic network management in terms of computing, caching, and video streaming, dynamic coverage and control
- Enhanced experience use case demonstrated in real operating environment
- Knowledge of B5G/6G requirements and network architectures
- Energy-efficient video streaming solutions
- Trade-off and cost for performing load balancing in the edge
- Scientific publications, visibility, and demo videos

### **WP related**

VTT is involved in WP2, WP3, WP4, WP6. VTT will take part in system architecture definition and use case requirement analysis (WP2). VTT will provide architectural and methodological support for distributed computation platforms (WP3). VTT further investigates computation placement optimization approaches. VTT will support dynamic coverage and connectivity extension via modelling of mobile access point networks and radio resource consumption (WP4). VTT will contribute to the implementation, integration, and set-up of the Enhanced Experience use case (WP6). The demonstration will include dynamic video load balancing via multicast streaming as well as dynamic computation placement.

### **Other partners involved**

VTT will mainly collaborate with WP leaders and task leaders. Enhanced Experience use case is implemented with UoS, OPTIN, and ORANGE. Integration between the components is evident.

### **Targeted to**

The following stakeholders can benefit from the Enhanced Experience use case

- Network operators: multicast- instead of unicast streaming can decrease the network load and spectrum usage significantly freeing it to other tasks
- Local and remote users: enhances the user's experience resulting in improved rating, better income
- Event organisers: improved quality of experience
- Service providers: more users, improved service quality, better income

Additionally, theoretical results are useful for the scientific society.

### **Background used**

The third-party mobile multicast software (version1) has been demonstrated in earlier projects as well, but since those days it has been upgraded to the next version following the features illustrated in 5G. VTT is not allowed to commercialize or making money with the system, but simply to demonstrate its usage in real mobile networks, such as in 5G test network.

**TRL expected at the end of the project**

TRL5 -TRL6

**Exploitation****Exploitation paths**

Further research, education, and knowledge regarding energy-efficient video streaming solutions, optimizing and controlling resource usage in the network, e.g., placement of computation in cloud and edge servers for realizing the computation-communication trade-off and dynamic coverage and control as well as demonstrations in real operating environment showing the benefits of the theory and laboratory tests. Visibility of the research via scientific publications. Co-operation with the consortium partners.

**Plan to follow your exploitation path**

VTT has an excellent record of accomplishment to transfer the expertise gained from EU and national projects to industry by customer projects, spin-offs, or license of patents and IPRs. Statistics show that 50% of most demanding innovations in Finland have involved VTT's expertise. VTT has good connections with mobile industry in Finland and in Europe. The knowledge obtained from the project will be used to benefit VTT's customer and partner organizations, which will further increase impact of DEDICAT 6G.

**Innovation****Key innovations as having value to create impact for the project**

Energy-friendly video streaming solutions, methodology and solutions to improve network resource efficiency and coverage

**Competitors identified so far**

Aalto University in Finland has partly similar system, but VTT has stronger background and knowledge in performing practical evaluations and demonstrations against the theory in the background enhanced by sophisticated network performance meters.

## 5.2.3 ORANGE

**Strategy in the project**

ORANGE, as a telecom operator, is involved in the front line on the subjects of B5G/6G. We want to proactively develop the technology, the architecture and the use-cases of B5G/6G. Indeed, B5G/6G is expected to open a wide range of new applications, paving the way for new business opportunities. In addition, we are looking for new international and interdisciplinary collaboration opportunities.

**Results expected****Type**

B5G/6G prototype platform components

**Description**

The B5G/6G prototype platform will be useful as a proof-of-concept platform, to run demos and validate the feasibility of our selected approaches.

**WP related**

Mainly WP3

**Other partners involved**

All the partners contributing to the prototype platform

**Targeted to**

The main beneficiaries of the results are the researchers of ORANGE working on B5G/6G technologies, along with the business units involved in B5G/6G development and pre-deployment studies.

**Background used**

None

**TRL expected at the end of the project**

proof-of-concept

**Exploitation****Exploitation paths**

ORANGE expects to improve its expertise about B5G/6G technologies and services. This will allow the team involved in the project to be able to provide support to ORANGE for the development and deployment of B5G/6G networks.

**Plan to follow your exploitation path**

ORANGE plans to expand the state-of-the-art and protect the innovation developed with patents. The KPI for assessing success are:

- Number of patents
- Number of publications in peer-reviewed international conferences or journals
- Number of ORANGE business units for which a support is provided, regarding B5G/6G development and pre-deployment studies.

**Innovation****Key innovations as having value to create impact for the project**

Opportunities for new services will be created thanks to this project. In particular, the resource orchestration for edge computing is identified as a good leverage for improving delay, energy consumption, reliability and security of services and applications.

**Competitors identified so far**

All operators and manufacturers studying the subject of B5G/6G.

## 5.2.4 NOKIA

**Strategy in the project**

Nokia is working on two important projects in the domain of data and resource management that will be used for managing all kinds of data and resources - even radio resources and

applications and services. These products are Nokia Data Marketplace (NDM) and World Wide Streams (WWS). NDM will be used in WP5 as a platform for AI/ML orchestration for security algorithms.

Main motivation for Nokia for joining the project was to improve TLR of this product and improve its capabilities, as well as to learn and understand what additional features will be needed in order to create more complete products.

### **Results expected**

#### **Type**

Pilot-tested and improved Nokia Data Marketplace product

#### **Description**

Nokia Data Marketplace (NDM) currently has a set of features that can be improved through research and use-cases of DEDICAT 6G. First of all, as NDM acts as a data access control layer, security is paramount. Nokia will lead WP5 which deals with security, and will work in improving the platform in the domain of AI/ML orchestration.

#### **WP related**

WP5

#### **Other partners involved**

Nokia works to improve its NDM product, and currently does not share ownership on it

#### **Targeted to**

Nokia Data Marketplace is useful for various industry verticals - mobility, public safety, supply chains, healthcare, government, AI/ML and many others where data protection, sharing, monetization and privacy is important.

NDM is solving a problem of secure and auditable data sharing, and this can be applied on 5G/6G services and radio and other resources.

Additionally, NDM orchestrates AI/ML on the top of the platform, so that algorithms can use data shared and exchanged through NDM for multi-party collaborative analytics.

#### **Background used**

Nokia will leverage on existing NDM and WWS projects. They are fully owned by Nokia

#### **TRL expected at the end of the project**

TRL 6

### **Exploitation**

#### **Exploitation paths**

Main exploitation paths are commercialization and contribution to standards

#### **Plan to follow your exploitation path**

Commercialize product and sell the solution through Nokia sales channels.

Contribute to standardization.

The KPI for assessing success is to sell the solution to at least 10 customers in the next 3 years.

## **Innovation**

### **Key innovations as having value to create impact for the project**

Key innovations will come from research in the domain of security and AI/ML orchestration. WP5 deals with security algorithms. Those and the data for training must be protected and orchestrated. While data can be exchanged and shared through a secure distributed marketplace, AI/ML must be executed in such a manner to preserve data privacy. Research around this will be done following modern approaches like Confidential Computing or Fully Homomorphic Encryption cryptography methods.

### **Competitors identified so far**

Competitors are Dawex, AWS Data Marketplace, IOTA, Immuta.

