D1.3 Innovation Management Plan

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Control sheet

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ABBREVIATIONS

Abbreviation	Definition
5G SA	5G Stand-Alone
5G NSA	5G Non-Stand-Alone
AOEP	Automotive Open Experimental Platform
API	Application Programming Interface
AR	Augmented Reality
CA	Consortium Agreement
DC	Data Centre
DML	Distributed Machine Learning
DoA	Description of Action
EC	European Commission
FFMpeg	Fast Forward MPEG (Motion Picture Experts Group)
FW	Fire Wall
IDS	Intrusion Detection System
IP	Intellectual Property
IPS	Intrusion Prevention System
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
LAN	Local Area Network
MANO	Management and Orchestration
MEC	Multi-access Edge Computing
MSO	Multi-domain service orchestrator
NDA	Non-Disclosure Agreement
NFV	Network Function Virtualisation
NOD	NetApp Orchestration and Development (framework)
OBU	On Board Unit
OVM	On-Vehicle MANO
PC	Project Coordinator
REST	REpresentational State Transfer
RSU	Road Side Unit
SM	Slice Manager
TAP	Terminal Access Point
TM	Technical Manager
TRL	Technology Readiness Level
VNF	Virtualised Network Function
VR	Virtual Reality
WAN	Wide Area Network
WP	Work Package

Executive Summary

The main purpose of this deliverable is to provide an initial list of the targeted innovations by the project and to link the innovations to the background knowledge that is brought to the project and the foreground knowledge that is generated by the project activities. The goal is to prepare a clear list of the exploitable project innovations that will be used to set the main rules for the management of the innovation during the course of the project and in conjunction to the exploitation activities.

The project background is significantly extended with respect to the initially declared background in the consortium agreement. This expansion is the result of the planning work performed in the initial phase of the project and the definition of the development activities with respect to the building modules of the overall platform, the virtualised network functions in support of the NetApp deployments in the automotive sector, the application components for the targeted use cases and the additional algorithms for the distributed machine learning-based intelligence. Accordingly, the foreground knowledge is also specified with respect to the fields mentioned above, following the related definition activities for the system architecture and the functional elements of the platform and the use cases. Next, a list of potential innovations is extracted and linked to the background and foreground knowledge in 5G-IANA.

The innovation management actions and main procedures are finally defined, highlighting also the coordination role of the technical and innovation manager for the identification and update of the project innovations at a regular basis and in collaboration with the work package and task leaders of the technical project activities. The establishment of the innovation monitoring system is important to accurately follow the market trends and identify on time the true potentials of the developed work within 5G-IANA.

It is noted that the contents of this deliverable will be re-evaluated and updated at a plenary level.

1. INTRODUCTION

1.1. Purpose and scope

5G-IANA recognizes the importance of innovation management and accounts for innovation management activities across the project's lifecycle. Beyond the project's main technical objectives towards the development and demonstration of the enabling framework for the onboarding, deployment and management of innovative NetApp solutions in the automotive sector, the project's methodology ensures that exploitation and innovation management are core features in its structure. To this end, the Innovation Management task aims at identifying and analysing the innovation potentials of 5G-IANA and providing additional information and directions.

This deliverable describes the project's innovation management methodology, developed to support and ensure the successful exploitation of the project results as well as the conversion of these results into innovative success stories. In particular, the innovation management activities include:

- The identification of the background knowledge that is required by the contributing partners in the various technical development activities.
- The identification of the targeted foreground knowledge split down to individual modules, software components, infrastructure capabilities that in general are expected to be developed and integrated with the goal to realise the project objectives.
- The extraction of the list that collectively presents the innovation potentials of the projects (to be used as the basis for the exploitation activities).
- The link of the innovation potentials with the background and foreground knowledge for the proper tracking of the development activities with respect to the targeted innovations.
- The continuous monitoring and update of the 5G-IANA innovations based on a set of well specified activities during the course of the project.

