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Leap in Advancing of critical Quantum key distribution-spAce components (LaiQa)

Deliverable D10.3

Initial Data Management Plan

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List of abbreviations

AGA	Annotated Grant Agreement
APCs	Author Processing Charges
CA	Consortium Agreement
DMP	Data Management Plan
DOI	Digital Object Identifier
DSP	Digital Signal Processing
EC	European Commission
ECL	External Cavity Laser
EML	External Modulated Laser
EPPS	Entangled Photo Pair Source
EU	European Union
EOSC	European Open Science Cloud
FAIR	Findable, Accessible, Interoperable, Re-usable
FSO	Free-space optical
GA	Grant Agreement
GEO	Geostationary Earth Orbit
HTTP	Hypertext Transfer Protocol Secure
IA	Innovation Action
ICT	Information and Communication Technology
InM	Innovation Manager
InMC	Innovation Management Committee
IPR	Intellectual Property Rights
DS-BB84	Decoy-State BB84
QBER	Quantum Bit Error Rate
SKR	Secure Key Rate
OA	Open Access
OAI-PMH	Open Archives Initiative Protocol for Metadata Harvesting
OGS	Optical Ground Station
OKD	Optical Key Distribution
PC	Project Coordinator
P&M	Prepare and Measure
QKD	Quantum Key Distribution

Executive Summary

This document provides the initial version of the Data Management Plan (DMP) to be implemented by LaiQa project team. The LaiQa DMP is a deliverable of WP10, and more than is a document that prescribes how LaiQa contributes to the Horizon Europe objectives for Open Research Data Pilot, introduced in aiming to improve and maximize access to and re-use of research data generated by projects. In line with this decision, in this initial phase LaiQa has identified several data sets which will be generated within the project and shared with the research community.

One of the objectives of the project is to improve the exchange and dissemination of research results and possibly to enable and promote a wider validation of the project results and to encourage a fair comparison and evaluation of different solutions in the technical areas of LaiQa. It should be mentioned that the LaiQa project has been subject to security scrutiny. Following the guidelines of SAB, it is expected that any kind of sensitive information generated within LaiQa will be treated accordingly. Moreover, the DMP will be monitored by the LaiQa SAB and the open research datasets will be also reviewed by the board.

The Data Management Plan deals with all the concerns about the treatment of the data that will be collected, processed or generated in the whole project lifecycle and has been structured in compliance with the guidelines and the template conveyed by the European Commission.

Hereafter are reported the main aspects that will be considered in the Data Management Plan, for each of the data set identified in the project:

- Types of data generated, collected or processed
- Standards used to manage data
- Data exploitation methodology
- Accessibility to data produced by the Project
- Data Dissemination level
- Data Preservation and re-use

The DMP is a 'live' document in which the respective information will be made available on a finer level of granularity through updates as the implementation of the project progresses and when significant changes occur. This document is the first version of the DMP, providing an initial description of the expected data sets and their management plan, while more details and potentially further data sets might be added during the course of the project implementation. The document will be maintained active and regularly updated with additional data sets or details about the existing ones during the total duration of the project.

Keywords: Data Management Plan (DMP), open science, FAIR (Findable, Accessible, Interoperable, Re-usable data), Dissemination level, data sets, research data management, quantum cryptography, satellite communications payload and systems

Definitions of Terminology

Dataset: Digital information created in the course of research, but which is not a published research output. Research data excludes purely administrative records. The highest priority research data is that which underpins a research output. Research data do not include publications, articles, lectures or presentations.

Background: any data, know-how or information — whatever its form or nature (tangible or intangible), including any rights such as intellectual property rights — that is:

(a) held by the beneficiaries before they acceded to the Agreement and

(b) needed to implement the action or exploit the results**.**

Results: any tangible or intangible effect of the action, such as data, know-how or information, whatever its form or nature, whether or not it can be protected, as well as any rights attached to it, including intellectual property rights.

Data Management Plan (DMP): A formal working document which outlines how datasets will be handled both during the active research phase and after the project is completed. DMPs in some forms are now a requirement of a research project and therefore must be addressed at the earliest phase of the research lifecycle.

Digital Object Identifier (DOI): A persistent identifier or handle used to identify objects uniquely and to direct communications to the correct server, developed by the International DOI Foundation. An implementation of the Handle System, DOIs are in wide use mainly to identify academic, professional, and government information, such as journal articles, research reports and data sets, and official publications.

Metadata: Information about datasets stored in a repository/database template. For example, an image may include metadata that describes how large the picture is, the color depth, the image resolution, when the image was created, and other data. A text document's metadata may contain information about how long the document is, who the author is, when the document was written, and a short summary of the document.

Repository: A digital repository is a mechanism for managing and storing digital content. Repositories can be subject or institutional in their focus.

Zenodo: A general-purpose open-access repository (https://about.zenodo.org) developed under the European OpenAIRE program and operated by CERN. It allows researchers to deposit data sets, research software, reports, and any other research related digital artifacts. For each submission, a persistent digital object identifier (DOI) is minted, which makes the stored items easily citable.

1 INTRODUCTION

The Horizon Europe framework recommends that a Data Management Plan ('DMP') is established and regularly updated. The scope of the DMP is to describe how to select, structure, store and make FAIR (Findable, Accessible, Interoperable and Re-usable), the "background" information used and the project "results" generated during the project lifecycle.

The present deliverable is the Initial Data Management Plan for LaiQa project and it is structured along the guidelines of Data Management Plan (HE) template[1]. In completing the sections of the template the requirements on "Intellectual Property Rights- Background and Results-Access Rights and Rights of Use" as stipulated in Article 16, as well as the "Communication, Dissemination and Visibility" requirements as stipulated in Article 17 in the Annotated Grant Agreement, are taken into account.

Horizon Europe framework has adopted the **Open Science** approach in its Data Management strategy - that is based on open cooperative work and systematic sharing of knowledge and tools as early and widely as possible. The Open Science approach aims at increasing the quality and efficiency of research and accelerate the advancement of knowledge and innovation by sharing results, making them more reusable and improving their reproducibility. Open Science and Open Access requirements and how LaiQa fulfils them are discussed in this document.