NDM leverages on Nokia well positioning in the telecom space, especially for exchange of 5G services. Additionally, NDM adds AI/ML orchestration on top of the data marketplace, and this feature will be extensively researched and developed in DEDICAT 6G, WP5. Finally, NDM uses private, permissioned blockchain to protect, tag, anchor and hash the data, record every transaction immutably and allow for complex business contracts enforcements via blockchain Smart Contracts.

## **5.2.5 ATOS**

### **Strategy in the project**

ATOS team participating in DEDICAT 6G is the Smart Networks and Services (SN&S) Unit, inside ATOS Research & Innovation department (ARI). SN&S Unit focuses on the research and definition of novel network architectures and on the enhancement of network protocols to enable the continuous evolution and improvement of the performance of telecommunications networks. SN&S Unit has a broad experience in software networks - Network Function Virtualization (NFV) and Software Defined Networking (SDN), concretely, in Management and Orchestration (MANO) and Operations Support Systems (OSS), including network slicing. Following this line of expertise, ATOS joined the project to contribute its knowledge to the project and lead NFV topics. ATOS has an asset coming from another project (NFVCL) that wants to extend with new functionalities that are aligned with ATOS Telecom, Media and Technology Industry (TMT) portfolio. ATOS' final goal as a research department is to get internal/external support for developing assets further, to be able to bring them to a market ready stage and incorporate them to the company sales portfolio for the benefit of the European research, the company TMT business and the digital transformation of ATOS' customers.

### **Results expected**

#### **Type**

- 1) Extension of NFVCL, software component
- 2) Deployment of a 5G core, knowledge

#### **Description**

- 1) NFVCL is in charge of assisting NFV-O (OSM) in the automatic creation of customized network slices for 5G vertical applications.
- 2) Experience and expertise in the configuration and deployment of 5G core networks, mainly driven by the needs and requirements of Public Safety (UC3) and Smart Highway (UC4) applications.



**WP related**

- 1) WP3 and WP4
- 2) WP6

**Other partners involved**

No

**Targeted to**

Mobile network operators

**Background used**

NFVCL from MATILDA project. This asset is not fully owned by ATOS (60%). Licence 3-Clause BSD.

**TRL expected at the end of the project**

TRL3

**Exploitation****Exploitation paths**

For the two different results, three possible exploitation paths can be identified: further research, contribution to open source projects and standards and knowledge transfer and commercialization.

## 1) NFVCL

- Further research  
The integration and (re)use of the results derived from the research projects is of key importance for the company, not to mention the key relationships that ATOS forges during the course of the projects, that lead to new joint proposals.
- Contribution to open-source projects and standards  
Open-source solutions have generated a lot of interest in the context of network virtualisation. In this regard, ATOS has been member of one of the most prominent open-source orchestration solutions, OSM, for several years now and has contributed to it through the work developed in projects like SONATA, 5GTANGO or 5GENESIS. ATOS was even member of the OSM Technical Steering Committee for the releases seven and eight cycles. ATOS provides DEDICAT 6G with the knowledge and experience acquired as a result of its contribution to OSM, as well as the opportunity to give visibility of the project in this open-source community, encouraging collaboration, increasing the possibility from the project to influence OSM roadmap and even contribute to it, widening the impact of DEDICAT 6G results. Likewise, DEDICAT 6G is an opportunity for ATOS to keep its collaboration with OSM, which is giving the organisation a lot of visibility in the open-source community in general and is a key advantage when communicating with ATOS business units and customers. It also positions the company in a privileged place to extend its business opportunities around open-source solutions, for example providing support services (i.e consulting or adaptation of assets).

- Knowledge transfer and commercialisation  
In ARI, there is a well-established process for innovation management, that selects the different innovation paths for the assets coming from the research projects, depending on their maturity, typology and the strategy of the ARI Unit involved in its development. If a high commercialization potential for an asset is detected, an ARI shuttle is created and this entails the asset maintenance and internal evolution following a business plan with a technical roadmap, asset package & demo preparation, estimation of costs and incomes, commercial plan, software repository, set up infrastructure, IP management and a marketing plan with its own branding. At this point, the asset is ready to be an input in the innovation process of the correspondent Industry in ATOS.

## 2) Deployment of a 5G Core

- Further research  
This result can be applied to the SN&S testbed and reused in future research projects. This testbed is an environment that emulates the virtualised infrastructure part of a 5G network and is remotely accessible via VPN. It has the essential components to replicate such an environment, NFV-O (OSM), VIMs (2 OpenStacks) and a cluster of K8s, as well as a communication channel with ETSI HIVE. It serves mainly as an internal test environment for the unit.
- Contribution to open source projects and standards  
The 5G core that ATOS is deploying in the project is free5GC<sup>13</sup>, an open-source project for 5G mobile core networks. In this respect, it is possible to contribute back to the project with new features.
- Knowledge transfer and commercialisation  
The knowledge generated by deploying a 5G core can be of help to ATOS TMT Industry, so specific collaborations could materialise.

### Plan to follow your exploitation path

The NLVCL is applied in DEDICAT 6G to be extended with new functionalities, like the deployment on K8s and migration capabilities between different compute nodes and offloading. Application of ML/AI techniques for assisting NFV-O on network slice deployment will be also explored.

In the regular meetings that ARI SN&S Unit holds with ATOS TMT Industry, ARI team learns about the company's strategy, the global portfolio, and the partners and customers' demands; on the other hand, ARI team provides insight about the latest European research trends, the projects and consortia the ARI team is involved in and the general results coming out of the projects. The NFVCL is already an asset that ATOS TMT Industry knows about. When the NFVCL enhanced with DEDICAT 6G capabilities is more mature, we plan to give a detailed presentation of its new features to discuss convergence and paths for collaboration. The business consultant and the technical team involved in the project will support ARI SN&S Head of Unit to prepare the material for this presentation. Results and new opportunities will be reported in future deliverables.

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<sup>13</sup> <https://www.free5gc.org/>

Regarding the knowledge that will be acquired in the deployment of a 5G core, ARI team participating in DEDICAT 6G will share this knowledge with their SN&S Unit's colleagues participating in different 5G projects.

## **Innovation**

### **Key innovations as having value to create impact for the project**

To be completed

### **Competitors identified so far**

To be completed

## **5.2.6 AIRBUS**

### **Strategy in the project**

Airbus DS SLC is a global supplier of advanced communication and collaboration solutions based on TETRA, TETRAPOL and 4G/5G technologies. Our solutions focus on large-scale mission or business critical (MCX) networks and enhance multimedia communication for public safety users during crisis and mission management.

The Professional Mobile Radiocommunication (PMR) technologies are at cornerstone of digital transformation enabled by LTE and 5G. In such context we attend to demonstrate that the technologies B5G/6G developed in the project will further enable mission critical and business critical organizations and end-users with rich and reliable capabilities, services and applications.

AIRBUS expects to address the future market of mission critical with products and solutions which bring the best technology to the Public Protection and Disaster Relief (PPDR) users and fully compliant with their expectation and needs. The results that we will achieve will nurture our products and solutions roadmap to further develop a competitive portfolio and maintain our leadership in the PMR industry.

