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D8.3 Data management plan & ethics v1

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Authors List

Leading Author (Editor)				
Surname		**Initials**	**Beneficiary Name**	**Contact email**
Bembnowicz		PI	IMEC-NL	pawel.bembnowicz@imec.nl
Co-authors				
#	**Surname**	**Initials**	**Beneficiary Name**	**Contact email**
1	Bellanger	MB	Lightricity	Mathieu.bellanger@lightricity.co.uk
2	Kanlis	AK	CERTH	alexkanlis@iti.gr
3	Kauer	MK	Lightricity	Matthias.kauer@lightricity.co.uk
4	Kouzinopoulos	CS	CERTH	kouzinopoulos@iti.gr
5	Sideridis	P	CERTH	sideridis@iti.gr
6	Tzitzios	IT	CERTH	jtzitzios@iti.gr
7	Van de Wiel	RW	IMEC-NL	Rik.vandeWiel@imec.nl
8	Van Hal	RH	IMEC-NL	Roy.vanHal@imec-nl.nl

Reviewers List

List of Reviewers				
#	**Surname**	**Initials**	**Beneficiary Name**	**Contact email**
1	Meli	MM	ZHAW	marcel.meli@zhaw.ch
2	Vujičić	OV	PENTA	oskar.vujicic@penta.hr

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List of definitions & abbreviations

Abbreviation	Definition
ASSC	Autonomous Smart Sensing Card
ABS	Access and Benefit Sharing
DG RTD	European Commission's Directorate-General for Research and Innovation
DMP	Data Management Plan
GDPR	General Data Protection Regulation
H2020	Horizon 2020
IIoT	Industrial Internet of Things
LEPPI	Legal, Ethical, Privacy and Policy Issues Manager
MCU	Microcontroller Unit
MS	Microsoft
PCs	Personal Computer
PMIC	Power Management Integrated Circuit
PV	Photo Voltaic
R&D	Research and Development
RAID	Redundant Array of Independent Disks
RF	Radio Frequency

Executive summary

This document is a deliverable of the AMANDA project, funded by the European Commission's Directorate-General for Research and Innovation (DG RTD), under its Horizon 2020 Research and innovation programme (H2020). This report provides general description related to data management, ethics and standardisation which will be applied in the project and focuses on data collected up to M6 of the project. The document consists of four Sections. Section 1 provides information about the project scope, the goals of this report and the LEPPI manager nomination. Section 2, Data management plan, describes the needs, reasons and methods of data management, together with examples. Section 3 details ethical aspects of the project. Section 4 provides condensed information about data collected during the period M1 – M6 and can be used to track data collected for the project's duration. The information provided in Section 2 can be used as explanation of condense description of data provided in the Tables of Section 4.

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1. Introduction

1.1. Overall technical objectives

AMANDA is an ambitious project aiming to develop a unique ASSC which will have the size, feel and look of a credit card. It can be ideal for easy deployments in buildings (smart living environments) or as wearables (bikes, valuable assets and people). This project will cover the triangle of experimentation, development and standardization to optimize the materials behaviour, connectivity, miniaturization, power consumption, security, intelligence, design and cost. AMANDA's partners have the expertise and combination of world-class manufacturing infrastructures and know-how. The partners are using micro- and nano- technology, new composites, innovative architectures and advanced software. AMANDA's vision is to overcome the existing technological challenges and achieve the development of a user-friendly wearable platform not only for indoor and outdoor environmental sensing, but also for asset- or even people- tracking. A combination of developed and existing off-the-shelf technologies will be selected and integrated into the ASSC. Innovative PVs (Lightricity PV), PMIC (e-peas) and batteries (Ilika solid-state battery), all packed in under 3mm thickness. It will introduce technical breakthroughs that will boost further miniaturization, offer increased sensitivity, small footprint and ultra-low power consumption (maintenance free lifetime more than 10 years).
The project execution will require tight cooperation between the partners. That will lead to the generation of a significant amount of information, such as datasheets, specifications, measurement and reporting data as well as other types of data. The data management task is in place to make sure that all information is categorised and stored in a safe way and can be accessed at any time by authorised personnel.

1.2. Purpose, context and scope of this deliverable

This document relates to data management and ethic plans within the AMANDA project. As the project progresses, it will be updated if needed. Updates to this document are foreseen at milestones M18 (v2), M30 (v3) and M36 (v4) and will focus on the management of scientific data collected for the whole duration of the project and making them findable, accessible, interoperable and reusable (FAIR). The document describes the process applied by the consortium to ensure good data management and high ethical standards. It enables clear tracking of data collected, not only during the project execution but also after its conclusion. External parties can have access to public data. Therefore, this document points to the assigned project member who can provide the dataset. The following aspects are dealt with:

- Collected data
- Information contained in the data
- The data format
- The contact point for the data request

Authorized personnel is able to track the information and access it in case the information is needed.
The DMP is a living document, which will evolve during the lifespan of the project. Particularly whenever significant changes arise, such as dataset updates or changes in consortium policies. This document is the first version of the DMP, delivered in M6 of the project. It includes descriptions of datasets collected until M6 by the project and the specific conditions attached to them. It also provides a framework for future data documentation. Although this report already covers a broad range of aspects related to the AMANDA data management, the upcoming versions will get into more detail on particular issues such as data interoperability and practical data management procedures implemented by the AMANDA project consortium.