These activities provide notable value for the 5G-IANA project and are expected to assist in the related exploitation activities by providing a clear view of the innovation potentials and the potential impact that the integrated platform and use case NetApp solutions could bring.

1.2. The role of Innovation management in 5G-IANA

The innovation management in 5G-IANA is included within the technical management activities. This enables the potential innovations to be closely monitored and mapped to the progress of the technical developments. The technical management procedures are led by the technical and innovation manager (TM), who is working with the project coordinator (PC) and the work package (WP) leaders to plan, monitor and direct all general technical aspects. This includes the identification of foreground knowledge development and the potential innovations, directly from the work within the WPs. With this approach, any technical decisions can be mapped and examined alongside the targeted innovations on a WP level and therefore be interrelated directly to the planned innovations, (and in turn to the project's exploitation activities). Moreover, it is within the responsibilities of the joint technical and innovation management team to efficiently handle any conflicting choices for technical developments, avoiding their escalation to the general assembly level, while also ensure that the project's administrative actions develop the required and favourable conditions for the targeted innovation and their exploitation after the end of 5G-IANA.

1.3. IPR related guidelines based on Consortium Agreement

The Consortium Agreement (CA) has already established a legal framework for the project in order to provide clear regulations for issues within the consortium related to the work, IP-Ownership regarding innovations and any other project outcomes. The innovation and results ownership related matters are covered in sections 8 and 9 of the CA. More specifically, section 8 deals with the handling of *results* and clarifies issues related to: a) ownership of generated results, b) transfer rights, and c) acceptable dissemination actions. Section 9 deals with the access rights to the background and foreground knowledge and defines: a) the handling of background knowledge offered to the project (including the update process for the background knowledge), b) the overall access right principles for the generated knowledge, c) the access rights for implementation, d) the access rights for exploitation, e) the access rights rules and conditions for affiliated entities, and f) the access rights for new parties entering the consortium or parties leaving the consortium.

The key guidelines dictate that:

- The results of the project shall be owned by the project partner carrying out the work leading to project's results or even patentable innovations.

- For the cases that the results are created jointly by at least two project partners and it is not possible to distinguish between the contributions of each of the project partners, such work will be jointly owned by the contributing project partners.
- If in the course of carrying out work on the project, an invention is made having two or more contributing parties contributing to it, and it is not possible to separate the individual contributions, then such joint inventions and all related patent applications and patents shall be jointly owned by the contributing parties.

1.4. Innovation management actions as described in this deliverable

The following sections summarise the key elements for the innovation management that will guide the related activities throughout the project and will be regularly updated according to the defined rules.

Section 2 provides an inventory for the 5G-IANA innovations focusing both on the background knowledge that is brought to the project and foreground generated knowledge as the project implementations progress.

Section 3 summarises the key innovations that are identified by the partners with potentials for exploitation after the end of the project. The innovations are also linked to the background and foreground knowledge.

Section 4 describes the general innovation management rules and procedures adopted by the project.

2. 5G-IANA INNOVATIONS' INVENTORY

This section provides a list of the background knowledge brought to the project and the foreground knowledge that is generated or will be generated as a result of the development activities of the project.

2.1. Background brought to the project

The background refers to the knowledge in the form of software artefacts, modules, application algorithms and processing data, as well as infrastructure solutions and supporting hardware, that is provided by partners to the project, in order to be used for the development activities as these are denoted by the project's objectives. The background knowledge can be the basis of the developments or the medium in order to generate the project developments and results.

The initial background has been declared by partners in the CA. The goal here is to extend the initial list with the identified background entries required for achieving the project goals. This is an open list and therefore additional background can be declared at any point according to specific knowhow that the participating partners bring in view of implementing the project tasks and as long as these are in accordance with the project objectives. The new entries are introduced on the basis of mutual trust among partners and are subject to official confirmation at the general assembly level according to CA paragraph 9.1.2.

