



PROJECT “LOCUS”: LOCALization and analytics on-demand
embedded in the 5G ecosystem, for Ubiquitous vertical applications

Grant Agreement Number: 871249
(<https://www.locus-project.eu/>)

DELIVERABLE D7.1 v.2

“Communication and Dissemination Plan v.2”

Deliverable Type:	R
Dissemination Level:	Public
Contractual Date of Delivery to the EU:	31/12/2020
Actual Date of Delivery to the EU:	31/12/2020
WP contributing to the Deliverable:	WP7 – Communication, Dissemination, Standardization and Exploitation
Editor(s):	
Author(s):	CNIT, Stefania Bartoletti, Natascia De Fenzo
Internal Reviewer(s):	CNIT, Andrea Conti, Nicola Blefari Melazzi VIAVI, Takai Eddine Kennouche
Short Abstract:	The goal of this deliverable is to define the project communication and dissemination plan as well as a first version of the data management plan.
Keyword List:	Communication, dissemination, data management

1. Executive Summary

This deliverable is a revised version of D7.1, based on the comments of the experts of the first technical project review. The deliverable D7.1 aims at defining the initial dissemination and communication plan of the Project LOCUS. The document describes the following main areas:

- communication channels deployed by LOCUS addressing different target audiences, including collaboration with relevant projects in similar fields;
- communication activities towards different audiences;
- scientific dissemination plan, including conference participation and publications;
- data management plan.

The next deliverable reporting dissemination and communication activities is planned as follows:

- D7.2 - Communication, Dissemination Actions, Standardization and Open-Source Contributions v1: Delivery date M15.

VERSION CONTROL TABLE			
VERSION N.	PURPOSE/CHANGES	AUTHOR (S)	DATE
1.0	First draft with data management plan	Stefania Bartoletti	23/12/2019
1.1	Revision	Domenico Giustiniano, Giacomo Bernini	30/01/2020
2.0	Draft of the revised version addressing the Project Reviewer's comments.	Stefania Bartoletti, Natascia De Fenzo	13/12/2020
2.1	Revision	Takai Eddine Kennouche, Andrea Conti	24/12/2020
2.2	Revision	Nicola Blefari Melazzi	29/12/2020



INDEX

1. EXECUTIVE SUMMARY	2
2. INTRODUCTION.....	4
2.1. LIST OF ABBREVIATIONS	4
2.2. TABLE INDEX.....	5
3. COMMUNICATION AND DISSEMINATION STRATEGY	6
3.1. TARGET AUDIENCES AND KPIS.....	6
4. COMMUNICATION AND DISSEMINATION PLAN	10
4.1. RISKS RELATED TO THE COVID-19 PANDEMIC AND RELATED LOCUS CONTINGENCY PLAN	14
4.2. STANDARDISATION ACTIVITIES	15
5. COMMUNICATION AND DISSEMINATION MANAGEMENT	17
5.1. KPI MEASURABILITY.....	18
5.2. LOCUS COMMUNICATION AND DISSEMINATION TEAMS AND TASK FORCES.....	21
5.3. ACKNOWLEDGEMENT OF EU FUNDING	22
6. DATA MANAGEMENT PLAN	23
6.1. DATA SURVEY AND SUMMARY.....	23
6.1.1. PoC Data and Infrastructure	25
6.1.2. Publishable Results	27
6.2. FAIR DATA	27
6.3. ALLOCATION OF RESOURCES	29
6.4. IPR MANAGEMENT.....	29
6.5. ETHICS AND SECURITY.....	29
6.5.1. Involvement of humans in the activities.....	31

2. Introduction

The main goals of the LOCUS communication and dissemination activities are listed below.

- To raise awareness outside the project about the LOCUS activities.
- To inform stakeholders, end-users, target groups organization and general public on the benefits and expected results of the LOCUS project.
- To engage stakeholders, end-users, targeted group organizations, and the general public for getting inputs and feedbacks towards the LOCUS project, by let them drive general requirements and technical specifications according to their daily life experiences.
- To promote the LOCUS achievements and results to increase visibility and to facilitate the identification of potential synergies with other projects (e.g., H2020 projects).

This document sets a general plan for all these communication and dissemination activities, identifying targets and goals for each category to be addressed during the project.

In addition, the initial Data Management Plan (DMP) is presented. The DMP will be updated and reported in the deliverables related to WP7, i.e., D7.2, D7.3, and D7.4, and D7.5.

Specifically, Sec. 3 presents the general strategy, the main target stakeholders that will be considered for LOCUS communication and dissemination as well as the main KPIs for the progress monitoring of the activities. Based on such target stakeholders and KPIs, Sec. 4 describes the general communication and dissemination plan for the second and third year, providing target values for the main KPIs. **Note that this is a general plan, which is then updated, detailed, and adapted on a yearly basis in D7.2 and D7.3.** Furthermore, a contingency plan for facing the effects on the COVID-19 pandemic on the communication and dissemination plan is presented. Sec. 5 introduces the tools and actors for the management of the communication and dissemination plan. Sec. 6 presents the data management plan, which will be updated within D7.2 and D7.3. Finally, the personal data officer board is presented.

2.1. List of Abbreviations

ABBREVIATION	FULL NAME
CA	Consortium Agreement
BMT	Business and Marketing Team
CFS	Certificate on Financial Statement
DOA	Description of the Action



EB	Executive Board
GA	Grant Agreement
GB	General Board
KOM	Kick off Meeting
NDA	Non-Disclosure Agreement
PC	Project Coordinator
PO	Project Office
RT	Review Team
ST	Scientific Team
GitLab	A web-based distributed version-control system for tracking changes in any set of files
WPL	Work Package Leader
WPT	Work Package Team

Table 1: Abbreviation List

2.2. Table Index

Table 1: Abbreviation List.....	5
Table 2 Table of LOCUS Stakeholders, Interest, Opportunity, and Communication and Dissemination KPIs	9
Table 3 List of main international, peer-reviewed conferences of interest.....	14
Table 4 COVID-19 Contingency Plan	15

3. Communication and Dissemination Strategy

LOCUS partners believe that an effective internal and external LOCUS communication strategy is essential for the full and long-lasting success of the project. Therefore, LOCUS has defined its communication strategy to determine which communication and dissemination channels and activities will be effectively used to convey (i) information about the LOCUS project including objectives; (ii) LOCUS project's scenarios; and (iii) LOCUS project's results, tools, and solutions.

3.1. Target Audiences and KPIs

LOCUS' target audiences belong to diverse subgroups, including consortium members, Universities and Research institutions, peer projects (e.g., H2020 projects, other international and national projects), standardization bodies and industry, EU and national policy-makers and institutions, and general audience.

We now briefly present the target audience categories, indicating their expected interests in LOCUS research outcomes, based on their needs. We list the opportunities for LOCUS to communicate its role and disseminate the research outcomes with such audiences, while receiving feedback for better progressing with the activities. **For each target audience we provide the KPIs that will be monitored through the project. To adapt and plan the specific activities on a yearly basis, the target numbers for such KPIs are given in the detailed yearly plan in Section 4 below.** The measurability of such KPIs will be described in Sec. 5.1 together with the tools used. Therefore, the presentation of the target audience also contextualizes the rest of this document.