Furthermore, the DMP contains information related to (i)the types of data the project will collect, use and generate, (ii) the data standards to be employed and (iii) how project partners may disseminate and exploit project results. The DMP deliverable also reports on the data sets that will be made available in open repositories together with the necessary reference details for accessing the open data.

More specifically, the DMP identifies:

- What types of data will be generated and/or collected,
- What data will be exploited/and which will be the data dissemination level,
- What standards will be used to manage data/ metadata,
- How will data be preserved, during and after project completion.

This document provides an initial description of the expected data sets and their management plan, while more details and potentially further data sets might be added during the project implementation. The document will be maintained active and regularly updated with additional data sets or updates on the existing ones. As a minimum, updated versions of the DMP document will be released with D10.4- Updated Data Management Plan, due in M18 and D12.3 - Final Data Management Plan, due in M36.

[1] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/reference-documents?programmePeriod=2021-2027&frameworkProgramme=43108390

2 LAIQA – PROJECT OVERVIEW

LaiQa is a 36 - month Research Programme part of the HORIZON Innovation Actions funded by the European Commission, through the European Health and Digital Executive Agency. It is launched on 1 January 2024.

LaiQa's scope is to develop and enhance critical components and technologies necessary to build a global spaced-based quantum network. LaiQa envisions to realize unconditionally secure quantum communications over long distances integrating functional QKD components with advanced system integration techniques, into deployable space-QKD systems. The project's objectives include the development of space-deployable, high-brightness 1550 nm entangled photon pair source (EPPS), a space-suitable Decoy State - BB84 Prepare and Measure (P&M) source, a photonic integrated EPPS for next-generation on-board sender stations, a quantum memory for long-distance entanglement distribution, an advanced fibercoupling/ adaptive optics system for converged space/terrestrial QKD segments, and software components towards the optimization of LaiQa architecture. The project will demonstrate P&M- and entanglement based QKD systems both in lab/terrestrial FSO testbeds and in field demonstrations in Helmos optical ground station (OGS). LaiQa will also mobilize its consortium to prioritize standardization activities with focus on space components for P&M- and entanglement-QKD.

3 LAIQA – DATA MANAGEMENT PLANNING

The present section describes the plans of LaiQa consortium for the management of the different sets of research data that will be produced, collected and used for internal processing and validation in the project.

3.1 Open Science Approach by LAIQA

LaiQa will apply the Open science policies as prioritised by the Horizon Europe framework. Open science practices will be applied to ensure that research data, of all sorts, generated in the course of the project is Findable, Accessible, Interoperable, and Reusable (FAIR). This means that interested parties – academia, industry, end users, civil society will be able to search for, find and access research as well as to understand and use the research data. This access will help in maintaining and checking the quality of research conducted in the framework of the project, but also will offer an opportunity to interact with interested communities .

Open Science Practices

Open science practices include early and open sharing of research output(for example through preregistration, registered reports, pre-prints, or crowd-sourcing); research output management; measures to ensure reproducibility of research outputs; providing open access to research outputs (such as publications, data, software, models, algorithms, and workflows); participation in open peer-review.

In the framework of Horizon Europe a couple of open science practices are identified as mandatory, such as:

(i) open access to scientific publications,

(ii) responsible management of research data in line with the FAIR principles of 'Findability', 'Accessibility', 'Interoperability' and 'Reusability', under the principle 'as open as possible, as closed as necessary',

(iii) information about the research outputs/tools/instruments needed to validate the conclusions of scientific publications or to validate/re-use research data,

(iv) digital or physical access to the results needed to validate the conclusions of scientific publications, unless exceptions apply,

(v) in cases of public emergency, if requested by the granting authority, immediate open access to all research outputs under open licenses or, if exceptions apply, access under fair and reasonable conditions to legal entities that need the research outputs to address the public emergency.

However, due to IP or commercial considerations, may not all data/tools/methods be at open access. Potential restrictions to open access will be evaluated on a case-by-case basis. In cases that immediate open access is not recommended, consortium is committed to deposit research data and outputs retrospectively in repositories and provide open access the earliest possible.

In the remaining of this section, the how those practices are applied by LaiQa is discussed.

3.1.1 Open access to publications

The first aspect to be considered in the DMP is related to the open access (OA) to the publications generated within the context of the project and made available online to any user at no charge. In line with the Horizon Europe guidelines on open access to scientific publications, the publications that will arise from the LaiQa project will be made public through the following two channels:

a) **Open access publishing** (also referred to as **'Gold' open access**) means that an article is immediately placed in open access mode (on the publisher/journal website). In this option, beneficiaries publish their results in open access journals, or in hybrid journals that sell subscriptions and offer the possibility of making individual articles openly accessible via the payment of Author Processing Charges (APCs). LaiQa will preferably target 'Gold' open access journals which apply article processing charges for the article to be published and then it is freely available online via the Open Access journal site.

b) **Self-archiving** (also referred to as **'green' open access**). The project will use widely self-archiving (or green open access) services for research community like ResearchGate or Academia, that will allow balance between traditional publications and open-access. In this option, the beneficiaries deposit the final peer-reviewed manuscript in an online repository of their choice (e.g. Zenodo). If this route is chosen, the beneficiaries will ensure open access to the publication within a maximum of six months, in-line with the open access obligations established by the EC.

The consortium partners will use the **Open Research Europe** publishing platform to enable direct publication of the research outputs in support of research integrity, reproducibility, transparency and open science practices. We should note here that there may be cases where the project participants, may need to submit articles to journals (or proceedings) that only offer a lower level of open-access, requiring either parallel publication or an embargo period.

Additionally, whenever possible the LaiQa consortium will retain the ownership of the copyright for their work using a 'License to Publish', which is a publishing agreement between author and publisher. With this agreement, authors can retain copyright and the right to deposit the

article in an Open Access repository, while providing the publisher with the necessary rights to publish the article.

All publications will acknowledge the project funding. This acknowledgment will be included also in the metadata of the generated information since it allows to maximize the discoverability and visibility of publications and to ensure the acknowledgment of EU funding.