The list of declared background knowledge is also associated with the relevant field in 5G-IANA and include:

1. **AOEP**: referring to all platform related components for NOD, SM, MSO, Toolkit.
2. **Infra**: referring to the general virtualised infrastructure solutions for OBU, RSU, MEC, DC, OVM as well as to the testing infrastructure modules (software and hardware).
3. **VNFs**: referring to the communication type of virtualised network functions (VNFs) for supporting specific functionalities of the NetApp components upon deployment.
4. **UCApp**: referring to the application components in support of the deployed and evaluated use cases and the part of the NetApp implementations linked to them.
5. **DML**: referring to the related algorithm solutions and software components for supporting the distributed machine learning (DML) solutions proposed by the project.

Furthermore, all the listed background entries are classified according to their IP ownership protection status which at this stage consider the cases of:

- Copyright: referring to IP protected background
- Open: referring to open background
- Mixed: referring to modules that contain both open and copyright protected modules, typically in the form of open interfaces over protected core framework.

Additional categories that are considered for the future include:

- Registration: referring to open background which usage is made though available under certain conditions upon user registration and approval by the owner
- Agreement: referring to background which usage is governed by special restrictions and rules that are made available after NDA.

The list of collected background is provided below in Table 2-A.

Table 2-A: List of background knowledge to be used in the project

BG#	Relevant background	Relevant field in 5G-IANA	Contributing Partner	Short description	IP protection	TRL
BG1.1	Vertical Application Orchestrator	1. AOEP	UBITECH	An application orchestrator for the onboarding and lifecycle management of application components	Copyright	5
BG1.2	Intent API framework	1. AOEP	UBITECH	REST-based communication for application features translation to slice requirement	Open	5
BG1.3	5G Apps & Services Catalogue	1. AOEP	NXW	Catalogue platform enabling the management of heterogeneous elements in a 5G ecosystem and across multiple administrative domains (e.g., NFV descriptors/packages, MEC application descriptors)	Open	5
BG1.4	Vertical Slicer	1. AOEP	NXW	Orchestration platform capable of handling the modelling and life cycle management of Vertical services across multi-technology and multi-domain network slices (e.g., including the provisioning and configuration of radio, 5G Core and transport network resources)	Open	5

BG1.5	Monitoring platform	1. AOEP	NXW	Monitoring platform, based on opensource tools, capable of monitoring the infrastructure, applications, slices and other platform components (e.g., AOEP blocks)	Open	6
BG2.1	Mobile network latency	2. Infra	NOKIA	Integration and use of the latest expansion stage of a 5G SA Architecture for latency optimised data transmission	Mixed	5
BG2.2	Mobile network as a service	2. Infra	NOKIA	Deployment and use of the latest available product features for the 5G mobile network to support services for different vehicular services (network slicing, multiple-access edge computing, subscription management)	Mixed	5
BG2.3	ITS & MEC Test system	2. Infra	FSCOM	Virtualized test system for ITS and MEC	Open	5
BG2.4	rMON IoT platform	2. Infra	ININ	A distributed, cloud-management solution designed for deployment of IoT-based remote monitoring	Copyright	6
BG2.5	PPDRone facility	2. Infra	ININ	5G SA/NSA private mobile system	Copyright	6
BG2.6	OBU	2. Infra	LINKS	Physical OBU that provides communication and processing resources	Copyright	6
BG2.7	RSU	2. Infra	LINKS	Physical RSU that provides communication and processing resources	Copyright	6
BG3.1	Metadata formatting libraries	3. VNFs	VICOMTECH	Multi-language library to create, real, update and delete OpenLABEL metadata	Open	6
BG3.2	V2X communications	3. VNFs	LINKS	VNFs communications for short-range and long-range communication	Copyright	6
BG3.3	ITS Stack	3. VNFs	LINKS	VNFs related to the ITS communication stack	Copyright	6
BG3.4	Baseline software for OBU and RSU	3. VNFs	LINKS	VNFs related to baseline functionalities that are offered on the OBU and RSU	Copyright	6
BG3.5	5G Core	3. VNFs	NXW	Virtualised 5G Core network based on free5GC that can be dynamically provisioned and configured	Open	4
BG3.6	Virtual DNS	3. VNFs	NXW	Virtualised DNS based on Bind9 that can be dynamically provisioned and configured	Open	5
BG3.7	Virtual FW	3. VNFs	NXW	Virtualised firewall based on vyOS that can be dynamically provisioned and configured	Open	5
BG3.8	Virtual IDS	3. VNFs	NXW	Virtualised IDS/IPS based on Snort that can be dynamically provisioned and configured	Open	5