Stakeholder	Interest	Opportunity	KPIs
LOCUS Consortium	The internal communication within LOCUS consortiums is important to make partners more aware of the activities carried out by peer partners, including those not specifically related to the project itself. This can help to strengthen the connections among	Internal Calls, Meetings; Joint publications; Joint organization of events.	Number of joint publications and events. Number of communications towards partner organizations at large. Number of interactions with partner organization

	partners and to increase the transfer of knowledge between Industry and Academia.		persons and structures not directly involved in the project.
Universities and research centres	<p>LOCUS research outcomes can be of interest to any research group working on the 5G ecosystem and on localization, as well as to students of ICT and telecommunications engineering.</p> <p>Also, the topic of cellular localization is increasingly of interest for research organizations, also towards 6G activities, and LOCUS is very well positioned in the EU framework to play a protagonist role in this field.</p>	<p>Scientific dissemination through journal papers and conference proceedings; organization and participations to international workshops and main conferences in the field; organization of dedicated Ph.D courses and tutorials, information through website and social media.</p>	<p>Number of events organized involving universities and research centres; average number of attendees; number of followers, interactions and visits of the website and social media from research centres and universities.</p>
European and National policy-makers, societal, and environmental stakeholders	<p>The research outcomes of LOCUS can provide inputs to policy makers and societal/environmental stakeholders. It will make them aware of project results, especially for the definition of policies and procedures related to location data and location-based analytics.</p>	<p>Participation and organization of events involving policy makers; information and connection through the website and social media</p>	<p>Number of policy-makers, societal, and environmental stakeholders and institutions reached; number of followers, interactions and visits from policy makers, societal, and environmental</p>

			stakeholders on the website and social media.
Standardization bodies	A number of standardization bodies deal with 5G standardization and involve location information. LOCUS research outcomes can serve as inputs to such standardization activities and can receive feedback useful for adapting the research activities to the most recent standards.	Attend and contribute to standardization bodies targeting novel technologies in the 5G networks area (3GPP, ETSI, IETF/IRTF, NGMN); share research outcomes to industry events; inform the industry community on LOCUS achievements through website and social media.	Number of activities and participation to working groups from standardization bodies. Number of proposals for contribution to standardization bodies.
Industry stakeholders	The exploitation of LOCUS research outcomes cannot prescind from a continuous transfer of knowledge between the projects and industry stakeholders that can use LOCUS solutions for many vertical applications.	“Marketing-oriented” presentations at industry events will be also organized; LOCUS will also leverage the 5G-PPP where many industries of the field collaborate with 5G-related projects.	Number of participations to industry events. LOCUS concepts will be demonstrated through PoCs tested in relevant environments (TRL 5). The PoCs will be also made available to third parties for running additional experiments. The project will strive to present such results to interested

			industries and public administrations.
Peer projects	Projects involving 5G technology and positioning are interested in LOCUS research activities. Collaborations and transfer of experiences and knowledge can help to reach the project objectives on both sides.	Organization of joint events; joint publications; participation to workshops and working groups. Here, the participation of LOCUS to the 5G-PPP will incentivize the joint activities with other projects.	Number of meetings with peer projects; organization of joint events and publications.
General Public	There is a growing interest from the general public to understand the main innovations that 5G can bring to daily lives and especially related to people location. An effective communication to reach the general public can help to improve the common understanding of the advancements in 5G and beyond. Furthermore, it can make people aware of how the public European funds are spent for making an impact also on their lives.	Participation to events involving the general public, strategic use of social media and website to reach a larger audience	Number of events targeting the general public; average number of people involved; number of followers and interactions through social media.

Table 2 Table of LOCUS Stakeholders, Interest, Opportunity, and Communication and Dissemination KPIs

4. Communication and Dissemination Plan

Given the objectives, target audience, and KPIs described in Sec. 3, here we present the general communication and dissemination plan, which will be periodically monitored through the Four-monthly reports and updated with the future versions of D7.x, according to the roadmap in Figure 1.

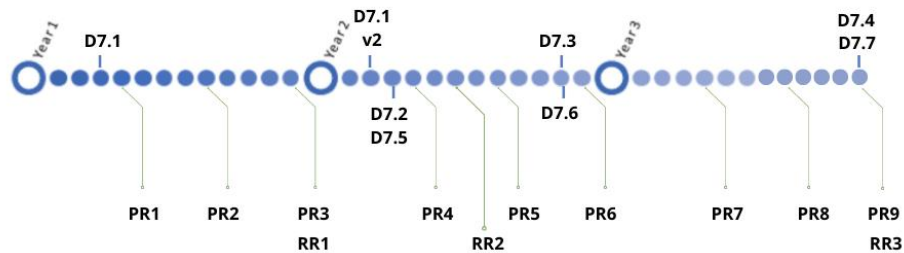


Figure 1: Roadmap of Communication and Dissemination Monitoring

The following Communication and Dissemination plan regards the second and third year, as this deliverable is produced on Month 13. Note that the proposed target frequencies/numbers are provisional and indicative, since a detailed plan on a yearly basis will be provided in D7.3 (for Year 2) and D7.4 (for Year 3)

Activity	Suggested venues	Target Frequency/Number during the Second Year	Target Frequency/Number during the Third Year
Joint journal publications within the consortium	<ul style="list-style-type: none"> IEEE Transactions and Magazines ACM Computer Communications Review, Journal of the ACM 	Two	Two
Joint events/conferences where more than one partner participates or is	See Table 3 List of main international, peer-reviewed conferences of interest for LOCUS dissemination.	Two	Two

among the organizers			
Journal papers on international peer-reviewed journals	<ul style="list-style-type: none"> • IEEE Transactions and Magazines • ACM Computer Communications Review, Journal of the ACM 	Four	Four
Participation to international conferences	See Table 3 List of main international, peer-reviewed conferences of interest	Four	Four
Organization of a workshop	Workshops within main International conferences.	One	One
Events and meetings involving policy-makers, societal, and environmental stakeholders and institutions reached.	5G-Italy, European Research Week, European commission-organized events	Two	Two
Participation to working groups within standardization bodies.	3GPP, ETSI, IETF/IRTF, NGMN	One at the end of the second year	Two at the end of the second year, with more specific contributions from LOCUS outcomes.
“Marketing-oriented” presentations at industry events. Here, PoCs in relevant environments (TRL 5) can be showcased	Mobile World Congress (MWC), Open Networking Summit (ONS), ITS European Congress, etc.	Biannual	Three (with PoCs)

available to third parties for running additional experiments.			
Meeting with peer projects	5G-PPP, Other national and international projects related to 5g and telecommunication	Monthly	Monthly
Organization of joint events and publications with peer projects	Whitepapers within 5G-PPP, 5G-PPP work groups, participation to the steering committee and the technical committee of the 5G-PPP, joint brochures with peer projects, workshop organized by and with peer projects, magazine papers	Two	Two
Number of events targeting the general public.	Participation to the European research week, release of online videos and tutorials	Two	Three
Press articles	Specialized websites, Newspapers, Online news websites	Three	Three
Number of communications towards partner organizations at large.	Joint video conference calls or webinars with partner organizations.	Two	Two
Number of events organized involving universities and research centers	Meetings, webinars/seminars	Two	Two