Metadata of deposited publications will be open under a Creative Common Public Domain Dedication (CC 0) or equivalent, in line with the FAIR principles (in particular machine actionable) and provide information at least about the following: publication (author(s), title, date of publication, publication venue); Horizon Europe ; grant project name, acronym and number; licensing terms; persistent identifiers for the publication, the authors involved in the action and, if possible, for their organisations and the grant. Where applicable, the metadata will include persistent identifiers for any research output or any other tools and instruments needed to validate the conclusions of the publication(GA, Article 17)

To ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication, the metadata must be in a standard format and will include all of the following:

- the terms "European Union (EU)" and " Horizon Europe";
- the Name of the action, the Acronym and Grant Number;
- the publication date and length of embargo period (if applicable), and
- a persistent identifier (e.g. DOI)

3.1.2 Research Data Management

Apart from the open access to publication explained in the previous section, LAIQA will adopt the European Open Science Cloud (EOSC) as the trusted environment for hosting and processing research data. The EOSC portal capabilities will be explored and embraced as a medium to underpin the open access research policy. In specific, two types of data sets are defined:

Background: any data, know-how or information (tangible or intangible), including any rights such as intellectual property rights, that already exist or have been already generated and reported by other research initiatives or held by the consortium members from their own research and development activities prior or in parallel with the project and which might be used as inputs in LaiQa in implementing the project or exploiting its results. LAIQA will act only as recipient of this type of data and, if just re-used "as-is", the project will not define any specific strategy for their management which is already handled by other organizations.

Results: any data, know-how (tangible or intangible) - whether or not it can be protected, as well as any rights attached to it, including IPRs - that is produced as a result of project activities.

Before a dataset is deposited in an open access repository, the partner(s) responsible for uploading and preserving the data will seek consent for data preservation and sharing from all partners involved (according to the provisions of the CA and with the guidance of the Innovation Management Committee [InMC]). The respective partners, in collaboration with the Project Coordinator (PC) and the Innovation Manager (InM) will be responsible for postponing or restricting data sharing to allow enough time for publishing the results in peer-reviewed journals or for seeking patents. To facilitate handling of datasets especially where multiple partners are involved, to expedite data dissemination and ensure that no ethical issues are associated to the respective datasets, the process will be overseen by the InMC.

3.2 FAIR (Findable, Accessible, Interoperable, and Reusable) data

Data and research outcomes generated by LaiQa activities will be managed and curated in line with the FAIR principles. In summary, the application of FAIR principles for LaiQa generated data, i.e. publications, simulation data and experimental data as identified in DoA, is as follows:

For Publications

F: Reputable publications**, A**: Either green open access or gold open access, will be stored in reputable repositories such as Zenodo**, I:** Easily accessible online, downloadable, and printable in machine-readable formats like standard text files. Bibliographic metadata, including project terms, name, acronym, grant number, publication data, and persistent identifiers, will be utilized**, R:** The project will make every effort to allow copying, distribution, searching, linking, crawling, and mining as necessary**. Curation**: By the author, Article Processing Charges (APCs) for gold open access have been included in partners' other costs where applicable.

For Simulation Data from components/sub-system modelling activities

F: Types of persistent, unique identifiers (e.g., digital object identifiers); deposited in trusted repositories e.g. Zenodo,

A: Open access over standard protocols (e.g., HTTP and OAI-PMH); IPR considerations and timeline for open access; provisions for access to restricted data for commercial exploitation and/or verification purposes,

I: Standards, formats and vocabularies for data and metadata; accompanied with a "README" file describing any of the relevant information to a specific dataset,

R: Licenses for data sharing and re-use (e.g., Creative Commons, Open Data Commons); availability of tools/software/models for data generation and validation/interpretation/reuse. Storage/preservation costs; person/team responsible for data management and quality assurance.

For Experimental data from components/sub-system characterization and demonstrators testing

F: Types of persistent and unique identifiers (e.g., digital object identifiers); deposited in trusted repositories e.g. Zenodo

A: Open access over standard protocols (e.g., HTTP and OAI-PMH); IPR considerations and timeline for open access; provisions for access to restricted data for commercial exploitation and/or verification purposes,

I: Standards, formats and vocabularies for data and metadata; accompanied with a "README" file describing any of the relevant information to a specific dataset,

R: Licenses for data sharing and re-use (e.g., Creative Commons, Open Data Commons); availability of tools/software/models for data generation and validation/interpretation /re-use. Storage/preservation costs; person/team responsible for data management and quality assurance.

3.2.1 Making data findable, including provisions for metadata

For the open datasets, a Digital Object Identifier (DOI) will be assigned to datasets for effective and persistent citation when it is uploaded to the repository [Zenodo]. This DOI can be used in any relevant publications to direct readers to the underlying dataset.

Each dataset generated during the project will be recorded in an Excel spreadsheet with a standard format and allocated a dataset identifier according to Table 1. The owner of each dataset will be responsible for the creation of the spreadsheet associated with the generated dataset, while ICCS (Project Coordinator) will be responsible for gathering and preserving the information of all the dataset in its local repository.

LaiQa naming convention for project datasets will comprise of the following:

- A unique chronological number of the datasets in the project will be added;
- The title of the dataset;
- A prefix " LaiQa " indicating an LaiQa dataset.
- A unique identification number linking with the dataset work package e.g., "WP2".
- For each new version of a dataset it will be allocated with a version number which will be for example start at v1.0;

Search keywords will be provided when the dataset is uploaded to Zenodo, which will optimize possibilities for re-use. Zenodo follows the minimum Data Cite metadata standards.

The information and metadata stored in the record-spreadsheet for each generated dataset is summarized in Table 1 below.