BG3.9	Virtual TAP	3. VNFs	NXW	Virtualised TAP, based on vyOS, to tap traffic from WAN/LAN into a mirroring interface	Open	4
BG3.10	Actuator interface	3. VNFs	FIVECOMM	VNF for interpreting the information sent/received by the user/vehicle, and producing the control signal	Mixed	5
BG3.11	Long-distance communication	3. VNFs	FIVECOMM	VNF to transmit and receive data for long-distance communication to specific edge/cloud services	Mixed	5
BG3.12	Gamification Engine	3. VNFs	HIT	A Gamification engine composed of (i) a UNITY plugin (ii) a backend infrastructure using Django Python (iii) a web interface. Moreover, a series of gamification features are supported (i) live progress tracking (ii) achievement system (iii) progress statistics (iv) in-app currency. The engine has been tested in e-learning apps and corporate-Training, and has been integrated with Unity VR apps using the OpenVR API.	Copyright	3
BG3.13	rMON VNFs	3. VNFs	ININ	Set of business and operational intelligence VNFs (Management, Collector and Analytics).	Copyright	6
BG4.1	Digital Content Solutions	4. UCApp	HIT	A Digital Content Storage and retrieval system supporting various formats such as (i) video, (ii) 360 video (iii) audio, (iv) digital assets that can be utilized in (a) digitization of scientific documentation services (b) AR publishing (c) Mobile applications serving as indoor or outdoor multimedia guides. FFMpeg is utilized in order to provide cloud encoding of the digital content to the required format.	Copyright	3
BG4.2	Virtual CDN	4. UCApp	NXW	Virtualised content delivery network composed by virtual caches, a load balancing function and an origin streaming server. The different VNFs can be dynamically provisioned and configured	Open	5
BG4.3	Driving behaviour & trip recording app	4. UCApp	OSeven	A device-agnostic cloud-based platform (O7Platform) which integrates the following modules: (i) user-friendly smartphone app (O7App) for trip recording (ii) a set of gamification and user engagement features (iii) backend infrastructure for big data analysis (iv) O7Portal as the tool for the visualisation of metrics and scores (v)	Copyright	6

				machine learning and big data algorithms (vi) scoring models for the evaluation of driving behaviour.		

2.2. New developments (foreground) planned

The foreground refers to the knowledge in the form of software artefacts, modules, application algorithms and processing data, as well as extensions in the infrastructure and supporting hardware, that is generated by the project's partners, during the course of the project and according to the planned development activities following the project's objectives. Therefore, the foreground knowledge represents the results and developments of the project.

The list of identified foreground knowledge is summarised in Table 2-B. This is an open list that collects information from the implementation activities of the project and updates it on a regular basis as defined in management of innovation section 4.

Similar as in the case of the background, the entries are classified according to the 5G-IANA development fields where they apply and the applied IP protection.