Number of followers, interactions and visits of the website and social media from research centers and universities	Expected numbers from the websites of the research centers and university (excluding the LOCUS project website or social media). Interactions involve feedbacks, emails, comments from outside people.	Followers: 100 Interactions: 10 Visits: 500	Followers: 200 Interactions: 25 Visits: 1000
Number of policy-makers, societal, and environmental stakeholders and institutions reached	Total number of stakeholders/institutions reached through the organized events	25	50
Number of followers, interactions and visits from policy makers, societal, and environmental stakeholders on the website and social media.	The analytics numbers for the interaction through LOCUS website or social media. This number includes general public as well as stakeholders listed on Table 2.	Followers: 50 Interactions: 20 Visits: 200	Followers: 200 Interactions: 50 Visits: 500
Number of proposals for contribution to standardization bodies.	Proposals to the standardization bodies such as 3GPP, ETSI, IETF/IRTF, NGMN	One	Three
Number of participations to industry events.	Mobile World Congress (MWC), Open Networking Summit (ONS), ITS European Congress, etc.	Three	Five
Number of demonstrations	PoCs to be made available to third parties	N/A	Three

through PoCs tested in relevant environments (TRL 5).	and presented to industries or public administrations.		
Number of people involved from general public	Participation to events involving general public	200	500

Table 2 Communication and Dissemination plan

The following table lists the main conferences of interest for the dissemination of LOCUS research outcomes.

<ul style="list-style-type: none"> • IEEE GLOBECOM • IEEE ICC • IEEE VTC • IEEE EUCNC • IEEE Int. conference on Indoor Positioning and Indoor Navigation IPIN • IEEE/ION Position, Location and Navigation Symposium • IEEE 5G World Forum (WF-5G) • ACM CoNEXT • ACM Mobicom • ACM Mobisys • ACM Sigcomm • IEEE WoWMoM • IFIP Wireless Days • Workshop on Synchronization and Timing Systems

Table 3 List of main international, peer-reviewed conferences of interest

4.1. Risks related to the COVID-19 Pandemic and related LOCUS Contingency Plan

The COVID-19 pandemic outbreak has noticeably changed the dissemination and communication activities within the first year of the project.

In this context, it was decided, at least during the main breakout, to reschedule some of the activities, for example to increase the effort towards joint journal publications while the main conferences were temporarily suspended or cancelled. WP7 is following very closely the evolution of the organization of the main conferences in the sector and will adapt quickly to offer the type of contribution required to reach the largest possible audience. To this aim, despite we expect the situation to improve during the second and third year of the project, we here provide a contingency table related to the main risks linked to the COVID-19

restrictions that might continue during the next project phase, considering their effects on communication and dissemination activities. The monitoring of the contingency plan will be continuous and reported with the next D7.x deliverables.

Risk	Target Audiences that will be impacted	Contingency Actions towards the impacted audiences
Restrictions to travel	Consortium, Research Community, Industry, Peer Projects, General Public	Organization of online events and participation to virtual conferences; Organization of regular internal meetings to monitor the progress of the activities and promote joint publications; Massive use of social media to reach the general public, preparation and update of posters and videos to be shared online
Universities Closing	Education, PhD Schools	Organization of webinars during online Undergrad PhD Courses; organization and participation to online Undergrad and PhD schools; participation to online events organized by universities and research centres.
Demos will be delayed	Industry, Peer Projects	Design PoCs so that they can be performed as much as possible in a distributed way, exploiting resources at partners' premises and relying on remote interaction also for technical operation. This could also open new opportunities/capabilities for PoCs. Increase the effort towards industry and peer project virtual collaboration within and outside 5G-PPP.
One or multiple events are cancelled	Research community, Industry, General Public	Strengthen the network with peer projects and promote alternative events to reach target audiences. For example, the network of 5G-PPP COMMS, i.e., the communication leaders from 5G-PPP projects, can be leveraged to plan alternative solutions.

Table 4 COVID-19 Contingency Plan

4.2. Standardisation activities

There is a number of important standardisation activities happening around localization and the LOCUS project has managed to contribute to many of them. These activities range from



the planned activities in 3GPP which aim to enhance localization accuracy for enabling 5G vertical applications to the new efforts in ETSI related to track and trace applications as a response to the COVID-19 pandemic. The open standards, particularly O-RAN and OAI, are looking at supporting localization applications in a more virtualized and open manner.

According to the Project Description of Work, the plan and initial report of standardisation activities will be described in D7.2, which is due in Month 15.



5. Communication and Dissemination Management

The management structure for dissemination and communication in LOCUS is reported in this Section and illustrated in Figure 2. With reference to Figure 2, the blue boxes represent the main target audiences of LOCUS dissemination and communication: research community, industry, public administration and general public, education, standardization bodies, and other projects. The agents coordinating activities towards the aforementioned targets are:

- The LOCUS communication team, including experts of communication and social media management, the website responsible (CNIT), and the leaders of the three tasks of WP7; this team meets periodically and manages the main tools of WP7, such as GitLab, Zenodo and the website. The team coordinates all the joint activities and is constantly in communication with all the partners, through an excel live file on Sharepoint and periodical questionnaire about individual activities.
- A task force including a PR responsible for each partner in contact with the LOCUS communication team; each PR is invited to provide a content on a monthly basis concerning the activity of the partner in LOCUS itself or other activities in line with LOCUS objectives.
- A standardization focus group (FG) that is in charge for the standardization activities and includes several partners within the consortium; the focus group meets regularly for the planning and implementation of standardization activities targeting the main standardization bodies of the field (see Sec. 4).
- A task force of members participating in the 5G-PPP coming from different partners of the consortium. Together with the technical manager and the WP7 leader and deputy within 5G-PPP technical and steering board committee, there is currently a representative of LOCUS in two working groups (Architecture and Automotive) proposing the project outcomes and participating to joint dissemination activities with other projects.

The aforementioned agents are dynamically evolving based on the needs.