1.3. Nomination of the LEPPI manager

There is a need to appoint a LEPPI manager. The LEPPI manager will be responsible for the coordination of all activities related to legal, ethical, privacy and policy issues that may arise during the development and validation phases of the project.
In case of issues related to law, ethics and privacy, the LEPPI manager will cooperate and advise the following decisions making bodies: Plenary Board, Quality Control Board and Ethics Helpdesk.
Table 1 shows the assigned LEPPI manager, chosen by the project partners.

Partner short name - company	Name	Email
IMEC	Rik van de Wiel	Rik.vandeWiel@imec.nl

Table 1 LEPPI nomination

Rik van de Wiel is a senior employee at IMEC. He has been working as R&D Manager in the field of Connected Health Solutions for eight years. Rik van de Wiel contributed to many data collection trials, including a number of trials in which medical devices were evaluated.

2. Data management plan

During the project and as part of WP8, administrational documentation will be created in regards to project coordination. Shared documents within the consortium are processed and managed by the project coordinator. Other data generated in the project (e.g. questionnaire information, specification of the components or measurement data and others) are managed and stored by the partner responsible for the generation of the data. The data should be stored and be available on request by an authorized associate. An authorized associate can be for example another consortium partner or third party who received authorisation for data access from Project Management Board.
The project data management should fulfil directive 2013/37/EU of reusability of the generated data.

2.1. Need of DMP

The project involves carrying out data collection (in the context of the piloting and validation phase) and a set of validation tests to assess the technology and effectiveness of the proposed framework in real life conditions. For this reason, human participants might be involved in certain aspects of the project and data will be collected concerning their biometrics and their travelling info. Since the project might collect personal-related data, the consortium must comply with any European and national legislation and directives relevant to the country where the data collections are taking place. That's why it has been decided to create a Data Management Plan (DMP) for the AMANDA project.
Data Management Plans are a key element of good data management. A DMP describes the data management life cycle for the data to be collected, processed and/or generated by a Horizon 2020 project. A DMP should include information on:

- The data that will be collected, processed and/or generated
- The methodology and standards that will be applied
- Whether data will be shared/made open access
- The way data will be curated and preserved (including after the end of the project)

2.2. Procedures of data collection

2.2.1. Data collection process

The data collection consists of two parts: the data collection description and the data collection detail.
The data collection description characterizes, in plain text and for each data collection, the types of research data that will be collected during the study. It also describes how information will be collected and why it is needed. This gives a general overview that can be used to fine tune the data management if needed. The following research data types are possible (but not limited to):

- Observational data: captured in real time, typically cannot be reproduced exactly. Examples: sensor readings, sensory (human) observations, survey results, images
- Experimental data: from labs and equipment, can often be reproduced but may be expensive to do so
- Simulation data: from models, can typically be reproduced if the input data is known. Examples: climate models, economic models, biogeochemical models
- Derived or compiled data: after theoretical search, data mining or statistical analysis has been done, can be reproduced if analysis is documented. Examples: text and data mining, derived variables/parameters, compiled database, datasheets, 3D models, project reports

The data collector can complete the matrix containing the detailed information of the data collection in the study based upon the following check list.

- Data collection explains how the data will be collected such as sensors, interviews and others
- Data type that will be collected could include text, numbers, images, 3D models, software, audio files, video files, reports, surveys and other types of data.
- Data format is the format in which the data will be stored
- Estimated size of the data contains a rough estimation of the size
- Which tools or software are needed to create/process/visualize the data?
- Responsible indicates which partner is responsible for the data collection
- Does the data have a specific character in terms of reproducibility, confidentiality and others? What does this mean for the management of the data?

2.2.2. Data collection description

This Section describes the context and type of collected data. The description can be done based upon the data types: observational, experimental, simulation or derived. Furthermore, the data should be commented in wording how, what and why it is collected.
The data collection detail shows what data will be collected in the study. Table 2 describes who collected the data, how the data was generated, the data format and the file size. Additionally, the table contains a column with the information about the specific character of the data.