Table 2-B: List of planned artefacts to be developed during the course of the project

FG#	Expected outcome (Foreground)	Relevant field in 5G-IANA	Contributing Partner(s)	Short description	Targeted IP protection	Targeted TRL
FG1.1	Application Graph composer	1. AOEP	UBITECH	HELM chart and TOSCA based descriptor module for composing an enhanced acyclic graph	Open	7
FG1.2	K8s-based deployment and lifecycle management modules	1. AOEP	UBITECH	Modules supporting the Orchestration programmability model over Kubernetes infrastructure (maintaining the OpenStack compatibility)	Copyright	7
FG1.3	Application Slice manager	1. AOEP	UBITECH, NXW	Formulation of slice intent and translation to specific SM format	Copyright	7
FG1.4	NetApp Catalogue	1. AOEP	NXW	Catalogue platform exposing a REST interface to maintain and manage information related to available NetApps to be used to compose Vertical Application	Open	6/7
FG1.5	Extended Policy engine	1. AOEP	UBITECH, ICCS	Enhancements to policy engine to accept VNF metrics	Copyright	5
FG2.1	Mobile network latency	2. Infra	NOKIA	Provision of improved latency by using the latest 5G product features in combined with	Mixed	7

				optimizations via configuration for latency reduction		
FG2.2	5G slice deployment and management	2. Infra	NOKIA	Provision of static 5G network slices of slice/service type eMBB and URLLC and optimizations via configuration	Mixed	7
FG2.3	Infrastructure design and implementation know-how	2. Infra	ININ, TS	Know-how on designing and implementation of IaaS services for mission critical use cases	Copyright	6/7
FG2.4	ITS & MEC Test system	2. Infra	FSCOM	Enhanced virtualized test system for ITS and MEC	Open	6/7
FG2.5	OBU with orchestration of VNFs	2. Infra	LINKS	Physical OBU integrating orchestration of VNFs	Copyright	7
FG2.6	RSU with orchestration of VNFs	2. Infra	LINKS	Physical RSU integrating orchestration of VNFs	Copyright	7
FG2.7	OBU with orchestration of VNFs	2. Infra	LINKS	Physical OBU integrating orchestration of VNFs	Copyright	7
FG3.1	Set of VNFs	3. VNFs	ININ	Newly designed and implemented VNFs, as well as upgraded existing VNFs	Copyright	6/7
FG3.2	Interoperable LDM	3. VNFs	VICOMTECH	Interoperable Local Dynamic Map	Copyright	5
FG3.3	Test system	3. VNFs	FSCOM	Adapted test system for VNF aspects	Open	5/6
FG3.4	UC2 related VNFs	3. VNFs	LINKS	New VNFs related to ITS stack or baseline functionalities to be used in UC2	Copyright	6
FG3.5	UC6 related VNFs	3. VNFs	LINKS	New VNFs related to ITS stack or baseline functionalities to be used in UC6	Copyright	6
FG4.1	UC1	4. UCApp	FIVECOMM	NetApp development for UC1 (including both BG and new VNFs)	Mixed	6/7
FG4.2	UC2	4. UCApp	BYLOGIX	NetApp/VNF development for UC2	Open	5
FG4.3	UC3	4. UCApp	HIT	NetApp/VNF development for UC3	Open	6
FG4.4	UC4	4. UCApp	NXW	NetApp/VNFs development for UC4 (CDN enhancement and integration)	Open	6
FG4.5	UC5	4. UCApp	OSeven	NetApp/VNF development for UC5	Open	6
FG4.6	UC6	4. UCApp	NXW	NetApp/VNFs development for UC6	Open/Copyright	5
FG4.7	UC6	4. UCApp	UULM	VNFs related to network data collection and aggregation, QoS prediction		

FG5.1	UC3	5. DML	HIT	Deep Neural Network solution for the prediction of Field-of-View of VR users for UC3.	Copyright	5/6
FG5.2	UC6	5. DML	ICCS, UULM	Distributed ML Orchestrator (DMLO)	Open	4/5
FG5.3	Test system	5. DML	FSCOM	Adapted test system for ML aspects	Open	5/6

3. EXPLOITABLE INNOVATIONS

This section summarises the exploitable innovations of the project and links them to the background and generated foreground knowledge.