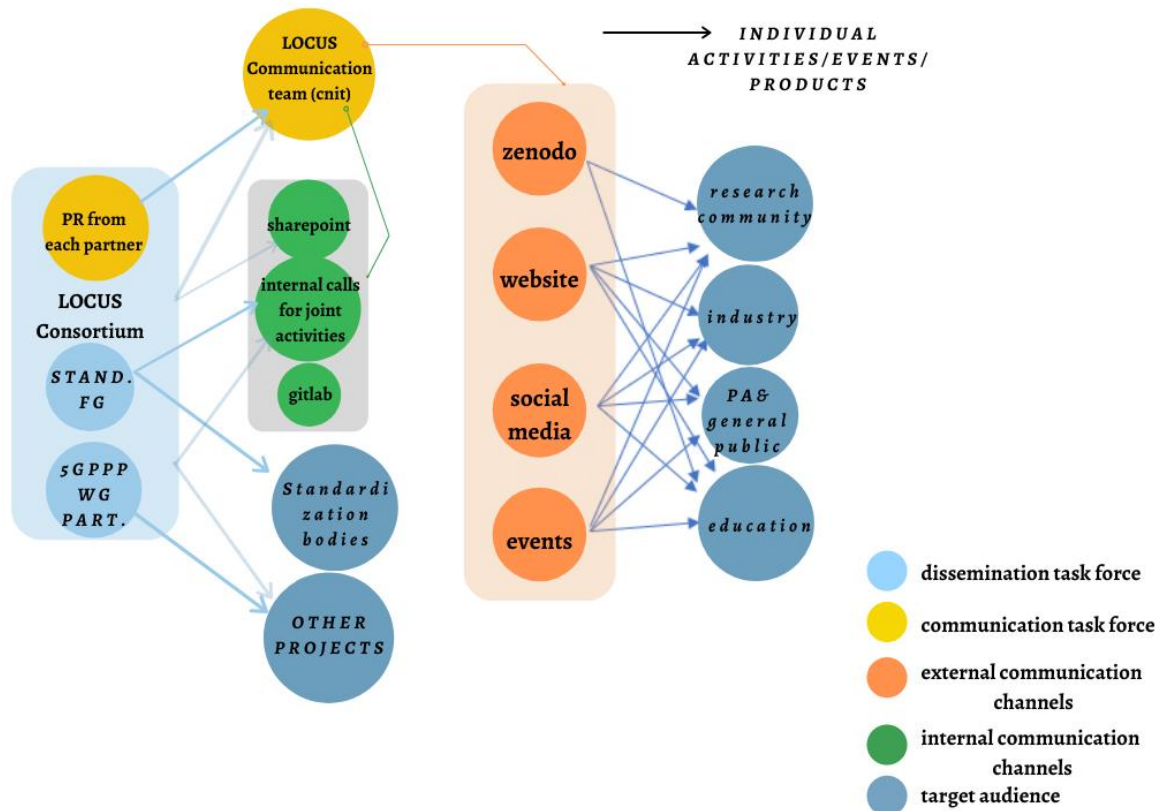


Figure 2: Dissemination and Communication Management in LOCUS

The orange and green boxes of Figure 2 refer to the main tools used for dissemination and communication of research outcomes. Many tools are mostly managed by the LOCUS communication team:

- Social media: Twitter and LinkedIn account
- Website
- Zenodo
- Organization of joint events

In some cases, they are used directly by the individual partners for the internal and external communication of their activities, events, and/or research products.

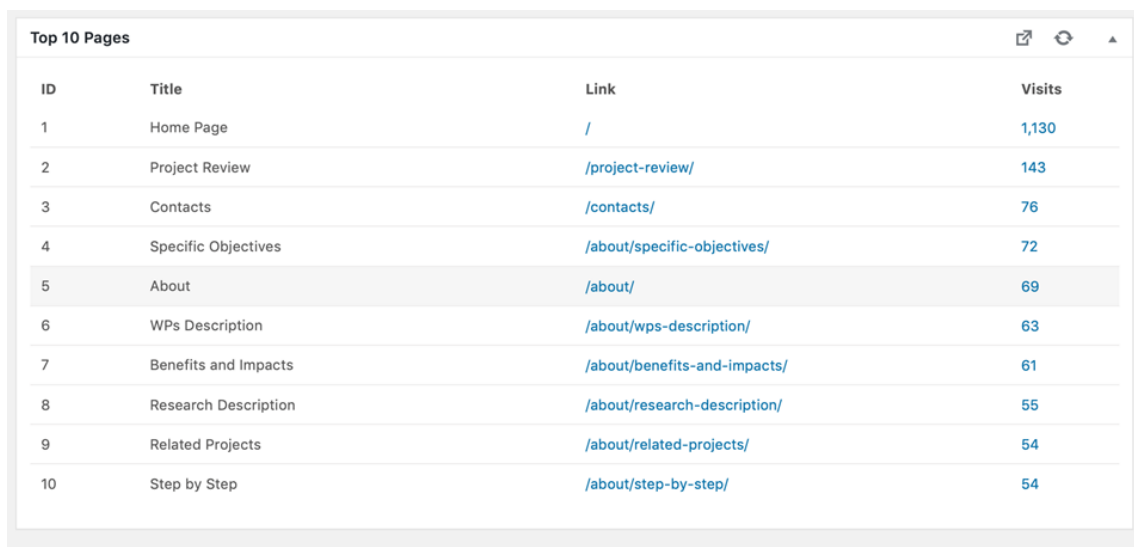
5.1. KPI Measurability

Several tools and KPIs have been defined to measure LOCUS' success in conveying research outcomes. This is particularly important to adapt the communication strategy to the specific target audience.

Each partner is required to report a summary for dissemination at each reporting period (four monthly basis). Each partner communicates the *number of individual activities* carried out and the amount of people reached within the scientific community, industry, civil society, etc.

In terms of dissemination, the number of papers in *top-tier journals* and *major conference proceedings* are an initial indicator of the quality of the dissemination of individual partners and of the consortium. In addition, the number of workshops, conferences, and events where the LOCUS outcomes are disseminated is considered.

As far as communication is concerned, a *plug-in for the website visits* has been activated to monitor daily the number of visits and visitors (unique users). This plug-in analyses also the search engines used to visit the website, and the platform used (see Figure 3 and Figure 4).



ID	Title	Link	Visits
1	Home Page	/	1,130
2	Project Review	/project-review/	143
3	Contacts	/contacts/	76
4	Specific Objectives	/about/specific-objectives/	72
5	About	/about/	69
6	WPs Description	/about/wps-description/	63
7	Benefits and Impacts	/about/benefits-and-impacts/	61
8	Research Description	/about/research-description/	55
9	Related Projects	/about/related-projects/	54
10	Step by Step	/about/step-by-step/	54

Figure 3: Visits per page

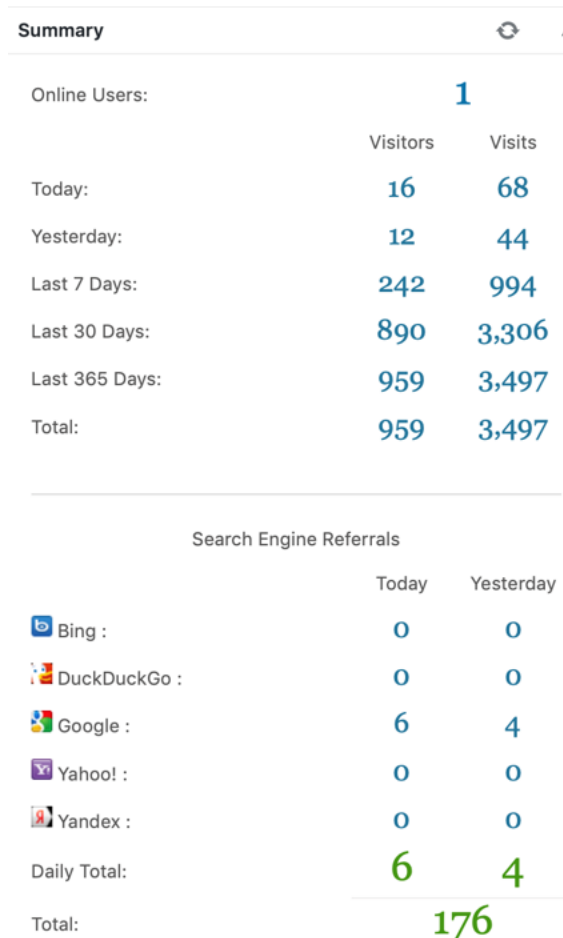


Figure 4: Visits and search engine referrals

A similar activity is performed on the social media channels: “twitter analytics” is a free tool which can provide information on the number of visits, the number of likes and re-tweets and which shows data regarding the most viewed post and most active followers.