### **Results expected**

#### **Type**

Mainly design, software components and evaluation of MCX connectivity platform in the context of B5G/6G.

#### **Description**

MCX connectivity platform integrated with DEDICAT 6G platform to benefit from dynamic coverage extension during crisis management.

End-to-End integration of MCS Client and Servers with mechanisms for dynamic coverage and connectivity extension in order to leverage network efficiency.

Security and trusted design will be considered in order to enhance secured communications for PPDR users.

#### **WP related**

WP2, WP3, WP4 and WP6

#### **Other partners involved**

All partners are involved in the Public Safety use case.

**Targeted to**

The results will benefit to first responders and PPDR users, law enforcement organisations, medical organizations or private security companies.

The future solutions developed on the results of DEDICAT 6G will improve the response capabilities to crisis of public safety organizations and leverage the enhanced situational awareness experience by improving efficiency and decision-making processes.

**Background used**

The existing interfaces will be available to partners in order to develop connectors to our solution.

**TRL expected at the end of the project**

TRL6 -TRL7

**Exploitation****Exploitation paths**

Airbus DS SLC is a key contributor to the 3GPP Mission Critical Services (MCS) standard definition, composed of MCPTT (Mission Critical Push To Talk), MCDData (Mission Critical Data) and MCVideo (Mission Critical Video) which will enable to provide broadband mission critical services on top of LTE and later on B5G/6G to public safety users. Airbus DS SLC actively contributes to SA2, SA3, SA6, CT1 and RAN groups and will therefore contribute to make sure that MCS evolutions and more generally multimedia critical communications take advantage of B5G/6G.

AIRBUS aims to demonstrate that dynamic coverage extension innovation based on drones or robots will further enable public safety users with rich and reliable multimedia services and applications, as part of the PMR industry next evolution to broadband beyond 5G and 6G.

**Plan to follow your exploitation path**

To be completed

**Innovation****Key innovations as having value to create impact for the project**

Leverage MCS communications resiliency based on dynamic coverage extension.

Increase critical communications efficiency based on dynamic distribution of intelligence.

Enhance end-to-end security and trust of critical communications in the scope of B5G/6G.

**Competitors identified so far**

Legacy public safety players, but also newcomers enabled by broadband PMR (4G/5G for now). Depending on the markets and opportunities, they can be competitors or partners.

What differentiates us is that we are a trusted end to end player for what concerns mission critical solutions with strong innovation capabilities and that we can leverage assets of other Airbus group entities (e.g. cyber security, satellite communications, Intelligence capabilities (e.g. imagery intelligence)).

## 5.2.7 OPTIN

### **Strategy in the project**

OPTIN wants to improve the capabilities of their smart glasses by creating a specific application related to the DEDICAT 6G project which may be marketable afterwards. Furthermore, we want to acquire knowledge about B5G/6G infrastructure and how it can impact our future product development roadmap. This project will also allow OPTIN to make new partnerships in the ecosystem and participate in future proposals.

### **Results expected**

#### **Type**

Software component and knowledge. Improvement of current display function and smart glass footprint.

#### **Description**

Specific application to interface our smart glasses with the DEDICAT 6G infrastructure.

#### **WP related**

WP2 and WP6

#### **Other partners involved**

No

#### **Targeted to**

Existing and future customers of our smart glasses.

#### **Background used**

Our ORA-2 smart glasses. Previously developed application for the MONICA project.

#### **TRL expected at the end of the project**

TRL6

### **Exploitation**

#### **Exploitation paths**

Commercialisation and knowledge

#### **Plan to follow your exploitation path**

We will promote the results of DEDICAT 6G project and our software solution to existing and new customers. We will work on dissemination activities linked to trade shows and exhibitions around optical technologies, augmented reality, wearable technologies, and defense such as SID (Society of Information Display, worldwide), Photonics West (US and Europe), AWE (Augmented World Expo in US and Germany), the Wearable Tech Show (UK), and Eurosatory (France). We also foresee the publication of one white paper. Our exploitation strategy will be based on the optimization of OPTIN smart glasses through a dedicated application for first responders as proposed in the project which will be an excellent differentiator for OPTIN.

### **Innovation**

#### **Key innovations as having value to create impact for the project**

The version of OPTIN smart glasses that will result from DEDICAT 6G will allow a more seamless integration to various customer backends considering the project requirements. Furthermore, the user interface will be compatible with the requirements of emergency first responders

such as firefighters, law enforcement, and other vertical segments targeted by the project. The project should help the company to build and provide a new wearable AR display product more adapted to first responder mission critical verticals, as well as to establish joint development and the exchange of new ideas with consortium partners to build this new device.

**Competitors identified so far**

Vuzix, Microsoft, RealWear, Magic Leap, Google. None of the aforementioned actors, as far as we know, have an optimized solution that can interact with the network through what is being developed through the DEDICAT 6G project. Furthermore, they do not have a dedicated UI for first responders.

## 5.2.8 VLF

### **Strategy in the project**

VLF operates ChainRider (chainrider.io), which is blockchain as a service solution for quick prototyping, deployment and validation of private permissioned and consortium blockchains and smart contracts – based on Hyperledger Fabric. VLF integrates IoT solutions with blockchain enablers to realize advanced trust management processes. In DEDICAT 6G project, VLF leads Task 5.2 which focus on realization of DEDICAT 6G trustworthiness management platform and procedures for DEDICAT 6G system and project use cases. Blockchain network configurations and smart contract templates validated in trust management challenges of the DEDICAT 6G project will be included into the ChainRider service offering. The ChainRider includes marketplace for validated/best practice Hyperledger Fabric configurations and smart contract templates. Here, all validated configurations and templates from the DEDICAT 6G trust management work will be included.

VLF operates its IoT platform including cloud and edge processing (IoT controllers) components. Through participation in DEDICAT 6G project, VLF will enhance IoT platform's capabilities to include advanced methods for intelligence distribution and opportunistic networking at the edge. VLF will validate applicability of its IoT platform (with DEDICAT 6G enhancements) in the Smart Warehousing and Public Safety use cases.

### **Results expected**

#### **Type**

Solution and software components

#### **Description**

Solution: validated DEDICAT 6G trust management platform based on distributed ledger technologies (DLT).

Software components: smart contract templates facilitating DEDICAT 6G trustworthiness processes, integration points and metrics.

#### **WP related**

WP5

#### **Other partners involved**

To be discussed and agreed with partners participating in WP5

#### **Targeted to**

Distributed ledger technologies can be applied in solving various challenges related to process automation (through smart contracts), trust management and transaction validation. However, validating different configuration is cumbersome process that takes significant amount of time and engineering resources. There is still shortage of validated best practices (blockchain network configurations and smart contract templates) when it comes to applying DLT in various domains and for various challenges. With ChainRider blockchain as a service solution, VLF aims to drastically reduce the time needed for configuring, deploying and validating blockchain solutions in all application domains. With VLF's solution, blockchain systems can be up and running and ready for further integration in 30 minutes instead of couple of days/weeks how much usually takes for a blockchain engineering team to configure, deploy and populate blockchain network with smart contracts.