Table 1: Data Set record

Data set Reference Name	*The reference name will be based on the naming convention outlined above in Paragraph* 3.2.1
Description	*Description of the Dataset*
Standards and Metadata	In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions. The following fields will be used:
	1. Dataset Title *The title of the dataset which should be easily searchable & findable*
	2. Name(s) of dataset creator(s) *Lead partners responsible for the creation of the dataset* **3. Description of Data** *Brief description of the open data to be included in the metadata* **4. Data Source** *How/why was the dataset generated.* **5. Creation Date** *Date of generation of the dataset* **6. Format** *Possible formats of the datasets e.g. DOC, XLSX, PDF, JPEG, TIFF, etc* **7. Expected size** Approximate size of the dataset **8. Location of Data** Institutional repository where the data are stored. **9. Digital Object Identified (DOI)** *The DOI can be entered once the dataset has been deposited in the repository*

Data set Reference Name	*The reference name will be based on the naming convention outlined above in Paragraph* 3.2.1
	10. Access status Type of Dataset "Open" or "Restricted" **11. Embargo** Embargo period of the dataset (if applicable) **12. Funding Statement** This project has received funding from the European Union's Horizon Europe Framework Programme (HORIZON) under G.A No 10113524. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains. **13. Work Package** *LaiQa Work Package associated with this dataset* **14. Related publications** Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text. **15. Dataset Citation** A 'ready-to-use' citation reference for the dataset will be provided –incorporating the core descriptive elements. **16. Keywords** Dataset related Keywords **17. Version number** Dataset version number in order to keep track of changes to the dataset
Data sharing **Archiving and preservation**	♦ **Repository** Expected repository to be submitted. ♦ **Date of Repository Submission** *The date of submission to the repository will be added once it has been submitted* For redundancy, besides uploading the data on Zenodo it will be also maintained on a university-owned storage server at ICCS (PCRL group). The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The dataset will be preserved for at least 5 years after the project end and the associated costs will be covered by ICCS through own funds.

3.2.2 Making data openly accessible

Research data that are created during the project are owned by the beneficiary that generates them (G.A. Article 16). Each beneficiary must disseminate its results as soon as possible unless there is legitimate interest to protect the results. A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries — unless agreed otherwise — at least 45 days, together with enough information on the results it will disseminate (G.A. Article 17).

Generated research data will be deposited as follows:

- ⇨ ***Restricted data*** will be deposited in the repository of the partner that owns it.
- ⇨ ***Data accessible by the consortium members only*** will be deposited in the SharePoint Documents Repository of LAIQA (Private area for consortium members only). More

specifically a folder(-s) will be setup in the project's private area, for easy upload of project datasets visible to the consortium members.

- ⇨ ***Open data*** will be deposited in Zenodo repository. Zenodo.org is open, free, searchable and structured with flexible licensing allowing for storing all types of data: datasets, images, presentations, publications and software. In addition, Zenodo repository allows researchers to deposit both publications and data, while providing tools to link them.

LaiQa project has chosen to use Zenodo.org as the repository for storing the open project data for the following reasons:

- ✓ It enables Shared Research through the reposition of all research outputs from across all fields of research and science;
- ✓ It is Citeable and Discoverable: uploads get a Digital Object Identifier (DOI) to make them easily and uniquely citeable;
- ✓ It fosters the establishment and curation of research Communities through the creation of digital repositories, fully controlled by the owner;
- ✓ Allows the identification of grants, integrated in reporting lines for research funded by the European Commission via OpenAIRE;
- ✓ Allows for Flexible licensing and,
- ✓ Ensures security of the stored research results for the future in the same cloud infrastructure as CERN's own LHC research data.

Data objects will be deposited in Zenodo under:

- Open access to data files and metadata and data files provided over standard protocols such as HTTP and OAI-PMH
- Use and reuse of data permitted
- Privacy of its users protected

For the data being deposited in an external repository (i.e. Zenodo), a dataset registry record will also be created in LAIQA Documents Repository. The registry record will be updated by the partner that is responsible for the specific generated data and will include relevant metadata explaining what data exists and a DOI linking to where the data is available in the external repository.

During embargo periods, information about the restricted data will be published in the data repository, and details of when the data will become available will be included in the metadata. Where a restriction on open access to data is necessary, attempts will be made to make data available under controlled conditions to other individual researchers. In accordance with G.A. Article 25, data must be made available to partners upon request, including in the context of checks, reviews, audits or investigations. Data will be made accessible and available for re-use and secondary analysis.

In parallel to the available Open Research Datasets, several restricted datasets will be generated within the project. These datasets that contain critical details on LAIQA developments will be protected in a restricted area. Each LAIQA partner is responsible to identify these datasets, to communicate with the consortium the updates on these datasets. Of course, these datasets can be moved from restricted area to the Open Data zone of LAIQA if their owners select to partially or fully release them. This change will be resembled in the Data Management Plan of the project.

3.2.3 Making data interoperable

LaiQa project shall collect and document the data in a standardized way to ensure that, the datasets can be understood, interpreted and shared in isolation alongside accompanying metadata and documentation.

Generated data will be preserved either in the LaiQa SharePoint Documents Repository or in the institutional intranet platforms until the end of the Project (see Section 8).

a) General Information

- Title of the dataset
- Dataset Identifier
- Responsible Partner
- Author Information
- Date of data collection
- Geographic location of data collection
- Title of project and Funding sources that supported the collection of the data

b) Sharing/Access Information

- Licenses/access restrictions placed on the data
- Link to Data Repository
- Links to other publicly accessible locations of the data
- Links to publications that cite or use the data

c) Dataset/File Overview

- This dataset contains X sub-dataset as listed below:
- What is the status of the documented data? – "complete", "in progress", or "planned"
- Are there plans to update the data?

d) Methodological Information

- Description of methods used for experimental design and data collection: <Include links or references to publications or other documentation containing experimental design or protocols used in data collection>
- Methods for processing the data: <Describe how the submitted data were generated from the raw or collected data>
- Instruments and software used in data collection and processing-specific information needed to interpret the data
- Standards and calibration information, if appropriate
- Environmental/experimental conditions
- Describe any quality-assurance procedures performed on the data
- Dataset benefits

An indicative example of a metadata file can be found in Appendix I of the present document.

3.2.4 Increase data re-use (through clarifying licenses)

The open datasets will be made available for re-use through uploads to the Zenodo community page for the project. In principle, the data will be stored in Zenodo after the conclusion of the Project without additional cost. All the research data will be of the highest quality, have long-term validity and will be well documented in order other researchers to be able to get access and understand them after 5 years.

If datasets are updated, the partner that possesses the data has the responsibility to manage the different versions and to make sure that the latest version is available in the case of publically available data. Quality control of the data is the responsibility of the relevant responsible partner generating the data.

4 DATA SUMMARY

LaiQa will produce several datasets during the lifetime of the project. The data will be quantitative and qualitative and analyzed from a range of methodological perspectives for project development and scientific purposes. These will be available in a variety of easily accessible formats, including Postscript (PDF, XPS), Excel (XLSX, XLS, CSV), Word (DOCX, DOC, RTF), Power Point (PPTX, PPT), image (JPEG, PNG, GIF, TIFF), compressed formats (TAR.GZ, MTZ).