Ref. nr.	Responsible Partner	Data type	Data collection	Data format	Est. size	Software	Specific character
1	CERTH	Project reports	Gathering information from different stakeholders in the project through interview, meetings, mails, ...	DOC, XLS	10mb	MS Office	Only personal information of project related persons included and no sensitive data
2	CERTH	Survey	Online survey	XLS	10mb	MS Office	No sensitive data included
3	IMEC	CO_2 Sensor reading	CO_2 sensor	CSV	0,4Mb	MS Office, Matlab	No personal information included

Table 2 Data acquisition details

2.3. Data storage and back-up

It is the responsibility of the project partner who collects the data to ensure that the data is regularly backed-up and stored securely for the lifetime of the project. The following matrix is filled in order to keep an overview of the data collected in the whole project.
Storage indicates the medium and location of the backups. We distinguish the following types:

- Network drives - These are secure and backed-up regularly. They are ideal for master copies of data. However, due to its online nature they might be target of hacker attacks.
- Local drives – Data on PCs and laptops can be lost because of technical malfunction or the loss of the device itself. These are convenient for short-term storage and data

processing but should only be relied upon for storing master copies when backed-up regularly.

- Remote or cloud storage - Commonly used services, such as Dropbox and Google Drive, will not be appropriate for sensitive data. Agreements with providers should be studied before using them to store sensitive data.
- External portable storage devices (external hard drives, USB drives, DVDs and CDs) - These are very convenient, being cheap and portable, but not recommended for long-term storage as their longevity is uncertain and they can be easily damaged.

Backup indicates the location and frequency of the backups. The data in this study will be stored and backed up as described in Table 3.

Ref. nr.	Responsible Partner	Data type	Storage medium and location	Backup location and backup frequency
1	CERTH	Project reports	Remote and cloud storage using Office365	Automated backup using Microsoft
2	CERTH	Survey	Local drive	No backups made
3	IMEC	CO_2 Sensor reading	Internal IMEC SharePoint	Automatic MS office service backup

Table 3 Data storage and data backup information

2.4. Data documentation

The data processed in the study is documented and labelled for immediate usage and future reference. The labelling consists of two parts:

- File naming. Files will have naming conventions for each data type. There are many conventions for file naming. It is suggested to follow the well documented, practical guidance from Purdue University [1]. Naming convention is very helpful in case of manual and automatic search.
- Metadata. Files can have metadata that describe the data stored in the file. Metadata have a description what the data contains and what each value represents. The reason to use metadata is, that it can be found easily when looking for information.

Wherever possible, existing community standards should be identified and reused. An example of commonly used generic metadata can be found at Dublin Core Metadata Initiative [2]. The data processed in the study will be documented according to the standards with the data type as described in Table 4.

Ref. Nr.	Responsible partner	Data type	Naming convention	Metadata
1	CERTH	Project reports	For facilitating common browsing and storage in different platforms and Operating System's, no spaces should be used in the document names and instead the dash character "-" should be used. All project document names must start with the prefix "AMANDA-" to facilitate quick identification and indexing. Names of deliverable documents should follow the convention: "AMANDA-Dw.n-Title-vX.Y.ext" where: "Dw.n" is the deliverable number: "w" is the WP number; "n" is the numbering within the specific WP; "Title" is the title of the deliverable; "vX.Y" is the version number: "X" is the version; "Y" is the sub-version; "ext" is the file extension pertaining to the format used.	n/a
2	CERTH	Survey	Database name: AMANDA_Surveys_2019	n/a
3	IMEC	CO_2 Sensor reading	Sensor designation+"_"+Place of measurement+ "_"+participant+"_" date of trial e.g.IMEC_CO2_eindhoven_Tom_20190522	Description: Data from CO_2 sensor based upon events like entering, leaving the room Subject: Sensor information Created: 14.06.2019 Creator: Jon Smith Classification: Confidential

Table 4 Data documentation

2.5. Data access

This Section describes how authorized access to the data is managed during the project for each dataset. During the project, it is required to keep data safe and secure. The process of data collection will already determine who has access to data. Data security is needed to prevent unauthorised access. Otherwise the data might be intentionally or unintentionally disclose, changes or delete. The storing partners are responsible for ensuring data security. The level of security required depends upon the nature of the data – personal or sensitive data need higher levels of security.

Table 5 shows an example of the data access presentation. The access controller is responsible for the access management of the data. Access management is the description on how the access to the data will be managed.
Data can be labelled as:

- Public information
- Restricted information
- Confidential information
- Strictly confidential

Access is limited to the appointed persons, functions and groups. It can be extended on demand.
The access to the data of the study will be managed by the assigned access controller for each data type. It will be done according to the access management description linked with the data type.