Figure 5: Twitter Analytics

The LinkedIn account is a personal one and not a public page, this means that the tracing must be done in a different way: an excel file has been created, to analyse the number of interactions of each post, the weekday of publication, the target of the interactors, in

particular their nationality, profession and company. Each month, the number of connections/followers reached will be reported, together with the number of profile views.

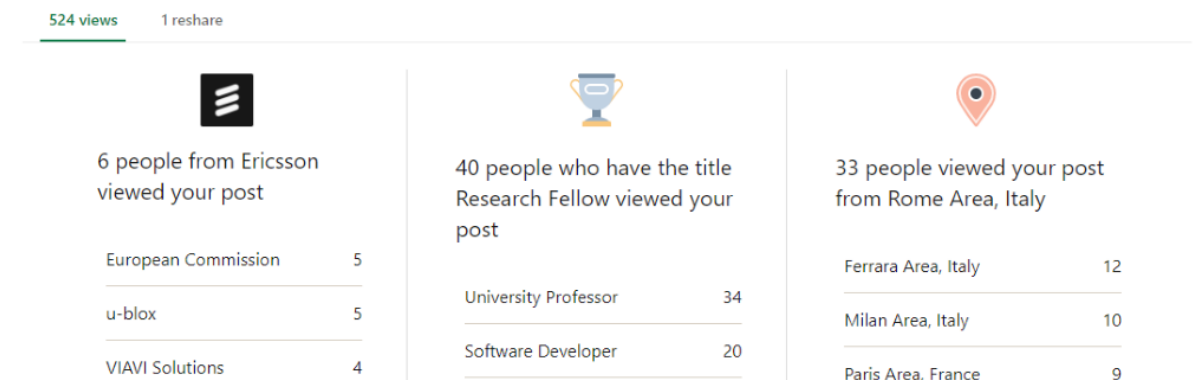


Figure 6: LinkedIn target audience

This tracing is particularly important for analysing the audience and plan the future posts accordingly.

5.2. LOCUS Communication and Dissemination Teams and Task Forces

LOCUS communication activities are coordinated by the Communication Team, which is in charge of the activities reported below.

1. Maintenance of the public website: the website is intended to share project vision, public deliverables, description of the workplan, and step by step achievements and dissemination results of the project.
2. Preparation of the communication material: a first poster is intended to be created and shared through the website. A brochure together with other projects within the 5G-PPP will be prepared. The material will be then shared through the “download” webpage of the website and the social media channels.
3. Management of social media: the LOCUS outcomes will be shared on LinkedIn and Twitter following a schedule on a monthly basis and analysing the interactions and visualizations to target companies, researchers, projects in the field, the 5G-PPP community, and the EC framework. These data will be measured, with monthly reports and analytics tools which provide graphs and statistics on the progress of social network interactions.

Content creation relies on a joint effort from all partners, which is managed through a *task force of representative PRs*, one from each partner, that is asked on a monthly basis to provide content related to the partner activities in LOCUS or outside LOCUS, but still linked to the project topics. Such content is processed and then shared through both website and social media channels.



An excel file is shared on the LOCUS Sharepoint within the communication team for scheduling the content of posts, news, actions over the communication channels and for reporting the communication activities.

5.3. Acknowledgement of EU Funding

Any material produced within the LOCUS dissemination and communication activities that is addressed to an external audience shall comply with the terms of GA – Article 29.4 - Information on EU funding – Obligation and right to use the EU emblem. Accomplishing this rule, material shall report in a visible way the following elements (unless it is impossible):

- the EU emblem, i.e., the European flag;¹
- it is mandatory to quote the following sentence in any dissemination material produced: “This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Grant Agreement No 871249”.

¹ [HTTP://EUROPA.EU/ABOUT-EU/BASIC-INFORMATION/SYMBOLS/FLAG/](http://europa.eu/about-eu/basic-information/symbols/flag/)

6. Data Management Plan

LOCUS follows the EC recommendations in terms of research data management. The LOCUS Data Management Plan (DMP) observes FAIR (Findable, Accessible, Interoperable and Reusable) Data Management Protocols.

6.1. Data Survey and Summary

A data survey is periodically performed within the consortium to detect any new data available within the project. The main types of data to be managed within the LOCUS project include simulation results as well as measurements from UEs and network infrastructure that support positioning, along with network configuration data, planning data, and other information that describes the physical nature of the network from which the data are generated.

In general, the data can come from UEs and network infrastructures, and can be waveforms or raw data, as well as RSS, CSI, performance KPIs, and position estimates. In addition, network configuration and planning data are used in some of the WPs.

Simulated data are generated through simulators implemented specifically within LOCUS or already owned by the partners or generated by open-source platforms. The validation of algorithms and techniques developed in LOCUS, will be achieved by building parametric models to relate the impact of network reconfigurations on received signal quality made by the technology or algorithm under-test to changes in KPI. A computing platform (potentially transportable) to conduct the simulation/emulation of the system based on real-world data will be provided. IBM will also generate samples of synthetic data for network demand and crowd movement pattern.

Non-simulated data can be generated in experimental testbeds or operational commercial networks, with data acquired from partners in the consortium who possess testbeds and/or commercial network assets. In case of commercial networks, the partner in the consortium providing the data will take care of the proper anonymization of the data. More information about the ethics and security related to data management is given in Sec. 6.5.

In some cases, open-source datasets will be also considered for testing LOCUS solutions with data which is external to the consortium. To this date, most of the data used in the project and reported in the data survey (see a summary in Table 6) is simulated data. More non-simulated data is expected to be managed in the second year of the project, as WP6 is going to start (see a summary of expected real data and infrastructure in Sec. 6.1.1). In any case, a more comprehensive data catalogue is going to be collected and managed by the personal data officer, to highlight any ethics or security issues.