The table below summarizes the data that is foreseen to be generated during the implementation of LaiQa project. They are listed under each of the Work Package taken from the GA Annex 1 – Description of Action (DoA). The datasets will have the same structure, in accordance with the guide of Horizon Europe for Data Management.

Table 2: Summary of the Data Sets foreseen to be generated at the Initial DMP

Data Description	Related Deliverable (s)	Type	Format	Estimated Volume	Access	IPR Owner
WP2. Definition of Use Cases, Specifications and Requirements						
Feasibility analysis for selected scenarios and LaiQa usecases.	D2.3		Notebook (.txt file), excel (.xlsx) and PDF files	< 100 MB	Public (Zenodo)	ICCS
Technical Specifications for the entire LaiQa ecosystem, including HW and SW components	D2.1		Excel files (.xlsm, .xlsx)	<100MB	Restricted (Stored at qssys data storage facilities	qssys
Definition of assembly process for space-qualified sources and functional/environmental test plans	D2.4		Word documents (.docx) and pdf files (.pdf)	<50MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs
Selected set of simulations for scenarios or parts thereof as a benchmark and/or input to the ICCS simulation results described above based on the TNO toolchain.	D2.3		Notebook (.txt file), excel (.xlsx) and PDF files	< 100 MB	Restricted (Stored at internal TNO data management clusters)	TNO
WP3. Technology development of on-board quantum sources						
Detailed design of the EPPS on-board source	D3.1		Figures (.jpeg/.png), pdf files, Word documents(.docx)	<100MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs
Detailed design of the P&M on-board source	D3.2		Figures (.jpeg/.png), pdf files, Word documents(.docx)	<100MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs
Assessment of components for EPPS	D3.3		Figures (.jpeg/.png), pdf files, Word	<100MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs

Data Description	Related Deliverable (s)	Type	Format	Estimated Volume	Access	IPR Owner
			documents(.docx)			
Assessment of components for P&M source	D3.3		Figures (.jpeg/.png), pdf files, Word documents(.docx)	<100MB	Restricted (Stored at qssys data storage facilities)	qssys
WP4. Technology development of next-generation space quantum internet components						
Detailed report on the fabrication feedback progress enabling high-performance photonic integrated circuit-based entangled photon-pair source.	D4.1	Plain text, figures, database	Word documents (.docx) and figures (.png)	100MB> <1GB	Restricted (Stored at internal TNO data management clusters)	TNO
Datasets, descriptions, and figures from calibration and characterization of the quantum memory setup's subsystems.	D4.2		Notebook (.txt file), Excel (.xlsx) and PDF files, Figures (.jpeg/.png)	<100 MB	Restricted (Stored at internal TNO data management clusters)	TNO
Datasets, descriptions, and figures generated during calibration and evaluation of the memory preparation phase of the experimental cycle.	D4.2		Notebook (.txt file), Excel (.xlsx) and PDF files, Figures (.jpeg/.png)	<100 MB	Restricted (Stored at internal TNO data management clusters)	TNO
Datasets, descriptions, and figures generated during calibration and evaluation of the memory storage protocol. Storage time and efficiency metrics with weak coherent pulses of various bandwidth and intensity.	D4.2		Notebook (.txt file), Excel (.xlsx) and PDF files, Figures (.jpeg/.png)	<100 MB	Restricted (Stored at internal TNO data management clusters)	TNO
Detailed report on the design and interface definition for the interfacing between a PIC-EPPS photonic qubit and an absorptive quantum memory. Performance estimation based on theoretical calculations and comparison with experimental data.	D4.3	Plain text, figures, database	Word documents (.docx) and figures (.png)	<100MB	Restricted (Stored at internal TNO data management clusters)	TNO

Data Description	Related Deliverable (s)	Type	Format	Estimated Volume	Access	IPR Owner
WP5. LaiQa's components integration and subsystems for converged fiber/space networks						
Design and engineering models of hybrid POGS suitable for both classical and QKD links.	D5.2		Figures (.jpeg/.png), pdf files	< 300 MB	Restricted (Stored at ICCS data storage facilities)	ICCS
Detailed report on the design of the LaiQa Receiver Breadboard (LRBB), including Adaptive Optics pre-correction for improved free space to fiber coupling efficiency.	D5.3	Plain text, figures, database	Word documents (.docx) and figures (.png)	100MB> <1GB	Restricted (Stored at internal TNO data management clusters)	TNO
Detailed Design of the architecture for the Optically Switched quantum network.	D5.4		Notebook (.txt file), Excel (.xlsx) and PDF files, Figures (.jpeg/.png)	< 100 MB	Restricted (Stored at internal NKUA data storage facilities)	NKUA
WP6. LaiQa software components and models for optimized secure key rates						
Optical key distribution design & simulation files	D6.1	Figures & source code	Python/Matlab source files, Figures (.jpeg/.png)	< 100 MB	Restricted (Stored at internal TU/e data storage facilities)	TU/e
OKD secure key rate simulator	D6.2		Binary	< 100 MB	Open access (LaiQa Website / Zenodo)	TU/e
Optimized coding scheme	D6.2	Figures & source code	Python/Matlab source files, Figures (.jpeg/.png)	< 100 MB	Restricted (Stored at internal TU/e data storage facilities)	TU/e
WP7. Technology development and testing of space-qualified on-board sources						
Prototype of EPS Documents: Implementation and Assembly Plan, Test Plan, Test Report	D7.1	DEM	Figures (.jpeg/.png), pdf files, Word documents(.docx)	< 300 MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs

Data Description	Related Deliverable (s)	Type	Format	Estimated Volume	Access	IPR Owner
Engineering model of the P&M source: Implementation and Assembly Plan, Validation Test Plan, Validation Test Report	D7.2	DEM	Figures (.jpeg/.png), pdf files, Word documents(.docx)	< 300 MB	Restricted (Stored at qssys data storage facilities)	qssys
P&M source tested in relevant Environment: Qualification Test Plan, Qualification Test Report	D7.3		Figures (.jpeg/.png), pdf files, Word documents(.docx)	< 100 MB	Restricted (Stored at qssys data storage facilities)	qssys
EPPS tested in relevant Environment: Qualification Test Plan, Qualification Test Report	D7.3		Figures (.jpeg/.png), pdf files,)	< 100 MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs

WP8. Technology Integration and Demonstration of LaiQa's prototypes and network segments						
Data Description	**Related Deliverables**	**Type**	**Format**	**Estimated Volume**	**Access**	**IPR Owner**
Definition of testing methodologies and testbed setups configuration: Implementation Plan, Methodology Documents	D8.1		Figures (.jpeg/.png), pdf files, Word documents(.docx)	< 100 MB	Restricted (Stored at qtlabs data storage facilities)	qtlabs
Detailed report of the execution of the 2.5-km field test campaign.	D8.3	Plain text, figures, database	Word documents (.docx) and figures (.png)	500MB> <1GB	Restricted (Stored at internal TNO data management clusters)	TNO

Terrestrial Intra-City FSO link characterization in ICCS campus and intercampus ICCS/NKUA link.	D8.2		Pdf files, Notebook (.txt file), excel (.xlsx) and PDF files	<500MB	Publicly available via Zenodo	ICCS
Design and engineering models for adapting Aristarchos Telescope to OGS being capable for classical and QKD links.	D8.4	DEM	Figures and pdf files	~100 MB	NOA	

5 LAIQA OPEN RESEARCH DATASETS

The following three tables detail the OPEN research DATASETS that are foreseen to be generated at this stage of the project. However, the DMP is a live document, and this information will be verified during the project.

5.1.1 Data set 01. *Simulation studies of DS-BB84 QKD systems for different grades of OGS terminals_ LAIQA_WP2_VX.0*

Data set Reference Name	*DS1 Simulation studies of DS-BB84 QKD systems for different grades of OGS terminals_ LAIQA_WP2_VX.0*
Description	This dataset comprises QBER simulation analysis and Key Rate calculations for selected scenarios including different grades of OGS terminals and system assumptions for technological blocks to be developed within LaiQa.
Standards and Metadata	In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions. The following fields will be used:
	1. Dataset Title *DS1 Simulation studies of DS-BB84 QKD systems for different grades of OGS terminals_ LAIQA_WP2_VX.0*
	2. Name(s) of dataset creator(s) *ICCS staff*
	3. Description of Data QBER analysis and Key Rate calculations for selected scenarios including OGS terminals of HellasQCI
	4. Data Source *This dataset is a primary output of LAIQA project.*
	5. Creation Date *TBD*
	6. Format *TXT, TSV, CSV, PDF*
	7. Expected size <100 MB
	8. Location of Data Zenodo (*exact link to be provided*).
	9. Digital Object Identified (DOI) *TBD (DOI from Zenodo)*
	10. Access status Open Data
	11. Embargo No embargo period foreseen for this dataset
	12. Funding Statement This project has received funding from the European Union's Horizon Europe Framework Program (HORIZON) under G.A No 101135245. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains.
	13. Work Package

Data set Reference Name	*DS1 Simulation studies of DS-BB84 QKD systems for different grades of OGS terminals_ LAIQA_WP2_VX.0* .
	WP2 **14. Related publications** Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text. **15. Dataset Citation** A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. **16. Keywords** LAIQA, Simulation, DS-BB84, OGS, EuroQCI, P&M QKD, QBER, SKR **17. Version number** (TBD)
Data sharing **Archiving and preservation**	♦ **Repository** The research data will be deposited and maintained in Zenodo, the research data repository launched by CERN and OpenAIRE. ♦ **Date of Repository Submission** *TBD* For redundancy, besides uploading the data on Zenodo it will be also maintained on a university-owned storage server at ICCS (PCRL group). The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The dataset will be preserved for at least 5 years after the project end and the associated costs will be covered by ICCS through own funds.

5.1.2 Data set 02. OKD Secure Key Rate Simulator_LAIQA_WP6_VX.0

Data set Reference Name	*DS2 OKD Secure Key Rate Simulator_ LAIQA_WP6_VX.0* .
Description	This dataset will comprise codes and data related to the development of OKD simulator developed by TU/e within WP6.
Standards and Metadata	In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions. The following fields will be used:
	18. Dataset Title *DS2 OKD Secure Key Rate Simulator_ LAIQA_WP6_VX.0*
	19. Name(s) of dataset creator(s) *TU/e staff* **20. Description of Data** Key Rate calculations for selected scenarios identified within LaiQa WP6 **21. Data Source** *This dataset is a primary output of LAIQA project.* **22. Creation Date** *TBD* **23. Format** *Binary* **24. Expected size** <100 MB

	25. Location of Data LaiQa website, Zenodo (*exact link to be provided*). **26. Digital Object Identified (DOI)** *TBD (DOI from Zenodo)* **27. Access status** Open Data **28. Embargo** No embargo period foreseen for this dataset **29. Funding Statement** This project has received funding from the European Union's Horizon Europe Framework Program (HORIZON) under G.A No 101135245. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains. **30. Work Package** *WP6* **31. Related publications** Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text. **32. Dataset Citation** A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. **33. Keywords** LAIQA, Simulator, OKD, Secure Key Rate **34. Version number** (TBD)
Data sharing **Archiving and preservation**	♦ **Repository** The research data will be deposited and maintained in Zenodo, the research data repository launched by CERN and OpenAIRE. ♦ **Date of Repository Submission** *TBD* For redundancy, besides uploading the data on Zenodo and LaiQa website it will be also maintained on a university-owned storage server at TU/e-hosted server. Any processed data such as pictures and reports are stored on Sharepoint. All the software code and scripts are stored on a TU/e GitLab repository. All the servers and repositories are backed up and are managed by TU/e information technology services.