With DEDICAT 6G, trustworthiness management solutions (developed with support of ChainRider), stakeholders' needs for trust management solutions in heterogeneous ICT systems (opportunistic networks, distributed processing and edge communication/computing systems) will be addressed. Targeted stakeholders are all IoT/ICT system integrators and solution owners who have identified DLTs as potential solution for trustworthiness management challenges and process automation and need to quickly setup and validate the technology.

### **Background used**

Background is the ChainRider solution fully owned by VLF

### **TRL expected at the end of the project**

TRL 6 (for the trustworthiness management platform) and TRL 9 (for enhancements and service offerings as part of the ChainRider solution)

### **Exploitation**

#### **Exploitation paths**

Further research in domain of trustworthiness based on DLTs and applied to B5G technology. Enhancing commercial solution ChainRider and its service offerings for business users.

#### **Plan to follow your exploitation path**

VLF will lead process for specification of the DEDICAT 6G trustworthiness management enablers as part of the overall project system. KPIs for the project components will be defined during this process.

ChainRider will be utilized in developing, deploying and validating DLT configurations for the DEDICAT 6G trust management objectives. KPI to monitor is time needed to configure, deploy and reconfigure DLT configurations.

Validation process will result in a set of high performance Hyperledger Fabric network configuration and smart contract templates as well as integration examples for DEDICAT 6G technical challenges and use cases. These proven configurations and templates will be included in ChainRider marketplace.

VLF will work on promoting the validated templates and best practices to its ChainRider stakeholders. KPI to follow is the number of clients and their projects based on the templates and configurations from the DEDICAT 6G project.

VLF will integrate the trustworthiness methods and DLT modules in its IoT platform and service offerings.

### **Innovation**

#### **Key innovations as having value to create impact for the project**

DEDICAT 6G high performance trustworthiness management solution.

#### **Competitors identified so far**

We have identified several blockchain as service providers including Kaleido, Rockside, ChainStack, IBM, Microsoft etc. Most of these solutions are self-centred, require specific knowledge about the platform and have high adoption bar in terms of usage complexity, development time and required resources by end-users. Provided services are too generic to be easily applied in specific domains, such as energy and smart building sectors.



VLF puts focus on Hyperledger Fabric blockchain which is efficient (low energy consumption and low number of nodes required) and gives high performance (transaction speed). Chain-Rider allows software developers to quickly configure and deploy blockchain systems without the need for extensive knowledge of the Hyperledger Fabric technology.

## 5.2.9 CEA

### **Strategy in the project**

CEA is a worldwide known research centre for its high-quality research activities in the field of electronics and information technology. As a technology provider, CEA's long-term objective is to provide to industrial companies relevant solutions which tackle today and future concerns such as sustained development and security for citizens and industry. We have participated in a number of EU projects: FP7 MiWaves, and H2020 mmMAGIC on millimeter wave radio links, 5G MiEDGE combining mmWave radio technology and mobile edge cloud, H2020 SPEED-5G, FANTASTIC 5G and FLEX5GWARE on enhanced techniques for 5G, 5G Champion on 5G deployment, HIGHTS on advanced, highly-accurate positioning technologies and V2X connectivity.

DEDICAT 6G will contribute to increase its knowhow on the overall Long-Term Evolution of 5G RAN design, especially about mechanisms for coverage and connectivity extension in dense environments. In terms of short-term exploitation, CEA plans to protect project results through patents whenever applicable and disseminate these through publications in high-rank international conferences, journals, and workshops. The longer-term strategy of CEA is to transfer its knowledge to European industries through licensing of intellectual property or to foster the creation of spin-offs, if applicable. CEA aims to integrate DEDICAT 6G outcomes related to coverage and connectivity extension in future technological offers to industrial partners in the field of ad-hoc or private connectivity solutions.

### **Results expected**

#### **Type**

Knowledge

#### **Description**

Coverage extension mechanisms in order to manage the distribution of the dynamic network slicing over Mobile Access Points (MAPs) with limited computational resources

#### **WP related**

WP4 and WP6

#### **Other partners involved**

No

#### **Targeted to**

Efficiency, self-organized solution, coverage extension

#### **Background used**

The result will be mainly based on previous results done with NS-3 Network simulator.

CEA may use a background demonstration platform with bidirectional, dual RAT capabilities. This platform is able to implement the main features of 5G-NR physical layer and a light MAC

layer, operating both in sub-6GHz frequency range and in 26 GHz frequency range. The demonstration platform is composed of the ZCU111 evaluation board from Xilinx and RF heads provided by Analog devices (EVAL-ADMV1013 and EVAL-ADMV1014 evaluation boards). It also includes a custom electronically steerable antenna with beamsteering capabilities in the 26 GHz frequency range. The ZCU111 platform embeds a RFSoc chip with notably a FPGA and multicore ARM processors, on which the 5G-NR PHY layer (including forward error correction), the MAC functions and the beamsteering control are implemented. The platform is connected to a PC for traffic management and visualisation. Any such demonstration platform made available or otherwise introduced by CEA shall only be used by CEA for the Action and for no other purposes.

### **TRL expected at the end of the project**

TRL3

### **Exploitation**

#### **Exploitation paths**

The results of DEDICAT 6G will contribute to enhance the offers of CEA to industrial partners in search of wireless URLLC solutions for future applications.

#### **Plan to follow your exploitation path**

The exploitation plan of CEA is twofold. At short term, the outcomes of CEA's investigations on how to manage a global 5G network (multiple access schemes and mobile edge computing), having the specific targets of improving QoS (reliability, latency, availability...) in future 5G and 6G networks, will be protected through patents whenever applicable, and they will be disseminated through publications in high-rank international conferences, journals, and workshops. The research carried in the project will also be promoted in the Leti Days events organized by CEA-Leti once a year in France, Japan and USA. On a longer term, CEA aims at the integration of some of the most promising concepts of multiple access in future communication devices with the objective to address a wide range of services.

CEA has a long-lasting relationship with large companies, intermediate and small-medium enterprises of multiple sectors, involved either in wireless communications (original equipment suppliers, chip manufacturers) or in other areas as end-users of existing radio solutions. The strategy of CEA is to transfer its knowledge to these European industries through licensing of intellectual property or to foster the creation of spin-offs if applicable.

### **Innovation**

#### **Key innovations as having value to create impact for the project**

New algorithms

#### **Competitors identified so far**

To be completed

## **5.2.10 UoS**

### **Strategy in the project**

We joined the project as an UoS entity called 5G/6G Innovation Center. Part of our strategy is clearly to research and advance any technologies that can help going beyond 5G, which includes in the context of this project: dynamic MEC, use of AI in all required decision making

mechanisms, coverage extension using our fleet of autonomous drones, enhanced trust mechanisms based on block chain, etc.

### **Results expected**

#### **Type**

Architecture and specifications. Software modules. Knowhow. Algorithms. AI models and data sets.

#### **Description**

System architecture/technical specifications of the improved dynamic MEC, trust, decision making and coverage extension features. Implemented prototypes that we can integrate to our own 5G Surrey platform.

Software based mechanisms for connectivity extension and dynamic coverage provision including MAPs at the ground or in the air.