Ref. nr.	Responsible Partner	Data type	Access controller	Access management
1	CERTH	Project reports	C. Kouzinopoulos	Access will be granted to people working on the project after approval by the responsible from the company they represent and approval from the overall lead of the project. Data will not be made public at any time unless all parties agree to it or the necessary agreements are in place.
2	CERTH	Survey	C. Kouzinopoulos	Access is limited to the controller
3	IMEC	CO_2 Sensor reading	P. Bembnowicz	Access is limited to the controller

Table 5 Data access information

2.6. Data sharing and reuse

This Section describes if and how the data processed in the study can be shared including:

- What agreements are in place to share the data between consortium partners or third party
- What purpose of reuse can be envisioned for the data type in a later phase
- Will the data be shared with limited stakeholders or made publicly available
- How will the sharing and re-use be managed
- What safeguards are implemented for data sharing and re-use (such as anonymisation or scrambling of certain information)

The data processed in the study can be shared or reused as described in Table 6.

Ref. nr.	Responsible Partner	Data type	Sharing of data	Reuse of data
1	CERTH	Project reports	Only shared with stakeholders of the project	For future EU project proposals
2	CERTH	Survey	Only shared with stakeholders of the project	Reuse for all work packages development
3	IMEC	CO_2 Sensor reading	No data sharing	No reuse

Table 6 Data sharing and reusing

2.7. Data retention and archiving

This Section describes how long the data will be stored for this study, what data can be archived and what safeguards are setup for the data archiving. Examples of safeguards are limited access, anonymisation, scrambling and deleting parts of data.

The data processed in this study should have the defined retention period for each data type. The default retention period is set to the end of the AMANDA project activities. However, the retention time should be adjusted to significance of collected data. Table 7 shows suggested retention time with regards different type of data Nevertheless, the experiment designer should have decisive voice about retention period. Moreover, the files can be archived or deleted directly after processing.

Nr.	Data type	Suggested retention period
1	Voice recording	Delete subsequent to project end
2	Pure technical information	5 years or more
3	Non-anonymised raw measurements	Delete subsequent to project end
4	Anonymised raw measurements	5 years or more
5	Project reports	5 years or more

Table 7 Suggested retention time with respect to type of data

Table 8 shows the model description of the archiving process.

Ref. nr.	Responsible Partner	Data type	Retention	Archiving
1	CERTH	Project reports	5 years	No archiving after the foreseen 5-year period
2	CERTH	Survey	During the project execution	No archiving
3	IMEC	CO_2 Sensor reading	During the project execution	No archiving

Table 8 Data retention and archiving

2.8. Best practice advice for data collection process

During trials, where sensitive data is collected, the data collector can consider additional restriction in the internal communication. Sensitive massages can be encrypted. Only authorised limited personnel should receive the encryption keys. Thus, non-authorised persons do not get access to data.

Data gathered can be anonymised and only limited personnel should be able to track back experiments results to the personal identification of volunteer.

People in the premises or involved in the trials shall be instructed accordingly prior to the experiment execution.

3. Ethical concerns of the AMANDA project

The AMANDA consortium confirms that each partner will check with their national legislation/practice and their local ethics committee. That will provide guidelines on data protection and privacy issues, in terms of both data protection and research procedures in relation to any of the proposed public engagement and potential volunteer research activities. Any procedures for electronic data protection and privacy will conform to Directive (EU) 2016/680 and Regulation (EU) 2016/679 on the protection of personal data and its enactments in the national legislations.

The process of adhering to the applicable regulations begins with a thorough investigation of the EU and National research projects' ethical guidelines as well as the examination of the directives regarding privacy and protection of personal data and free movement of data issues. The legislation with which the AMANDA consortium must conform includes:

- The Universal Declaration of Human Rights
- The Convention 108 for the Protection of Individuals with regard to Automatic Processing of Personal Data
- The Directive 95/46/EC & Directive 2002/58/EC of the European parliament regarding issues with privacy and protection of personal data and the free movement of such data
- The Declaration of Helsinki on research involving human subjects
- Greek Law 2472/1997: Protection of Individuals regarding to the Processing of Personal Data
- Greek Law 3471/2006: Protection of personal data and privacy in the electronic telecommunications sector and amendment of law 2472/1997
- The Constitution of the Kingdom of the Netherlands, Article 10 Privacy.

The AMANDA project expects the development of a set of qualitative information collecting activities. In particular, interviews and questionnaires (Task 1.3) are planned. The double nature of consent appears again as both personal data and potentially sensitive information might be collected. Therefore, two issues become crucial from an ethical perspective: the confidentiality of the information and the anonymisation of personal data. The Code of Ethics of the International Sociological Association reminds researchers that "The security, anonymity and privacy of research subjects and informants should be respected rigorously" [3]. The sources of personal information obtained by researchers should be kept confidential, unless the informants have asked or agreed to be cited. Should informants be easily identifiable, researchers should remind them explicitly of the consequences that may follow from the publication of the research data and outcomes." [3]. From this article it is possible to extract some general rules that investigators must apply when designing and conducting their research:

- Information gathered from the participants should be kept confidential, unless specific consent to be cited is given by the participant.
- Information gathered should be anonymised and used only for the purpose for which it was collected.
- Participants must be informed when the investigator believes that some of the information shared may make them identifiable and the potential consequences.
- Participants must be given, in a clear and transparent manner, the opportunity to withdraw at any time and especially after being informed of their potential identification and potential the consequences.