5.1.3 Data set 03. Intra-campus and Inter-campus FSO links characterisation campaign for polarisation-encoded QKD_LAIQA_WP8_*VX.0*

Data set Reference Name	*DS3 Intra-campus and Inter-campus FSO links characterization campaign for polarization-encoded QKD_ LAIQA_WP8_VX.0.*
Description	This dataset comprises experimental characterization results for installed Km-scale FSO links in Athens. Link characteristics including link loss, stability over time, intensity variation measurements and polarization stability measurements will be included.
Standards and Metadata	In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the

	methodology used as well as file and folder naming conventions. The following fields will be used: **35. Dataset Title** *DS3 Intra-campus and Inter-campus FSO links characterization campaign for polarization-encoded QKD_ LAIQA_WP8_VX.0.* **36. Name(s) of dataset creator(s)** *ICCS staff* **37. Description of Data** FSO link characterization for 0.45Km intra-campus linki and 0.8Km intercampus link in the city of Athens. **38. Data Source** *This dataset is a primary output of LAIQA project.* **39. Creation Date** *TBD* **40. Format** *TXT, TSV, CSV, PDF* **41. Expected size** <500 MB **42. Location of Data** Zenodo (*exact link to be provided*). **43. Digital Object Identified (DOI)** *TBD (DOI from Zenodo)* **44. Access status** Open Data **45. Embargo** No embargo period foreseen for this dataset **46. Funding Statement** This project has received funding from the European Union's Horizon Europe Framework Program (HORIZON) under G.A No 101135245. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains. **47. Work Package** *WP8* **48. Related publications** Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text. **49. Dataset Citation** A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. **50. Keywords** LAIQA, FSO-QKD, Polarization Stability, Link Loss **51. Version number** (TBD)
Data sharing **Archiving and preservation**	♦ **Repository** The research data will be deposited and maintained in Zenodo, the research data repository launched by CERN and OpenAIRE. ♦ **Date of Repository Submission** *TBD* For redundancy, besides uploading the data on Zenodo it will be also maintained on a university-owned storage server at ICCS (PCRL group). The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The dataset

	will be preserved for at least 5 years after the project end and the associated costs will be covered by ICCS through own funds.

Table 3 below summarizes the data sets identified as relevant for LaiQa results validation and evaluation and are foreseen to be **"Open access".** In the following paragraphs these datasets are described in detail.

Table 3. List of Open data sets relevant to LaiQa research activities.

Data set name	WP related	Type
Data set 01: QBER/SKR analysis for satellite QKD use cases	WP2	Simulation Results
Data set 02: OKD Secure Key Rate Simulator	WP6	Simulator
Data set 03: Intra-city FSO link for polarization-encoded QKD	WP8	Experimental Results

6 LAIQA RESTRICTED DATASETS

The datasets that are foreseen to be restricted are listed in table 4 below.

Table 4. Restricted datasets in LaiQa

Dataset Description	Related WP	Related deliverables	Dataset Owner
Technical Specifications for the entire LaiQa ecosystem, including HW and SW components	WP2	D2.1	qssys
Simulation analysis datasets provided by the TNO toolchain	WP2	D2.3	TNO
Definition of assembly process for space-qualified sources and functional/environmental test plans	WP2	D2.4	qtlabs
Detailed design of the EPPS on-board source.	WP3	D3.1	qtlabs
Detailed design of the P&M on-board source	WP3	D3.2	qtlabs
Assessment of components for EPPS and P&M source	WP3	D3.3	qtlabs
Design and performance characterization of PIC-based EPPS	WP4	D4.1	TNO
Setup installation and calibration for Quantum Memory blocks performance evaluation	WP4	D4.2	TNO
Calibration and evaluation of the memory preparation phase of the experimental cycle	WP4	D4.2	TNO
Calibration and evaluation of the memory storage protocol	WP4	D4.2	TNO
Design and interface definition for the interfacing between a PIC-EPPS photonic qubit and an absorptive quantum memory, and photon-echo experimental data	WP4	D4.3	TNO
Detailed report on the design of the LaiQa Receiver Breadboard (LRBB), including Adaptive Optics pre-correction for improved free space to fiber coupling efficiency	WP5	D5.1	TNO
Design Layout and Engineering Developments for Hybrid POGS	WP5	D5.2	ICCS

Dataset Description	Related WP	Related deliverables	Dataset Owner
Optically Switched quantum network design. Reporting of WDM – routed entanglement distribution demonstration results for implementations included in T5.3	WP5	D5.4	NKUA
Optical key distribution design & simulation files	WP6	D6.1	TU/e
Optimized coding scheme	WP6	D6.2	TU/e
Prototype of EPS Documents: Implementation and Assembly Plan, Test Plan, Test Report	WP7	D7.1	qtlabs
Engineering model of the P&M source: Implementation and Assembly Plan, Validation Test Plan, Validation Test Report	WP7	D7.2	qssys
EPPS and P&M source tested in relevant Environment: Qualification Test Plan, Qualification Test Report	WP7	D7.3	qssys
Definition of testing methodologies and testbed setups configuration: Implementation Plan, Methodology Documents	WP8	D8.1	qtlabs
Reporting of field demonstration experiments in Helmos OGS.	WP8	D8.4	NOA

7 ALLOCATION OF RESOURCES

There are no immediate costs anticipated to make the datasets produced FAIR. The open datasets will be deposited in the Zenodo repository and will be preserved for at least 5 years after the conclusion of the project and in-line with the Deposit Data Policy of the European Commission.

ICCS (coordinator of the LaiQa consortium) is responsible for the initial definition of the DMP as well as for its implementation, monitoring and update. The updated DMP will be released with deliverables D10.4 (M18) and D12.3 (M36), while the latter consists of the Final Data Management Plan. All the consortium members shall support the Data Management protocol by providing the types of generated data that have been described in the methodology of the DMP report.

Each LaiQa partner should respect the policies set out in this DMP. Datasets must be created, managed and stored appropriately and in line with European Commission and local legislation. Dataset validation and registration of metadata and backing-up data for sharing through repositories is the responsibility of the partner that generates the data in the respective Work Package.

8 DATA SECURITY

The LaiQa data will be stored/archived in trusted repositories for long term preservation and curation. The storage facilities provided by the members of LaiQa project consortium and their security provisions, are summarized in the table below.