#### **WP related**

WP2, WP3, WP4, WP5 and WP6

#### **Other partners involved**

All

#### **Targeted to**

To be completed

#### **Background used**

The mathematic optimisation-based approach (which UoS has adopted to develop the software algorithm solutions) is expected to be exploited to design the user association and resource allocation mechanisms. Any background that will be exploited is fully owned by UoS.

#### **TRL expected at the end of the project**

TRL3 for system architecture/technical specification, TRL4-5 for technical solutions, TRL5-6 for WP6 results (scenario demonstrations)

### **Exploitation**

#### **Exploitation paths**

Standardization, publication, lecture material for academics. Demonstration to Surrey 5G/6G partners, We also use the 5GB platform for education purpose (master and PhD students) as a platform for experimenting new advanced features (machine Learning-based algorithms e.g.).

#### **Plan to follow your exploitation path**

The exploitation path can roughly be split in three different phases:

- 1) Publication: the technical findings and innovations obtained in DEDICAT 6G will be published to international journals and presented at international conferences.
- 2) Demonstration: for HW based solutions (prototypes), since it is aimed at integrating to our own 5G Surrey Platform, its demonstration is expected to 5G/6G industry partners for further collaboration and students for education.
- 3) Standardisation: the identified system architecture and technical requirements would be submitted as the contribution in 5G PPP Architecture WP.

## **Innovation**

### **Key innovations as having value to create impact for the project**

Mechanisms for dynamic coverage and connectivity extension provisions by using MAPs on the ground or in the air. Advanced trust management using block chain technology and federated learning.

### **Competitors identified so far**

To be completed

## **5.2.11 TTI**

### **Strategy in the project**

TTI wants to develop new features and improve capabilities of its IoT products.

### **Results expected**

#### **Type**

Component: Sensor node dynamic coverage

#### **Description**

IoT devices able to cope with dynamic coverage and connectivity extension process, to contribute to the configuration of mobile access points.

#### **WP related**

WP2, WP4 and WP6

#### **Other partners involved**

It is not expected a joint ownership of this project result

#### **Targeted to**

Public authorities: because the expected project result can contribute to the use of smart network and communication solutions in the public sector. Besides, public authorities can use the proposed technologies for the mitigation of many of the societal challenges (e.g., urbanisation, ageing, climate change, etc.).

Industry: because the outcome of the project will accelerate the adoption of digital technologies among the Europe's traditional industries.

#### **Background used**

The background used in this project is owned by the company and it is not the result of a joint development. Consequently, the company has the right to use it not only for research purposes, but also for commercial exploitation.

#### **TRL expected at the end of the project**

TRL5-TRL6. The IoT device will be developed and tested, including the production of pre-series for its validation in laboratory environment, as well as in a pilot site.

## **Exploitation**

### **Exploitation paths**

The main exploitation path is the commercialization of project results. However, TTI expects to reinforce the technical competences of the company and improve its competitiveness through the development of more advanced solutions for the industry.

TTI also expects to increase its participation in R&D programmes to foster the development of more new products and services for its customers and keep on teaming R&D activities with the most prestigious European organizations.

### **Plan to follow your exploitation path**

TTI as an SME will try to exploit the results of the project. For this, it will be needed to accomplish the following actions:

- Further research and development activities to increase the TRL level from 5-6 to 7.
- Industrialization of the device and the manufacturing process to reach TRL8 and MRL8
- Demonstration project to prove IoT devices in operational environment, as well as competitive manufacturing, deployment and operation.

KPIs we aim at:

TRL7 two years after the end of the project

TRL8 and MRL8 three years after the end of the project

TRL9 and MRL9 four years after the end of the project

## **Innovation**

### **Key innovations as having value to create impact for the project**

Enhanced security, privacy and trust for advanced IoT applications through the adoption of machine learning techniques based on security and data protection best practices and standards.

### **Competitors identified so far**

Libelium (Spain), iFarming (Italy), IoT solutions (Malta)

A distinguishing characteristic of TTI IoT product portfolio approach is that it is focused on high performance and high efficiency devices, to allow OPEX reduction in different applications. This way, TTI IoT devices achieve lower energy consumption and lower latencies when compared to competing solutions.

## **5.2.12 IMEC**

### **Strategy in the project**

We want to enhance our research in B5G and vehicular communications (V2X) area. In addition, since we have a testbed that can accommodate V2X experiments, we would like to enhance it by testing more features. AI and URLLC are the two aspects that motivated our intention in joining this proposal.

### **Results expected**

#### **Type**

Software component, new deployed testbed equipment

**Description**

We will enhance our CAMINO platform for the V2X management, as well as component for task distribution in V2X settings.

**WP related**

WP3 and WP4

**Other partners involved**

We aim to develop our own software components, as well as hardware components for the testbed.

**Targeted to**

V2X and 5G research communities, mobile network operators, road operators, equipment manufacturers, automotive OEMs.

**Background used**

The intended result will have also been fuelled by past involvements in previous projects. We have been involved in several V2X projects in the past that contributed to the current assets although we have the ownership of the testbed and its software components.

**TRL expected at the end of the project**

TRL5

**Exploitation****Exploitation paths**

We will primarily exploit our results and disseminate them into academic research papers. With the knowledge gain, we also expect to use it for academic purposes, such as teaching and supervision of theses. In addition, we will also be looking towards knowledge transfer to industries. Furthermore, with the experience gained from this project, we hope to participate in more future projects in related wireless communications fields.

**Plan to follow your exploitation path**

Design and build components for the testbed.

Enhance the testbed and proof of concept of components deployed on testbed.

In both cases, our KPI to monitor will be the number of research papers.

**Innovation****Key innovations as having value to create impact for the project**

New innovations in 5G and beyond for V2X verticals can come up thanks to these results. We are aiming to improve URLLC for connected and automated mobility with distribution of intelligence and dynamic mobile access points.

**Competitors identified so far**

No competitors per se, but there are other research organisations also looking into this field.

## 5.2.13 TUC

### **Strategy in the project**

The Professorship for Communications Engineering at TUC has been very active in investigating the mechanisms and requirements for the various stages of partly- up to autonomous driving and mobility. With increasing numbers of partly- or fully autonomous vehicles entering the traffic spaces in future, connectivity between the transport means and their environment becomes increasingly important and the real-time information and knowledge exchange will become an indispensable requirement, the distribution of intelligence in B5G networks will facilitate this.

For the team participating in DEDICAT 6G, we expect to gain more insights and research results to further develop our situation awareness approaches, to build a structure that allows the collaborative gleaning of knowledge in a highly dynamic (mobile) traffic space. The aim of the team is to increase our research outcomes, our portfolio of distributed learning and knowledge generation and thus opening the possibilities to work and collaborate with a range of industrial partners.

### **Results expected**

#### **Type**

Components, solution

#### **Description**

We will be extending our software tools for the distribution of intelligence in MEC like deployments. The team will also aim to further develop the capabilities of our Road Side Unit (RSU) solution as part of a highly dynamic and distributed network system for the generation of knowledge and dynamic situation awareness.

#### **WP related**

#### **Other partners involved**

We aim to develop our own platform (SW and RSU)

#### **Targeted to**

Mobile operators, equipment manufacturers, fleet operators, public administration, public transport.