In case the collected data contains personal information, data protection principles and legal requirements extracted from Regulation 2016/679 should be taken into consideration. In particular the investigator needs to put in practice organizational and technical measures directed to "minimising the processing of personal data, pseudonymising personal data as soon as possible, transparency with regard to the functions and processing of personal data, enabling the data subject to monitor the data processing" [4].

In case the collected data contains personal information, the responsible partner of the AMANDA project should apply the following rules:

- Information collected from the participants should be anonymised. Responsible partners of the Consortium will prepare a summary, of the conducted research's results. The raw information will be kept in local resources by the partners under their own responsibility and according to the data protection policies of their own organisations. Partners should pay special attention to the respect of the minimisation principle following article 89 (1) of Regulation 2016/679.
- Each task leader will collect the summaries and send them to the Ethics Helpdesk. The Ethics Helpdesk will review that no personal or sensitive information is contained in the summary, unless the participant has given specific consent. If needed, the Ethics Helpdesk can consult LEPPI during the process. The summary can be shared within the Consortium once this point is verified.
- The investigator must obtain specific consent from all the participants prior to their involvement in the different activities. The example of the consent template is provided in the Annex 1. The responsible partner should adjust provided template towards experiment.
- The task leader of each of the activities will propose to the Ethics Helpdesk a text containing the specific information concerning the activity. The Ethics Helpdesk will validate the specific Informed Consent Form before it is used with any participants. Informed consent must be obtained, in written form.
- Oral informed consent is highly discouraged. Although oral consent is legally valid, the data controller must be able to "demonstrate that the data subject has consented to processing of his or her personal data" (Regulation 2016/679, article 7.1). Therefore, investigators should only use this procedure when there is no other possibility and after having consulted with the Ethics Helpdesk. The Ethical Body will evaluate the situation, bearing in mind the potential value of the information that could be obtained from the participant.

Duly signed Informed Consent forms, both written and electronic or proof of the oral consent, should be kept by the controller for a 5 years period to be available for auditing by the Ethics Helpdesk or any competent authority.

The AMANDA project goal is to develop pervasive technology as described in the Section Overall technical objectives. Miniaturizing the electronic system is going to be safe and non-intrusive. The project goals are technical. Most of the collected datasets are going to describe electronic system behaviour e.g. power consumption, voltage stability, radio connectivity performance and others. The measurements, which are not related to the technical evaluation of the system, are foreseen to be related to environmental conditions. An investigated subject is exposed to the measured conditions. There is no intention to directly gather measurement from bodies of living creatures. Thus, there is no interaction between the electronic system and the body of the subject. The project does not have the aim to perform human trials. However, experiments where the device is placed in the room where people are present is considered. The project is not in the scope of Utilisation of Genetic Resources the Access and Benefit Sharing (ABS)

This check will be done prior to the data collection in the AMANDA study and the findings will be added to this report in Section 4.

4. Documentation of data collected in the AMANDA project during the M1 – M6 period

4.1. Context of the data collection

4.1.1. Voice of the customer data collection

IoT devices are nonstandard computing devices that connect wirelessly to a network and have the ability to transmit data. The IoT sector involves extending internet connectivity beyond standard devices, such as desktops, laptops and others, to any range of traditionally non-smart or non-internet-enabled physical devices and everyday objects. With applications in residential as well as industrial environments and the nonstandard nature of this technology, the need to acquire more data from the end-user point of view is increased. The AMANDA consortium is interested to investigate the variety of use case scenarios. The use cases where the ASSC can be implemented and used in. Thus, Voice of the Customer data acquisition plan is created.

In particular, a questionnaire was created by CERTH and PENTA as part of Task 1.2 System Requirements and Needs in order to complete Deliverable D1.3 Voice-of-the Customer, as part of the Industrial IoT application Section. The objective was to gather the end-user requirements from available industrial stakeholders, such as end users, product providers, suppliers and developers that have previously collaborated with anyone involved in the consortium. The industries were targeted by their interest in new ways to improve their business with the integration of new technologies.

The chosen platform to host the online questionnaires was Google Forms, due to previous experience of CERTH in data acquisition via questionnaires from relevant projects as well as the simplicity of the end reports. Anonymity of the answers was a critical priority. Therefore, no questions that could make the responsible employee identified were used. In fact, except from the company name and a single company contact email address, all questions in the form were strictly related to the IIoT subject and different use case scenarios.