Description	Owner	Sim./Real	Associated Source Code	Openly available	Methods/Software tools
System for the prediction of subscribers in urban area for right resources allocation	IBM	Real	Yes	Maybe (due to privacy-GDPR, can open to LOCUS project in the worst case)	Download from server + parsing tools
Location information will be fed to the LOCUS Geolocation Component from other 5G systems points of collection (e.g. LMF) and provided for end-users (consumers) as a standard representation for use with 3rd party APIs and applications	VIAMI	Real/Simulated	TBD	Depends on the tools used and licenses	TBD
Information regarding the crowd mobility analytics use case. The related proprietary datasets as well as open datasets found from online sources are considered to be leveraged by NEC.	NEC	Real/Simulated	Yes	No (for real citizen data, privacy reason) - Maybe (for internal data collection, can make public after paper publication) - Yes (using public open datasets)	Download from server
Simulated location of terminals and device-free targets from waveform samples, TDoA, AoA measurements, and multimodal sensor fusion.	CNIT	Simulated	Yes	Only to the Consortium upon request	Download from server + Matlab
Data used for work in WP3	IMDEA	Real data	yes	Yes, after publication of paper	TBD
High accuracy indoor positioning for	EAB	Simulated data	Yes	Yes, under request,	MATLAB

industrial IoT (LEN-UC3) Input and Output data				available only to the project	
Location for AR/VR users and eMBB network management	UMA	Real data captured from UMA testbed	No	Yes, under request, during the project	UMA Sharepoint credentials to download

Table 5 Summary of the Data Survey

6.1.1. PoC Data and Infrastructure

LOCUS data and infrastructure will concern the research conducted in the scientific WPs and the three PoCs: 1) Smart Network Management based on Location Information of 5G equipment and terminals; 2) Network-assisted Self-driving Objects 3) People Mobility & Flow Monitoring. The PoC evaluation capability will be underpinned by acquisition of a data set representative of 5G deployments.

There is a strong commitment within the consortium and their partners to ensure the acquisition of real datasets relevant to the LOCUS objectives and PoCs. LOCUS will have access to testbed(s) and network data provided by partners, external organizations and collaborating 5G projects as detailed in the following table. The data sets will comprise measurements of received signal strength and quality, time-based information, channel state information, performance KPIs, position estimates (or raw data from which these may be derived). Data will be enriched to allow tracing of individual mobiles between cells.

Data will be shared in the project only after proper anonymization, according to GDPR rules and constraints.

A first list of real data that will be available in the project is reported in Table 6.

Partner	Source	Data Type	WP where data will be used
ORA	Orange Cellular Network	Cellular data, radio QoS, GPS data	WP4
OTE	OTE Cellular Network	2G/3G/4G: network data source related to configuration, traffic, accessibility, utilization, retainability; geolocalized data indoor and outdoor, radio QoS	WP6 (the use in other WPs is under discussion)
UMA	LTE small cell network (12)	4G/5G (5G Trial Network to be deployed by April	WP4

	picocells); IoT setup (120 devices); 5G testbed, 5G Trial Network	2020, providing C007/18-SP call to be awarded), LoRA, WiFi, Zigbee	
TEI/CNIT	Constraints based cargo operations in Livorno's seaport	Data relevant to Automated Guided Vehicles (AGV) used in logistic cases. Use cases of such testbed (in a 3D virtual reality environment) will be considered: i) warehouse logistics, where the AGV will shuttle materials between different locations, and an assembly line, where the AGV will replace a conveyor	WP6
IMDEA	Own testbeds: 3D WiFi indoor localization; full-fledged mmWave system; SDR LTE testbed;	Localization information through WiFi-Time of Flight/Fine Time Measurements of COTS WiFi targets (including smartphones); CSI from mmWave Talon 802.11ad routers; ToF and AoA from LTE testbed;	WP3, WP6
SAMS	5G datasets from H2020 5G-VINNI at Ipswich UK	Tracing of 5G mobiles, RSS, latency, delay, angular information; 28GHz FWA trials for device-free context information (building and other objects)	WP3, WP6
NEC	NEC and local agencies; smartphone app in Heidelberg; PoC	GPS from smartphones; WiFi data in indoor environments; camera and auxiliary sensors; BT data in indoor office	WP6



	in New Zealand and Gold Coast		
--	-------------------------------	--	--

Table 6 Table of real data that is planned to be available within the second and third years of the project.

6.1.2. Publishable Results

As far as it is possible, all research data (including scientific publication and open-source software where applicable) will be made public, mainly targeting top journal and conference venues. To ensure Open Access to the scientific publications from the LOCUS project, they will be preferably published in media that allow **green online open access**. The Executive Board will select the most relevant publications of the project and for those a “gold” model will be pursued. For the rest of the publications, a “green” model with self-archiving will be pursued, in full respect of the publishers’ copyrights².

6.2. FAIR Data

In order to fulfil the FAIR principles (findability, accessibility, interoperability, and reusability) LOCUS data (simulation, real data, and publishable results) will be organized and shared in dataset through the GitLab repository of the project according to the following principles:

- Dataset reference and name – Internal project Identifier for the data set to be produced. This will follow the format: **LOCUS_WPWPNumber_TaskTaskNumber__PartnerName_DatasetName**
An example of this naming format would be: **LOCUS_WP7_Task1.1_CNIT_ListOfData**
- Dataset versioning will be managed through the Gitlab.
- Each dataset will be uploaded in the repository with a proper description about how the data is generated or collected, including its origin (in cases where data is collected), nature and scale and to which WP or external entity could be useful, and whether it underpins a scientific publication. Information on the existence (or not) of similar data and the potential for integration and reuse.
- Description of how data will be shared, including access procedures, embargo periods (if any), outlines of technical mechanisms for dissemination and necessary software and other tools for enabling reuse, and definition of whether access will be open or restricted to specific groups.
- In cases where the dataset cannot be shared, the reasons for this will be stated (e.g. ethical, rules of personal data, intellectual property, commercial, privacy-related, security-related).

Publications and the main models that are result of the project will be uploaded to the Zenodo repository (an OpenAIRE - <https://www.openaire.eu/>- and CERN collaboration), that matches

² NOTE THAT MANY OF THE MOST IMPORTANT PUBLISHERS (E.G., IEEE AND ACM) ALREADY ALLOW FOR SELF-ARCHIVING ON PERSONAL AND EMPLOYERS’ SITES, SEE E.G., WWW.IEEE.ORG/DOCUMENTS/PRINCIPLES_FAQ.DOC

all requirements of Open Data. Zenodo complies with FAIR principles because it creates metadata for making the documentation findable, accessible, interoperable and reusable. The following metadata formats are provided by Zenodo: MARCXML, Dublin Core (according to OpenAIRE Guidelines), DataCite, DCAT, JSON-LD (Schema.org). To make the data even more findable, some meta-data information will be uploaded to the webpage of the project, providing links to Zenodo.

A LOCUS community has been created in Zenodo to share the publishable results and any data or software that will be made openly available during the project (see Sec. 6.1). Each partner can upload its individual products and link them to the LOCUS community.