3.1. Targeted innovations (Exploitable assets)

The targeted innovations are stand-alone marketable outcomes that combine a number of artifacts/modules/components and perform a certain functionality or provide a complete service cycle. Therefore, the 5G-IANA innovations are built on top of the background and foreground knowledge forming the exploitable assets of the project.

This is an important analysis step that determines also the exploitation studies that will be performed under WP7. The list of innovations (or equally the exploitable assets) is presented in Table 3-C and is open for updates both with respect to the definition of the innovations' functionalities and the inclusion of new innovations.

Table 3-C: List of targeted innovations in the form of exploitable project assets

Inno#	Asset	Description
Inno1	5G-IANA AOEP	A complete platform framework for providing the management and orchestration of network and computing resources over communication/transport infrastructures enabling applications in the automotive sector to be onboarded, composed, deployed and managed across different domains (vehicles, road infrastructure, MEC nodes and cloud resources).
Inno2	NOD module	A framework for the orchestration of Vertical Applications composed by different NetApps that includes: a) the NetApp development environment for the onboarding of the application components and metamodels, b) the dynamic on-the-fly deployment of NetApps as Vertical Application components, in the form of compatible slice requests, according to their service requirements, c) the real-time life-cycle management of NetApps based on monitoring information and runtime policy criteria.
Inno3	NOD analytics framework	Monitoring analytics and policy enforcement over automotive driven data framework to further enhanced with intelligent (AI/ML driven) decision mechanisms.
Inno4	On-air mobile test network evolution	An on-air mobile test network targets the testing of the reliability of newly developed product features and their suitability for a range of services. The features must meet both the requirements of legacy services such as broadband Internet access as well as to improve the provision of novel services such as IoT and V2X. Network slicing is a novel network capability introduced with the 5G specifications. Hand-on experience with network slicing deployment is gained during the project period. Insights and problems deploying the network slicing solution for vehicular

		services will be reported to product development teams with the objective to improve future network slicing solutions. Different radio interface configurations are tested for their suitability for services such as V2X. Suitability e.g. may include frequency band specific throughput rates, latencies, reliability, etc. Suitable options are reported to product development and may become service specific default options for operators.
Inno5	ITS & MEC Test system	Enhanced ITS and MEC test systems complemented by ML and VNF components for future use in test projects and standardisation activities.
Inno6	Manoeuvre Coordination Autonomous Driving	Design and development of autonomous vehicle related VNF, NetApp and vertical NetApp for the manoeuvre coordination use case.
Inno7	Parking circulation & high risk hotspot detection	Design and development of two VNFs deployed on the MEC, for detecting parking circulation & high risk hotspots, and the related NetApp. The parking circulation feature will create heat maps across areas and times of day to assist the driver in finding a parking spot; the high risk detection feature will provide notifications to the driver if they are entering a high risk road segment, in order to adjust their driving behaviour.
Inno8	Field-of-View Prediction-Assisted 360º Video Slicer	Design and development of a 360º Video Slicer that utilizes a SoA Deep Neural Network Architecture to predict the feature Field-of-View of all users to optimize the video stream delivery to minimize network/computational resource consumption and allow a larger number of spectators.
Inno9	5G IoT NetApp	Improved distributed, cloud-management solution (based on the background knowledge of the partner), designed for deployment of IoT-based remote monitoring and sensing aimed at collecting and analysing data sent by (5G) IoT devices being connected to and managed by the platform.
Inno10	DML framework	Design and development of a Distributed Machine Learning (DML) framework, that will enable ML-based applications of Automotive Vertical players to be deployed and run over the network infrastructure.
Inno11	Orchestrated OBU and RSU	Physical OBU and RSU enhanced to integrate management and orchestration of VNFs.
Inno12	Remote driving application	Design and development of a remote driving application based in 8 VNFs, deployed both at the OBU and the edge of the network. The vehicle sends constantly the camera and sensing feeds, which permit the driver to take decisions and provide the orders. Deep learning is also used to provide information about the surroundings. Warnings are activated in case that specific events happen.