The first Section of the questionnaire was focused on the currently used solutions by industrial partners. With these questions, important insight was gathered on the type of sensor data that is already being measured in industrial environments as well as the type of power supply and autonomy of the utilized monitoring systems. Lastly, recommendation on improvements on the state-of-the-art components were collected.

The next Section of the questionnaire was mainly informative as the AMANDA ASSC is presented, with brief description of all available sensors and a link to the project's official website. The most critical part of the online questionnaire was the third Section on AMANDA use cases. Here, each company was asked to construct an ideal sensor monitoring system, with a selection of the most appropriate and useful sensor types as well as additional hardware options. A brief application description was asked along with questions concerning the desired power management solution, wireless communication and data transfer specifications as well as potential size constrains.

Although there was not any personal information or confidential data questions included in the online questionnaire, AMANDA partners decided to request a written consent from all companies that participated, to share their answers in Deliverable D1.3. Due to time delays on the reply of the consent, no raw data and company details were included in the Deliverable. The AMANDA consortium collected and merged the answers into a final list to make good use of the acquired data. The list contained State-of-the-Art monitoring systems along with proposed use cases scenarios. In this way, anonymity was kept through the whole process and in the same time, useful results and information were shaped to be used for the Deliverable.

Use cases	ASSC functionality
Cargo transportation conditions	Collect information about temperature, CO_2/smoke levels, noise levels and distance from a set point to ensure proper conditions and safety for the cargo and its means of transportation.
Indoor asset tracking	Keep track of a company's high value assets and their condition
Worker comfort level monitoring	Ensure comfort levels for the employees to increase their efficiency and motivation
Workplace information delivery	Keep an overview of the working conditions to ensure the health and safety of the employees

Table 9 Use cases merged from the distributed questionnaires

4.1.2. Voice of the customer data collection

The primary purpose of data collection is to obtain the information needed to create an ASSC architecture. Information is collected from end users. To ensure a certain quality of information, it was necessary to explain the purpose and objectives of the project. The aim of the implemented activities was to collect as much information as possible about the needs and wishes of end users.

Besides the survey interviews were used as well. The interview was conducted as part of WP1. Results and analyses were published in the completed Deliverable D1.3 Voice of the Customer Completed.

Surveys and interviews do not contain ethical questions and no ethical questions arise. All surveys and interviews are fully aligned with the EU Regulation 2016/679 [5] containing General Data Protection Regulation (GDPR).

4.1.3. Specification of the required components data collection

Components data was collected as part of WP1 "System Specifications, Requirements and Use Cases". This includes data from components being developed as part of the AMANDA project (e.g. temperature, touch, CO_2, imaging sensor, solid-state battery, energy harvester, MCU, PMIC) but also data from state of the art, off-the shelves electronic components (RF chipsets and modules, additional sensors: accelerometer, Volatile Organic Compounds, Humidity, Light and others) and peripherals (timers, displays, memory and others). Each technological partner within the consortium has contributed to the required data based on its current expertise and on technology scouting (literature survey of patents, datasheets). The collected data was compiled into a spreadsheet document that comprised various tables of relevant technical specification parameters (electrical and mechanical), graphs (power consumption profiles) and electronic block diagrams (PMIC). The purpose of the document is to share the same level of information between all partners, regardless of the individual level of expertise, in order to mutually understand the current status of each respective technology and put these into perspective with the intermediate and final project specification targets. As such, it can be considered as an internal technical project roadmap. Finally, it is also a comprehensive comparison tool for assessing the various sensors, RF and loads that will be integrated into the ASSC. This reference document contains sensible and confidential information that is therefore only accessible by the AMANDA project partners. Any relevant non confidential information can then be included into the public deliverable documents (for example D1.2 or D1.3). The

spreadsheet document will be updated throughout the project and the latest version is regularly circulated to all partners by email and stored on a local Git repository.

4.2. Data collection

Ref. nr.	Responsible Partner	Data Type	Data collection	Data Format	Est. size	Software	Specific character
1	CERTH	Industrial IoT use case suggestions and SoA solutions	Company name and contact email, currently utilized monitoring systems, suggestions on type of sensors, power management and wireless communication specifications, size constrains, impact of the potential use of the AMANDA ASSC	Online questionnaire in a commercial platform. Multiple choice questions as well as text	21 questions in total	Google Forms platform	n/a
2	PENTA	Survey, interview	Gathering information through interview, email, project presentation, technical talk….	DOC, XLS	0,5Mb	MS-Office	Only personal information related to the occupation
3	Lightricity	Technical specification tables, graphs, block diagrams	Technical specification of all components on the AMANDA card: electrical and mechanical specifications, including power consumption and footprint	PPT	3-4 Mb	MS-Office	2 types of information: - Specific to the innovative technologies developed as part of AMANDA (Sensors, PV, Battery, PMIC, MCU) - More general information, e.g. related to state-of-the-art and off-the-shelf components (RF, displays, additional sensors, peripherals and others)