#### **Background used**

We will be using our RSU platform as a starting point, the background of this has not been secured.

#### **TRL expected at the end of the project**

TRL4-TRL5

### **Exploitation**

#### **Exploitation paths**

Most of our exploitation will be in form of academic papers to strengthen our research profile overall. As a second path, we are looking into knowledge transfer opportunities to apply our platform with industry partners.

#### **Plan to follow your exploitation path**

Build simulation models and publish results. Our KPI will be the number of papers.

Build demonstrators and proof of concepts for experimentation. Our KPI will be the number of data sets and performance measurements.

### **Innovation**

#### **Key innovations as having value to create impact for the project**

The main impact from our side will be through publication of research papers.

#### **Competitors identified so far**

To be completed.

## **5.2.14 DIA**

DIA, as a vertical partner, has strong interest on exploiting project outcomes, extend knowledge on 5G/6G, address new and emerging trends and requirements in their premises and procedures. DIA is the UC1 pilot site and they are not going to develop a result as such, but their input to the project is key to understand the value of the DEDICAT 6G Platform. That is the reason why they have not followed the complete template, as many of the topics do not apply.

For the collection of their strategy and motivation, some questions were posed to them:

- What are the benefits you foresee from incorporating 5G/B5G DEDICAT 6G technology in your industrial processes? How do you think this will transform your business?
- If you are happy with the results of the pilot, would you think about an implementation in a real scenario? Would you be a potential customer? Having in mind that this project is a RIA and the results will have to be evolved after the end of the project.
- What is your innovation roadmap, what other related experiments are in your radar to incorporate this technology?
- Do you expect that the participation in the project will bring you some positive reputation among your customers, attracting new ones? How are you letting them know about this participation?

In the following lines, there are DIA reflections regarding these questions.

### **Strategy in the project**

DIAKINISIS S.A. is the largest logistics company in Greece for over 40 years under the Third Party Logistics (3PL) sector. Our services span among warehousing, distribution, repackaging and forwarding whilst our warehouse distribution network includes 15 warehouses, 8 hubs, exclusive partners and 3PL agents. Our team has identified the opportunities and challenges of 5G/6G in the Transport and Logistics (T&L) sector, and therefore, our strategy includes following the trends, better positioning within the changing business context of T&L (e.g. big data analytics), in the view of new start-ups entering the market. Primary goal is to remain competitive, reduce OPEX and increase productivity and QoS. Participating in further proposals is also part of our strategy as means of addressing our primary goals.

A number of drivers and trends in T&L segment are being investigated within DIA, including technology adoption and digitisation (e.g. automated scheduling, delivery consolidation from multiple shippers, and on-demand trucking), utilisation of robots and machines (for better handling warehouse inventory management procedures), mobile-first strategy for last-mile delivery, blockchain, AI and data predictive analytics. In this context, B5G DEDICAT 6G technology could address (by scope) those investigations and improve/optimize warehouse management procedures such as, for example, product geofencing, personnel monitoring,



autonomous transport. Moreover, DEDICAT 6G objectives related to advanced AI-based security and privacy protection with blockchain based trust management platform, trust building related to smart warehousing and T&L operations are of high interest for DIA.

### **Exploitation**

Based on the pilot's results, DIA could elaborate on adoption plan which will include provision in small-scale, deployment, testing in different warehouses and hubs, and involving different partners and gradual expansion to larger scale.

Key business problems of our customers are related to fast delivery as end-customers expect fast and often free delivery regardless the location. This poses requirements to optimise delivery routes and processes and address cost and inefficiencies of last-mile delivery. DEDICAT 6G workplan targets these issues so we expect impact in digitalisation and automation of our procedures within warehousing management.

DIA initiatives and results are being communicated via various channels (e.g. sectoral events, exhibitions, etc.) including communication within company's network.

- DIAKINISIS S.A., is a member of the ELGEKA group of companies. ELGEKA S.A. is the largest Greek commercial company in the food sector. Offering to its collaborators, customers and suppliers, an integrated system of commercial services comprising sales, marketing, trade marketing, and logistics, ELGEKA constitutes an integral link in the sector's supply chain.
- Global Synergy Buying Group S.A. (GSBG) is the largest specialized private label company in Greece. It operates in the wholesales sector of food, personal care and daily household products, mainly of private label.
- Moreover, DIA cooperates with around twenty (20) transportation providers.

Last but not least, DIA also participates in VITAL-5G project, an innovation action aiming at developing and testing specific network applications; some of them are targeting specific warehouse management procedures.

## 6 Standardisation plan and early activities

This chapter presents the DEDICAT 6G approach to ensure the alignment of the project's research with existing relevant standards and the action plan to track the evolution of these standards in order to identify opportunities for contribution.

Participating in standardisation activities is strongly supported by the European Commission<sup>14</sup>. Engagement with SDOs, and contribution to the revision of standards, serve dissemination and exploitation objectives, strengthening the overall impact of the project both in Europe and internationally. Other specific initiatives that can be considered as a pre-standardization step (they are not subject to international agreements or legal regulation like SDOs) also seek to build consensus within global players in the industry, thus identifying industry needs and fostering market acceptance of project results. Therefore, one of the project strategic goals is to convey its results into the different communities related with standardization and open-source development. To materialise this goal, DEDICAT 6G project aims at contributing to the evolution of the standards relevant to the UCs' scope and key technical mechanisms of the DEDICAT 6G platform.

In general, the process defined is not a linear one, instead each opportunity is dealt with individually as it emerges:

- An excel file has been created to keep track of the standardisation opportunities. Partners work collaboratively with this document and, when the opportunity is detected, include information related to the standardisation body or pre-standardisation forum, the specific working group that is dealing with the topic and link to it, the partners involved, what the possible contribution from DEDICAT 6G could be and an initial plan for contribution according to the partner's capacity. The opportunity can be to contribute to the specification of the next version of a standard or even spot demonstrated features of DEDICAT 6G as new features to be standardised in order to foster market acceptance of these technologies.
- Task leader regularly monitors the Excel file and engages with the correspondent partner to design a concrete plan. This plan will depend on several factors, mainly on the roadmap of the relevant standardisation organization working groups or technical committees. If the partner is already engaged with that specific group, the possibilities that the group offers to the contributors (presentation of general topics like liaisons with other groups or project presentation in the regular meetings of the group, PoCs, technical surveys, contribution to work items, revision of guidelines, technical reports or specifications, etc.) and a time plan aligned with the availability of the specific results. Synergies with other projects and initiatives are also explored to promote opportunities for shared standardisation contributions and transfer of knowledge across the 5G PPP pre-standardisation WG where the project has appointed two representatives (WINGS and AIRBUS).
- The plan for contribution is regularly assessed. The concrete activities conducted, the feedback collected from the members of the standardisation community and the next steps agreed are incorporated into the plan with new insights and adjustments.

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<sup>14</sup> [https://ec.europa.eu/growth/single-market/european-standards\\_en](https://ec.europa.eu/growth/single-market/european-standards_en)

## 6.1 Standardisation landscape relevant for DEDICAT 6G

In the following lines, the standardisation activities identified by the partners so far as relevant for the project are presented.