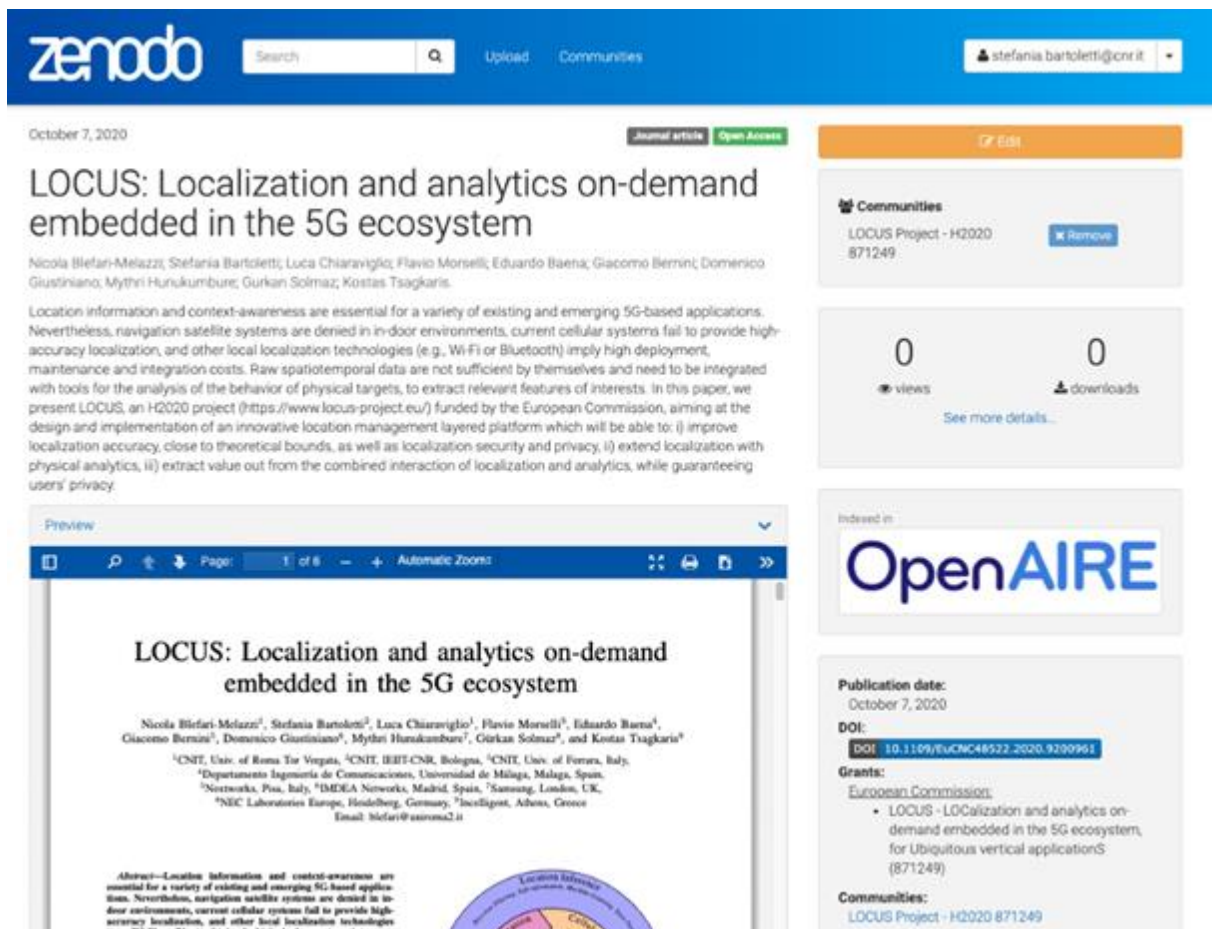


Figure 7: Zenodo LOCUS community

Data that will be made openly available. The part of data generated by LOCUS project that will be openly available, will be uploaded or linked to the Zenodo repository, GitLab and/or the website of the project except for those data restricted by IPR or other requirement of confidentiality (it may jeopardize some of the project's main objectives) and privacy (in case some of the data generated is personal data).

Methods or software tools that are needed to access the data. The data generated by the LOCUS project are intended to be accessible by user-level software, such as download of data clicking on a button, and Application Programming Interfaces (API) for retrieving data through



command line. Those data that require a relevant software to be accessed and executed will be properly documented and instructions regarding accessibility will be provided.

How the data will be licensed to permit the widest reuse possible. Whenever it is possible, for instance in case beneficiaries have no interest to commercially exploit certain results of the project, data will be open under the well-known license Creative Commons provided by Zenodo repository, and, in case of source code, by any open-source scheme such as GNU General Public License.

6.3. Allocation of Resources

LOCUS data, when possible, will be uploaded to the Zenodo repository.

As for publishable results, archival of a pre-print of the publication will be made available over public archives, e.g., Arxiv and project website, and linking it to OpenAIRE.

As for internal collaboration among partners, the Gitlab repository will serve for archiving project documents, and a SharePoint folder has been shared for collaborative writing.

6.4. IPR Management

LOCUS partners will protect the innovative knowledge produced by means of patents. IPR will be checked prior to dissemination and a decision will be made by giving priority to protection and exploitation.

The IPR management is part of the task T7.3 “Innovation and Exploitation” and the innovation plan will be presented in D7.3.

6.5. Ethics and Security

LOCUS ethics and security policies are related to the use of real location data that, if not properly anonymized, can constitute personal data. Data will be shared in the project only after proper anonymization and according to GDPR constraints.

In order to ensure personal data protection, Prof. Raffaele Bolla from CNIT has been appointed Personal Data Officer (PDO) for LOCUS by the project Coordinator (CNIT). Each partner then designated a Personal Data Officer (PDO) to support and work along with the project PDO. The project PDO and the partner PDOs, which from now on will be collectively referred to as PDOs, were assigned the following duties:

- Inform involved subjects about data protection rights, obligations, and responsibilities.
- Ensure data protection compliance.
- Advise the consortium about and point out any failure to comply with the data protection rules.
- Control over collection, processing and sharing of personal and confidential data between the partners and/or third parties.

The PDOs will be meeting regularly with a bimonthly frequency.

Partner	Name
CNIT	Raffaele Bolla (Data Controller)

EAB	Sara Modarres Razavi
TEI	Stefano Stracca
IBM	Joseph Anthony
NEC	Gürkan Solmaz
ORANGE	Sana Ben Jemaa
OTE	Alexis Andreadis
SAMSUNG	Mythri Hunukumbure
VIAVI Solutions	Takai Eddine Kennouche
INC	Kostas Tsagkaris
NXW	Giacomo Bernini
IMDEA	Stefan Gessler
UMA	Emil Jatib Khatib

Table 7 Personal Data Officers

It was decided that the list of data included in the DMP (see Sec. 6.1) needs to be complemented with additional information so as to contain a more detailed and focused information related to personal data and its management. Therefore, the PDOs have identified writing a comprehensive data catalogue as the first step to fulfil their task. This data catalogue includes all datasets containing personal information, and in case personal data are involved, detailed information on the technical procedures for data collection, storage, protection, retention, and destruction is added. Moreover, a data governance catalogue and data usage audit log will be defined to control sensitive data access if such data is present. The PDOs have first decided to collect preliminary information on each dataset used in the project to assess any potential presence of personal data or critical issues. With this goal, a questionnaire was prepared and sent to each partner, requiring for each dataset the information listed below.