3.2. Innovations linked to FG and BG

The innovations are mapped next to the identified foreground and background knowledge. This is presented in Table 3-D and provides a link between the generated results and project developments, the main contributing partners (ahead of the final development) and the agreed IP protection level.

Table 3-D: Innovations' mapping to BG, FG, TRL, contributors, and IP

Inno#	Asset	Related BG	Related FG	TRL improvement	Main Partner(s)	Contributing partner(s)	IP protection level
Inno1	5G-IANA AOEP	BG1.1-5 BG3.1-9	FG1.1-5	4→7	-	{ALL}	Mixed
Inno2	NOD module	BG1.1, BG1.3	FG1.1-2 FG1.4	5→7	UBITECH, NXW	ICCS	Mixed
Inno3	NOD analytics framework	BG1.1, BG1.5	FG.1.5	3→5	UBITECH, NXW	-	Copyright
Inno4	On-air mobile test network evolution	BG2.1, BG2.2	FG2.1-3 FG2.5-7	5→7	NOKIA	ININ, TS	Mixed
Inno5	ITS & MEC Test system	BG2.3, BG3.3	FG2.4, FG3.3-4 FG4.6-7 FG5.2-3	5→7	FSCOM	UULM, NXW, LINKS	Open
Inno6	Manoeuvre Coordination Autonomous Driving	BG2.6-7 BG3.2	FG3.3-4 FG4.2	5→7	BYLOGIX	LINKS, 5COMM	Open
Inno7	Parking circulation & high risk hotspot detection	BG4.3	FG3.2 FG4.5	6→7	O7	5COMM, VICOMTECH	Copyright
Inno8	Field-of-View Prediction-Assisted 360° Video Slicer	BG3.12, BG4.1	FG4.3, FG5.1	3→5	HIT	5COMM	Copyright
Inno9	5G IoT NetApp	BG2.4-5 BG3.13	FG3.1 FG4.6-7	6→7	ININ	UULM, NXW	Copyright
Inno10	DML framework	-	FG4.7, FG 5.1, FG 5.2, FG 5.3	3→5	UULM	ICCS	Mixed
Inno11	Orchestrated OBU and RSU	BG2.6-7 BG2.7, BG3.4	FG2.5-6	6→7	LINKS	-	Copyright
Inno12	Remote driving application	BG3.10, BG3.11	FG4.1	5→7	5COMM	LINKS, NOKIA, VICOMTECH	Mixed

4. MANAGEMENT OF INNOVATION

This section highlights the main goals for the innovation management procedure, including the key performance indicators identified for classifying the targeted innovations and the overall monitoring system for the identification, listing and update of the generated innovations in 5G-IANA.

4.1. General outline of management

The main goals for the management of innovation include:

1. the constant awareness of the project status with respect to the identified innovative outcomes,
2. the monitoring of activities with respect to potential innovations (including new innovations driven by market needs),
3. the readiness to generate new innovation pathways potentially exceeding the project objectives.

The technical and innovation manager is responsible to monitor the related activities and involve all the partners contributing to the project's developments to report the status as well as new potential opportunities at a regular basis. The updates are monitored at a plenary level within 4-month intervals and by the completion of the project's milestones and deliverables on technical activities.

The adopted procedure relies in the close collaboration between technical and innovation manager and the technical development team of the project with the goal to exploit the potential of project's innovations and provide guidance on project's technology choices based on existing and emerging market trends. Task leaders submit information on innovations or technology choices arising within their tasks. This information will encapsulate the following:

A. a description of the innovation or technology choice,
B. justification for considering the particular outcome as innovation or justification for making this technology choice,
C. analysis of alternatives choices and indications on market trends as perceived by the technical experts.