### **AIOTI – DLT<sup>15</sup>**

The Alliance for Internet of Things Innovation (AIOTI) mission is to contribute to the creation of a dynamic European IoT ecosystem to speed up the take up of IoT.

AIOTI has at the moment 11 working groups, Standardisation being one of them. The aim of this group is *“to be recognized as a major contributor to the worldwide interoperability, security, privacy and safety of IoT systems and applications, and particularly for the development of the market in Europe”*. Apart from this, there is also a Distributed Ledger Technologies (DLT) working group that is very relevant to the project's activities as it is the forum to discuss challenges and demonstrate opportunities brought by the application of DLT within IoT solutions.

DEDICAT 6G partner **VLF** actively participates in AIOTI DLT working group since January 2021. This participation can facilitate the path for contribution to the AIOTI Standardisation WG in DLT related topics.

### **IEEE - FNI<sup>16</sup>**

IEEE is *“the world's largest technical professional organization dedicated to fostering technological innovation and excellence for the benefit of humanity”*. IEEE is a leading developer of industry standards in a broad range of technologies. For that, IEEE Standards Association (IEEE SA) drives collaboration and helps to mobilize people from diverse backgrounds and industry sectors.

The IEEE Future Directions Committee has identified the technologies with primary focus and has established the correspondent initiatives as formal initiatives to engage IEEE. One of these initiatives is the IEEE Future Networks Initiative (FNI). IEEE FNI *“gathers researchers, scientists, engineers, and policymakers from industry, academia, and governments to solve challenges and reveal opportunities associated with future networks, envisioning the landscape of connectivity and applications beyond 5G”*. Inside IEEE FNI, the Systems Optimization WG has been formed to explore various approaches to manage complexity of future systems. They are addressing *“full-stack self-organizing systems, i.e., multi-layer and multi-domain organization and optimization of multiple stacks comprising of heterogeneous radio resources, fixed access and transport resources and compute and store infrastructure resources contributed by diverse service providers”*.

**VTT** is regularly participating in FNI Systems Optimization working group activities and states that their work is closely related to DEDICAT 6G since it concerns future network optimization. This collaboration could be the seed for a potential engagement activity with IEEE SA in DEDICAT 6G related topics.

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<sup>15</sup> <https://aioti.eu/working-groups/>

<sup>16</sup> <https://futurenetworks.ieee.org/>

### **3GPP**<sup>17</sup>

3GPP is “the reference Partnership project for mobile communications standardization, grouping several SDOs to provide a common global mobile communication system”. 3GPP specifications and studies are contribution-driven by member companies involved in working groups pertaining to three different Technical Specification Groups (TSGs): Radio Access Networks (RAN), Services & Systems Aspects (SA) and Core Network & Terminals (CT).

DEDICAT 6G partner **AIRBUS** participates in regular workshops and meetings, contributing to some topics for which they have an interest related to their technology. More concretely, AIRBUS is participating in RAN WG4 (Radio Performance & Protocol Aspects), CT WG1 (User Equipment - Core Network protocols), SA WG1 (Services), WG2 (System Architecture & Services), WG3 (Security and Privacy) and WG6 (Application Enablement & Critical Communication Applications). AIRBUS sees many synergies in the use of virtual Mission Critical Services, so they will support standardisation initiative by describing virtual MCS in the context of Dynamic Coverage Extension and Dynamic Shared of Intelligence.

### **ETSI – ENI**<sup>18</sup>

ETSI is a European Standards Organization (ESO). It is “the recognized regional standards body dealing with telecommunications, broadcasting and other electronic communications networks and services”.

The Experiential Networked Intelligence Industry Specification Group (ENI ISG) is working on the definition of a Cognitive Network Management architecture. They are exploring “Artificial Intelligence techniques and context-aware policies to adjust offered services based on changes in user needs, environmental conditions and business goals”.

**ATOS** participates in OSM, an ETSI-hosted project to develop an Open Source NFV Management and Orchestration (MANO) software stack aligned with ETSI NFV Information Models. In DEDICAT 6G, ATOS is in charge of OSM related activities and has identified an opportunity for collaboration with ETSI ENI, supporting OSM taking into account Machine Learning / Artificial Intelligence techniques.

Additionally, partners are exploring ETSI technology radar white paper<sup>19</sup>, that shows major trends impacting ETSI and the affinity with ETSI work. The goal is to identify possible collaboration from DEDICAT 6G in one or more of these topics.

## 6.2 Plan for contributions and early activities

### **AIOTI – DLT**<sup>19</sup>

The partner leading this contribution is VLF.

VLF plan is to contribute to AIOTI strategy for DLTs applied to secure IoT systems and communication networks and build basis for establishing distributed identity management, trust metrics and automated trustworthiness assessment procedures. The concrete contribution from DEDICAT 6G would be the trustworthiness management platform based on DLTs, for which VLF will share DEDICAT 6G results coming from WP5 with AIOTI DLT working group. In this way,

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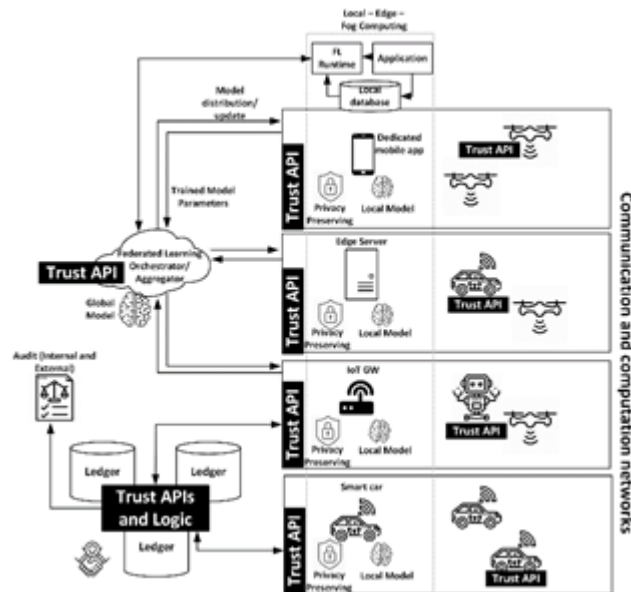
<sup>17</sup> <https://www.3gpp.org/specifications-groups>

<sup>18</sup> <https://www.etsi.org/technologies/experiential-networked-intelligence>

<sup>19</sup> [http://public2.brighttalk.com/resource/core/340680/etsi-wp-45-etr\\_746501.pdf](http://public2.brighttalk.com/resource/core/340680/etsi-wp-45-etr_746501.pdf)

VLF will pursue that DEDICAT 6G approach follows best practices promoted in the WG while impacting its strategy and outputs with the results achieved in the project.

Following this plan, DEDICAT 6G VLF partner Milenko Tomic presented a slide regarding DEDICAT 6G project and plans for implementing trustworthiness procedures based on DLTs. This presentation took place on the 8<sup>th</sup> April 2021 during a regular monthly WG sync call.



**Figure 2:**

**Figure 10: Introduction of DEDICAT 6G approach to AIoT – DLT**

The figure above was the focus of this short introduction. The feedback was very positive and the WG members acknowledged DEDICAT 6G's approach to utilize Hyperledger Fabric blockchain as a good choice.