- Names of persons and/or groups that may process the data
- Description of the processing operations which is performed upon personal data, such as collection, recording, storage, adaptation, alteration, retrieval, consultation, use, disclosure, transmission, dissemination, deleting
- Categories of data subject
- Categories of personal data, such as “normal” (i.e. name, address, email, location data, etc.) or “sensitive” (religious beliefs, political opinions, medical history/ information and so on)
- Safeguards taken to protect the data subjects’ identity, e. g. pseudonymization/ anonymization techniques
- Whether an informed consent is needed and, if so, the procedures for obtaining it.



After the collection of the questionnaires, the PDOs evaluate each dataset and will include it in the data catalogue, if personal data are present. Any potentially critical issues related to sensitive data will be discussed, and the PDOs will advise the consortium on the measures needed when collecting, processing, and sharing such data.

At this date, only anonymized data is expected to be used. Because of this, PDOs are planning primarily to operate a check and validate the anonymization techniques used. Nevertheless, an assessment about the management of the anonymized data will be done to ensure the absence of opportunities to obtain data referable to the original user from the project's analysis or elaborations and access control for all data linked initially to individual persons. In case it is not possible to do so, access to the data will be ruled by the data governance catalogue and recorded in the data usage audit log. Moreover, the PDOs will assess if any risk of misuse is present and if so, will act accordingly to the misuse risk management table, see table 8.

Particular care will be given during the collection of data for the PoCs since humans will be involved. At this early stage of the project, the details of data collection, processing and sharing have not been finalized, so the PDOs will be able to monitor the planning and implementation of these activities.

In case the need to collect or process personal data arises at a later stage of the project, the partners involved in the specific activity will follow the General Data Protection Regulation (GDPR) and will consult with their respective Data Protection Officers (DPOs) before performing such collection and/or processing. Partners will also take into due account specific national legislation related to the country where the collection of personal data is performed. For instance, Italy and Greece provide additional regulations in certain areas which are left by the GDPR to the discretion of member-states.

Specifically, partners operating in Greece (i.e., OTE and INCE), will consider the legal framework provided by the Hellenic Data Protection Authority (HDPa) (www.dpa.gr). OTE will consult HDPa guidelines related with its role in the LOCUS project and its intention to provide encrypted and anonymized data.

Partners operating in Italy, taking into consideration GDPR rules, will consider the Italian law regarding the protection of employees' personal data in case this kind of data will be collected or processed. In particular, an authorization from the National Labour Inspectorate (www.ispettorato.gov.it) and the Labour Unions will be required.

6.5.1. Involvement of humans in the activities

The use of real location data is strictly framed in the PoCs activities:

- PoC #1) In PoC #1 (Enhanced Smart Campus Facilities for Innovative Educational Experiences), the following end-user groups might be considered for their voluntarily involvement in the testbed operations: A. Instructors and B. Students from the University of Málaga. Special care will be taken during data onboarding for the pseudonymization/anonymization of all sensitive data. When not possible, explicit and

informed user consent will be sought for the processing of usage, mobility and intellectual/educational data used by the augmented/virtual reality tactile applications.

- PoC #2) In PoC #2 (5G localization for enhanced logistics via AGV) two use cases (i. warehouse logistics, ii. Assembly line) will be simulated and data will be collected from Automated Guided Vehicles hence no sensitive data are involved. For information gathered from real cargo operations, datasets will be anonymized where applicable.
- PoC #3) In PoC #3 (People Mobility & Flow Monitoring), user location information will be provided by the relevant partners. Special care will be taken during data onboarding for the pseudonymization/anonymization of all sensitive data. After data onboarding, no data with relations to specific places and people will exist in the project; this will be also reflected in the data management plan.

A set of risks of personal data breach and data misuse is listed in Table 8. The data catalogue and the DMP are living documents that will be updated at every iteration of the Data Management Plan on M20, M30 along with the other WP7 deliverables.

Risk id	1
Description	Sensitive data breach/leakage or loss of integrity from the framework's data persistence layer due to insecure access policies, unauthorized access, malicious intent, natural hazards etc.
Probability	Low
Impact	High (for sensitive information), medium (for non-sensitive, non-identifying information)
Priority	High
Mitigation/ Response	Data leakage or loss coming from direct access to the data persistence layer of the framework (i.e. database(s)) will be prevented by taking the following precautionary measures: <ul style="list-style-type: none"> • Encryption of the databases on the physical level on all replicas • Separation of logical data storage according to data sensitivity • Replication of data shards over multiple hazard/access safe locations, both centrally and on testbeds (avoid single point of failure), incl. backup locations • Access restriction (physical – no plug storage, virtual – separate data volumes from OS, user/group permissions)
Risk id	2
Description	Sensitive data breach/leakage from the usage of the framework by the various actors and stakeholders, especially for private data and in the

	<p>test applications. Even partial access to data from reduced scope applications, e.g. for analytics/predictive analysis applications, can lead to data leakage of sensitive information.</p> <p>Data leakage may come from the misuse of data which are provided for analysis/validation reasons. E.g. an analytics function might aggregate foot traffic in a specific area for a given population. The system must be able to effectively block the possibility that the (pre)aggregated data are leaked for instance via the UI interface.</p>
Probability	Low
Impact	High (for sensitive information), medium (for non-sensitive, non-identifying information)
Priority	High
Mitigation/ Response	<ul style="list-style-type: none"> • Access Control will restrict the data, the insights and the user interface elements available to each user depending on their set of privileges/rules for each account level (admin, analyst, end-user, etc.) • Access will be monitored/logged • Stakeholders (developers, analysts) will have to state their intended use of the data, which will have to be approved by the appointed DPO. This applies to results which are related in scope to the project as well for future dissemination/analysis activities beyond the project's lifecycle or scope. • Data, reports, derivative results extraction will also follow ACL and will be logged • Data will follow differential privacy guidelines (noising, approximation methods, one-way encryption etc.) so that even on the event of data leakage, they are not identifying particular users. • GDPR compliance will be enforced
Risk id	3
Description	Mobility patterns can be traced back to particular end-users, and potentially reveal sensitive information with respect to their habits and activities. For instance, a person visiting a health clinic regularly might provide insights which are of sensitive nature.
Probability	Low
Impact	Medium

Priority	High
Mitigation/ Response	<ul style="list-style-type: none"> • Access Control will restrict the data, the insights and the user interface elements available to each user depending on their set of privileges/rules for each account level (admin, analyst, end-user, etc.) • Access will be monitored/logged • Data, reports, derivative results extraction will also follow ACL and will be logged • Data will follow differential privacy guidelines (<i>noising</i>, approximation methods, one-way encryption etc.) so that even on the event of data leakage, they are not identifying particular users. • GDPR compliance will be enforced
Risk id	4
Description	Attempted identity impersonation, resulting in a user accessing data belonging to another user
Probability	Low
Impact	Medium
Priority	High
Mitigation/ Response	<ul style="list-style-type: none"> • Access Control will restrict the data, the insights and the user interface elements available to each user depending on their set of privileges/rules for each account level (admin, analyst, end-user, etc.) • End-user Access will be restricted by the scope of the test-case they are participating in. • Strict sign-on mechanisms will be in place.

Table 8 Misuse Risk Management Table