4.3. Data storage and back-up

Ref. nr.	Responsible Partner	Data type	Storage medium and location	Backup location and backup frequency

1	CERTH	Industrial IoT use case questionnaire answers	Original online spreadsheet document, created automatically by the Google Forms platform to gather all answers. Document was destroyed after the merge of the answers	No backup of data
2	PENTA	Survey, interview	Local drive, network drive	Daily backup, RAID array disk, external hard drives
3	Lightricity	Technical specification tables, graphs, block diagrams	Local drive, Git repository	Daily backup (local) Cloud storage (OneDrive) External hard drives

4.4. Data documentation

Ref. nr.	Responsible Partner	Data type	Naming convention	Metadata
1	CERTH	Industry IoT use case questionnaire answers	No naming convention needed	No metadata
2	PENTA	Survey, interviews	Database name: AMANDA project; folder name: Surveys; folder name: Interviews	n/a
3	Lightricity	Technical specification tables, graphs, block diagrams	No naming convention required	n/a

4.5. Data access

Ref. nr.	Responsible Partner	Data type	Access controller	Access management
1	CERTH	Industrial IoT use case questionnaire answers	Data removed after parsing. No access control required	Data removed after parsing. No access control required
2	PENTA	Survey, interviews	O. Vujičić	Access is limited to the controller
3	Lightricity	Technical specification of all components on the AMANDA card: electrical and mechanical specifications, including power consumption and footprint	M. Bellanger (local access) C. Kouzinopoulos (Git)	Access to the Git repository is limited to project partners (registration process and password required)

4.6. Data sharing and reuse

Ref. nr.	Responsible Partner	Data type	Sharing of data	Reuse of data
1	CERTH	Industrial IoT use case questionnaire answers	No sharing, data merged only for the purpose of D1.3 and deleted immediately after	No reusing of data is planned
2	PENTA	Survey, interviews	Only shared with stakeholders of the project	Reuse for all work packages development
3	Lightricity	Technical specification tables, graphs, block diagrams	Only shared with project partners (contains sensible and confidential information)	Reuse for all technical work packages (WP1-6)

5. Conclusions and future work

This report details the data management and ethics of the project. After a short introduction, Section 2 provides guidance on how to make Data Management Plans. Section 3 puts emphasis on ethical issues and refers European legislation related to ethics in research. Detail information of collected data in the AMANDA project is placed in Section 4. This Section can later be used to track all the generated data in the project. It therefore satisfies the need of reusability of the generated data required by directive 2013/37/EU.

During this project, no human trials are planned. However, data collection in form of questionnaires was conducted. Personal or sensitive data must be labelled as such. The data shall then only be stored, analysed and used anonymously. The individuals will be informed comprehensively about the intended use of the information collected from them. Participants shall give their permission for data collection for a scientific purpose, with their active approval in form of a written consent.

There is a potential for field tests, if time permits and lab testing is successful. These tests can include the deployment of prototypes at the location of end users for a preliminary evaluation of the ASSC. However, this decision will be made towards the end of the project. For each data set, ethical issues are considered separately in Section 4.1. The ethical aspect of each dataset is evaluated in the data description.

The data which will be generated during the project is mostly related to the performance of the electronic hardware. Section 4 describes and systematizes data originated form the project. The data management approach presented in this report mostly consists of labelling and describing the generated data. In this way the data can be tracked during and after the project's execution.

The data management plan & ethics document is an iterative report which will be updated repeatedly at months M18 (v2), M30 (v3) and M36 (v4). Future versions of the Deliverable will focus on the management of scientific data collected for the project and making them findable, accessible, interoperable and reusable. As a combined set of reports, it will document the progress of data generation and its storage. The data description should point ethical consideration towards the collected data. The data will be treated according to its sensitivity.

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Annex 1

Template of consent form for participant of AMANDA data collection trials

GENERAL TERMS AND CONDITIONS AND PRIVACY POLICY – AMANDA PROJECT TRIAL PARTICIPANT

.....full company name..... operating under the auspices of the .....authority name..... government, whose registered office is situated at ...Company Address....., conducts various scientific, working closely with other institutions and/or companies.

As a participant, you will be working with one or more **scientific research projects** to which the following **rights and obligations** apply. These rights and obligations apply for all of the (future) ..... company name..... research projects on which you will be collaborating. To be able to take part in the AMANDA research projects, you are required to agree with these terms and conditions.