Currently Milenko Tomic is contributing to the WG's document "Report on DLT-IoT Technological Convergence" and will reflect on the trustworthiness metrics which VLF is also investigating in the scope of DEDICAT 6G project. It is expected that new ways of collaboration will come up as a result of this activity.

### **IEEE - FNI<sup>20</sup>**

The partner leading this contribution is VTT.

DEDICAT 6G Technical Leader Aarne Mämmelä (VTT) is participating in the IEEE FNI Optimization WG meetings every second week. The WG has organized in January a workshop "Systems Optimization Imperatives, Techniques, and Opportunities for Future Networks" and published a roadmap report "Systems Optimization"<sup>[6]</sup> in which he has a contribution.

This collaboration activity could pave the way for engaging with IEEE Future Networks Initiative Standards Working Group as some opportunity for collaboration could be identified.

<sup>20</sup> <https://futurenetworks.ieee.org/roadmap>

**3GPPP**

The partner leading this contribution is AIRBUS.

As for now, it is too early to identify a possible collaboration, but AIRBUS is monitoring the working groups with more affinity to the project and will duly inform of any upcoming opportunity.

**ETSI – ENI**

The partner leading this contribution is ATOS.

The plan is to give a presentation to the ETSI ENI group to show the alignment of DEDICAT 6G with their specifications. Future activities will be reported in next deliverables.

## 7 Conclusions

This deliverable presents the plan that the DEDICAT 6G project consortium has made up for impacting the academia and the industry ecosystems with dissemination, standardization, and regulatory bodies' actions.

The provided plan spans the activities throughout the project duration. The plan will be constantly kept updated, according to relevant changes and new opportunities that might raise in the ecosystem, as well as within the project consortium, with the final aim of delivering the best possible impact of the project results.

A timeframe for standards and regulatory bodies' actions and impact is provided and a list of planned target dissemination and ecosystem engagements activities is elaborated.

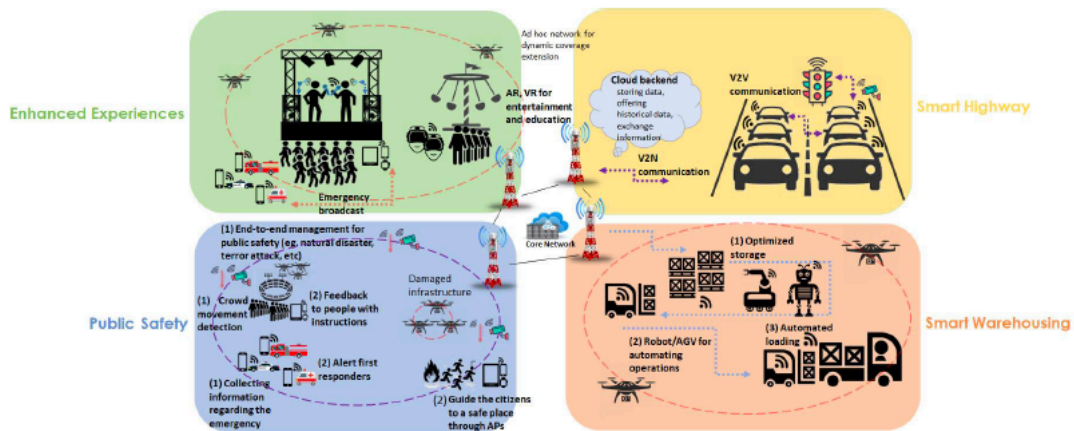
In future WP7 deliverables, updated reports on the plan will be provided.

# Annex I. – Project Flyer



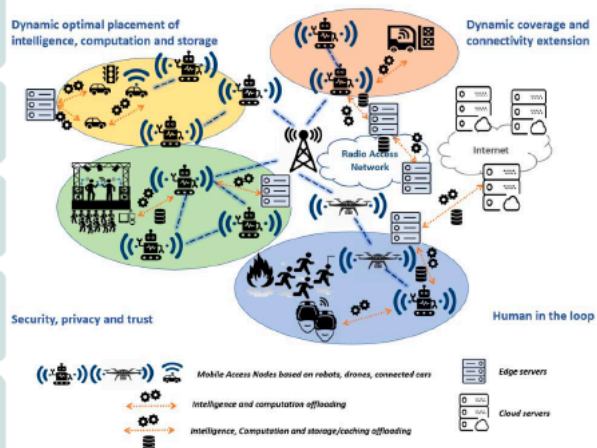
DEDICAT 6G aims to transform Beyond 5G networks into a smart connectivity platform that is green, highly adaptive, ultra-fast, and dependable/resilient for securely supporting innovative, human-centric applications.

### Use cases



### Technical challenges

- Mechanisms for dynamic distribution of intelligence and storage in conjunction with predictive caching.
- Mechanisms for dynamic coverage and connectivity extension.
- Security, privacy and trust assurance especially for mobile edge services.
- Applications with novel interaction between humans and digital systems through innovative interfaces and devices (AR, smart glasses, connected cars, robots, drones).
- Proof of concept, demonstrations, validation of the proposed solutions through system level simulations, lab-based testing of implemented functionality as well as application in experiments in realistic environments.



<https://dedicat6g.eu/>

<https://twitter.com/dedicat6g>

THIS PROJECT IS PART OF THE 5G PUBLIC AND PRIVATE PARTNERSHIP

5G PPP [WWW.5G-PPP.EU](http://WWW.5G-PPP.EU)

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## Annex II - Partner questionnaire



### Partners' motivation and expectations

**Partner's Name:**.....

1- Why did you join the proposal, what is your strategy?  
 i.e. I want to increase the TRL of an asset, I have a product and I want to improve its capabilities following the trends of the sector or the feedback I get from my clients, I want to acquire knowledge about B5G/6G, I want to position my company in the landscape, I want to make some partnerships and participate in further proposals, etc.

Please describe:

2- What do you expect to obtain at the end of the project?

Name of the Result	
<b>Result type</b> (solution, software component, knowledge...)	
<b>Description</b>	
WP related	
<b>Other partners involved?</b> (indicate if you will share the ownership of this result with another partner of the consortium)	
<b>Targeted to</b> (what type of stakeholder can benefit from this result and why – you solve a problem? you can help to be more efficient?)	

<p><b>Have you used any background?</b> (if this result is based on a previous result/ product that you own or maybe you own the previous result jointly with another partner or third party. Please indicate, if the background is not entirely yours that you have the rights to use it and exploit it commercially, if necessary)</p>	
<p><b>TRL expected at the end of the project</b></p>	
<p><b>Exploitation paths</b> (identify opportunities around your result: further research/education, knowledge transfer, commercialization, contribution to open source projects, standards, etc.)</p>	
<p><b>Plan to follow your exploitation path</b> (plan of actions and how do you intend to measure impact of planned actions - KPIs defined and criteria for success)</p>	<p><b><u>This is your individual exploitation plan:</u></b></p>
<p><b>Competitors identified so far</b> (and why are you different from your competitors)</p>	
<p><b>Key innovations as having value to create impact for the project</b> (Identify possible innovations - new product, new service, new process etc. that will be created/enhanced/ thanks to this result)</p>	

## Acknowledgment

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