This procedure extends towards T7.4 - Exploitation strategy, and can be used as input for the market related reports and analysis work.

4.2. Key Performance Indicators and Monitoring System

For an effective monitoring action, firstly key performance indicators are to be determined and a monitoring system in parallel with the innovation system is to be established.

4.2.1. Key Performance Indicators

Key performance indicators for Innovation Solutions are determined as follows:

- Timing:

  This indicates the position of the innovation with respect to market needs and most importantly the estimated time for the market penetration. It is extracted after the market analysis and exploitation plan per innovation, following the studies in WP7.
- TRL level:

  This indicates the technology readiness level at the time of the project end and can also be linked to the exploitation plans after the end of the project with an indication towards TRL 9.
- Discrepancy from objective:

  The specific category links the innovation with the objectives of 5G-IANA. It is an indication that shows whether the innovation follows the specific project targets or is extracted from the workplan and can be used to provide additional capabilities beyond the project objectives.
- Possible IPR:

  This provides an indication of the expected IPR that will follow the innovation. It can be linked to partners exploitation plans and TRL phases.
- Number of new ideas:

  This is a more forward-looking indicator that reflects the number of further development and innovations ideas derived from the targeted innovation. It is also linked to the exploitation plans of the individual partners and other related activities that are pursued in the topic of research.

4.2.2. Innovation Monitoring System

Key performance indicators are to be followed up closely in relation to the work plan and related tasks. The technical and innovation manager together with all WP and task leaders form the core of an Innovation

Monitoring Team which actively monitors the activities and participates in the exchange of the development status information, with respect to platform module developments, the use case (NetApp) components and the infrastructure set up and specificities. These members together form the innovation culture and facilitate innovation enabling factors to develop the Innovation Solutions determined successfully and also to come up with new ideas and Innovation Solutions.

For the monitoring of the innovation results, a system is to be formed and used rigorously, primarily after M09 of the project following the initial design phase of the project and prior to the development phase. The following system will be the main process for monitoring the key performance indicators:

1. Keep regular audit of (external) state-of-the-art and of (internal) project work. (In conjunction also with WP7 exploitation and IPR management activities).

2. Ensure favourable conditions for the foreseen innovations in Project and develop an innovation process to monitor the innovation within the project:

    a. Follow up “Consortium Agreement” for industrial rights sharing protocol, so that a favourable and transparent working environment is formed

    b. Form a system to resolve and eliminate any possible conflicts rapidly

    c. Form a virtual system for brainstorming and exchange ideas (using for example the project’s internal SharePoint online working space)

    d. Reserve a certain time during each consortium face-to-face meeting for monitoring innovation solutions and brainstorm on possible new innovation solutions.

3. Check and, if needed, take necessary actions to ensure that claimed innovations are being developed within the project.

4. Get feedback from Innovation Solutions responsible partners with adequate periods and follow up the development.

5. Identify and promote innovations arising during the course of the project work:

a. Create an online portal for new ideas: a directory in the project internal file repository has been created to collect new innovation ideas.

b. Innovation Management Team to evaluate the possible applications of the new ideas.

5. CONCLUSIONS

This deliverable summarizes the Innovation Management procedures of the 5G-IANA project and extracts the initial list of background and foreground knowledge, and the potential innovations.

The offered (background) and potentially generated (foreground) knowledge is categorised based on the targeted development field in the project. It is next used in order to link the developments with the targeted innovations in the project. The innovations in 5G-IANA are seen as significant stand-alone outcomes that can be separately exploited.

The work in this deliverable will provide the required feedback to WP7 T7.4 for the conduction of the exploitation and market analysis studies. It will be also used and regularly updated to monitor the project developments and map them to the existing innovations or generate new potentials.