PARTICIPATION

Participating in our projects

Your **participation in our project is voluntary and of your own free will**. You have the right at any time to cancel your collaboration, without having to give a reason. You may do so very simply in writing to .....email....., after which we will process your cancellation as quickly as possible.
In addition, you can also expressly request that the personal data gathered by us in your personal profile be amended in our databases, or you can have it deleted from our records. Please send your requests to .....email.....,.
To be able to participate, please indicate that you will be 16 years of age or older at the time your participation in the projects commences. If you have not yet reached the age of 16, you will require the express permission of (one of) your parents or guardian in order to take part in our projects.

What your participation involves?

As a participant, you will be taking part in research activities. This will involve you providing us with your suggestions, comments and other **feedback** via questionnaires, field tests, co-creations (group discussions) and other events **about the innovative products and/or services presented to you or made available to you.**
Feedback can take various forms, such as ideas, knowledge, insights knowhow, presentations, drawings or anything else, either in spoken or written form.
As a participant, you grant the principal(s) of our scientific research projects the right to use this feedback for the development or commercialization of products or services.
As a participant, you are not permitted to make **any arrangements regarding any form of recognition or remuneration for the use of your feedback by the project principal**. At the same time, you do not give any guarantees regarding your feedback and any use of it by the project principal(s) will be entirely at its/their own risk.

What data do we collect?

We gather the following personal data about you:

- 'ordinary' data, such as your name, date of birth, address, age, etc.
- information about your use of the products and/or services.
- any sound, video and/or picture recordings taken of you as part of our projects.
- data about the content that you create (e.g. text messages, tweets, photos, etc.).

PRIVACY

Protecting your privacy

..... company name....., is the party responsible for the processing of your Personal Data. ..... company name..... processes your feedback and personal data in accordance with the General Data Protection Regulation (EU) 216/679.

Why do we collect your data?

All personal data gathered during our projects will **be used only in the context of our research projects** and to gather statistics about our organization.

However, you do give us permission to take photos and/or video clips of your participation and, where applicable, use them for one of our projects. If we do so, you relinquish all rights to them.

Who will have access to your personal data?

To avoid any misunderstanding, here is a short explanation about the individuals, companies or organizations that will have access to your personal data:

- our own researchers and/or employees, as well as researchers and/or employees acting on our behalf, only if they require such access for the purposes described.
- employees of the companies and organizations with which we work in the context of (one of) our scientific research projects, exclusively for assistance and support (e.g. an installer who needs to come to your home in order to install an innovative product)
- Some of these parties receiving your personal data might be located outside the European Economic Area (EEA), such as in the United States. However, ... company name..... will ensure that your data has proper protection at all times and hence it will only be sent to countries or corporations that are able to guarantee equivalent protection (for example, these corporations fall under the EU-US Privacy Shield).

Your personal data

We gather your data under the lawful basis of consent. You always have **the right to retract your consent.** You also have the right to restriction of processing, right to data portability and right to object.
You have **the right at all times to access your Personal Data**. You can also ask us to amend any data that is incorrect or request us to delete all of your data. You can do this simply by sending an e-mail to .....email.....or by sending your request by post to …Company Address……, where you can also ask us to delete your data from our records.
When making a request, please attach a copy of your identity card so that we can be sure we do not delete and/or amend any data inadvertently without you wanting us to do so.

Storage period
Your personal data will be stored for up to 5 years after the most recent collection.
CONFIDENTIAL INFORMATION & NON-DISCLOSURE

In the context of your participation in our projects, it may be that you gain access or come into possession of confidential information. **We consider the following as confidential information**:

- The service(s) or product(s) about which feedback is gathered.
- The test results from our research.
- All information and data that we share in the context of our products, such as inventions, specifications, models, formulas, programs, plans, drawings, norms and standards, financial data, business and manufacturing secrets and all intellectual property rights for which the rights of title belong to us or for which we have acquired the right of notice or transfer.

Should you come into the possession of or gain access to any such confidential information, we expect you to take **all reasonable precautionary measures** to ensure that this information remains confidential. This means, among other things, that you will not disclose this confidential information to others or allow other people access to it without our prior written consent. Naturally, you **may not use this confidential information for purposes other** than your participation in our projects.

Questions

You can always send any questions and/or comments you may have to us via the following e-mail address: .....email....., or by telephoning ….phone nr….. or by post to the following address: *…Company Address…..*,.

This agreement contains all of the proper arrangements that exist between you and us in connection with the matters governed by this agreement. It replaces and supersedes any other agreements between you and ..... company name..... that may have existed previously with regard to these matters.

By signing this document, you accept the general terms and conditions detailed above for taking part in one of the ..... company name..... research projects. We reserve the right to adjust these Terms and Conditions.

Surname & First name:	Locality:
Signature:	Date:

The purpose of the research is related to the objectives of the project “AMANDA: autonomous self powered miniaturized intelligent sensor for environmental sensing and asset tracking in smart IOT environments”

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