Table 5. Description of data storage facilities of LaiQa partners

Beneficiary Short Name	Description of Data Storage Facility
1. ICCS	University-owned server at ICCS (PCRL). The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The Data will be preserved for at least 5 years after the project ends and the associated costs will be covered by ICCS through own funds. Data will be also stored at the ICCS's SharePoint Documents Repository devoted to LAIQA by the end of the project.
2. TNO	TNO experimental data is stored in a dedicated TNO server at TNO premises. Any processed data such as pictures and reports are stored on Sharepoint. All the software code and scripts is stored on TNO's GitLab repository. All the servers and repositories are backed up and are managed by TNO IT services.
3. QTLABS	All data is stored on a trusted and secure platform for document management and collaboration. The data stored is protected against loss by a dedicated cloud backup solution. This ensures that data can be recovered in case of accidental deletion or other data loss incidents. After the completion of a project, the data is archived. This ensures that data is preserved for long-term reference and compliance purposes, while still being protected under our security measures.
4. QSSYS	All data is stored on a trusted and secure platform for document management and collaboration. The data stored is protected against loss by a dedicated cloud backup solution. This ensures that data can be recovered in case of accidental deletion or other data loss incidents. After the completion of a project, the data is archived. This ensures that data is preserved for long-term reference and compliance purposes, while still being protected under our security measures.
5. NOA	All data is stored at the main storage facilities of the Research Center (National Observatory of Athens – NOA). Specifically, a dedicated NOA-owned server is used with a discrete Storage Array System attached to the server. The system operates in multiple RAID formats achieving capacity, efficient I/O speed and

Beneficiary Short Name	Description of Data Storage Facility
	reliability since backup is taken both in daily bases (data backup) and in weekly bases (system backup). The data are fully protected in the trusted network and are planned to be maintained for at least 5 years after the end of the LaiQa project. Beyond that point it is scheduled to be stored in an archive system with equivalent level of security for long-term reference purposes.
6. TU/e	TU/e models, source code and generated data are stored at a TU/e-hosted server. Any processed data such as pictures and reports are stored on SharePoint. All the software code and scripts are stored on a TU/e GitLab repository. All the servers and repositories are backed up and are managed by TU/e information technology services.
7. NKUA	All data is stored on Microsoft SharePoint, a trusted and secure platform for document management and collaboration. The data stored on SharePoint is protected against loss by a dedicated cloud backup solution. This ensures that data can be recovered in case of accidental deletion or other data loss incidents. The data stored on SharePoint is protected against loss by a dedicated cloud backup solution. After the completion of a project, SharePoint data is archived. This ensures that data is preserved for long-term reference and compliance purposes, while still being protected under our security measures.
8.TAS-I	All documents are stored on TAS-I in-house Configuration Management Tool (PLM) named Wand. The internal approval cycle is performed in accordance with the Company policies and is certified by the electronic signature on the first page or through other approval methods (by process). The formal emission of the document is performed only after successful completion of the signature release cycle. The evidence of approvals is stored in the Company information system. As soon as they become available, the Company protects and distributes documents according to the level of Company sensitivity of information they contain, and according to their related national or institutional sensitivity constraints, if any. The Company maintains a documentation database for each project, in order to make available a constantly updated record of all issued documents, their revision history and their validity status.

9 ETHICAL ASPECTS

LaiQa partners are to comply with the ethical principles as set out in the G.A. Article 14 which states that all activities must be carried out in compliance with:

a) Ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity (European Science Foundation, 2011) — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct) and

b) Applicable international, EU and national law including the EU Charter of Fundamental Rights and the European Convention for the Protection of Human Rights and Fundamental Freedoms and its Supplementary Protocols.

The LaiQa consortium will conduct this action adhering to the fundamental principle of research integrity —as set out in the European Code of Conduct for Research Integrity[2].

This implies compliance with the following principles:

[2] https://allea.org/code-of-conduct/

- **reliability** in ensuring the quality of research reflected in the design, the methodology, the analysis and the use of resources

- **honesty** in developing, undertaking, reviewing, reporting and communicating research in a transparent, fair and unbiased way

- **respect** for colleagues, research participants, society, ecosystems, cultural heritage and the environment

- **accountability** for the research from idea to publication, for its management and organisation, for training, supervision and mentoring, and for its wider impacts and means that beneficiaries must ensure that persons carrying out research tasks follow the good research practices including ensuring, where possible, openness, reproducibility and traceability and refrain from the research integrity violations described in the Code.

In case an action task raises ethical issues, the consortium will obtain all approvals or other mandatory documents needed for implementing the task, from any (national or local) ethics committee or other bodies such as data protection authorities. These documents will be kept on file and be submitted upon request by the coordinator to the granting authority.

LaiQa project is not expected to raise ethical issues overall, itdoes not involve the use of human participants or personal data in the research and therefore there is no requirement for ethical review.

Confidentiality

LaiQa beneficiaries must and will retain any data, documents, or other material identified as sensitive - confidential during the implementation for the project and for *five years after the final payment*. Further details on confidentiality can be found in the G.A. Article 13 along with the obligation to protect results in Article 16.

10 OTHER ISSUES

No other national/funder/sectorial/departmental procedures for data management are being used by the LaiQa partners.

11 CONCLUSIONS

This document has provided the first version of the Data Management Plan defined by LaiQa consortium in the first six months of the project. The DMP has identified several data sets which will be generated within the project and, for each of them, has defined the strategy for the documentation, open access sharing and maintenance of the associated data, according to the guidelines provided by the EC in the Horizon Europe program. More specifically, three (3) open research datasets will be generated by the LaiQa academic partners including both simulations and experimental data. Besides the open research datasets, twenty-six (26) restricted datasets will be generated by LaiQa consortium, focusing on the project's development path.

This document will be updated during the project lifecycle, in order to reflect any possible changes and additions in the data sets, as well as any refinement in the strategy to maximize the sharing and re-use of the project outcomes. These possible changes should be also reflected in the periodic reports of LaiQa project. In particular, at least two further versions of the DMP will be released: one in M18 and the final version at the end of the project in M36.

Appendix I - Example Metadata File Template

This metadata file was generated on *<insert date>* by *<insert name>*

GENERAL INFORMATION

1. **Title of Dataset:**
2. **Dataset Identifier in Repository:**
3. **Responsible Partner:**
4. **Author Information:**
   Investigator Contact Information Name:
   Email:

   Supervisor Contact Information Name:
   Email:

   Co-Supervisor Contact Information Name:
   Email:
5. **Date of data collection: ……**
6. **Geographic location of data collection (where was data collected?): ……**
7. **Title of project and Funding sources that supported the collection of the data: ……**

SHARING/ACCESS INFORMATION

1. **Licenses/access restrictions placed on the data:**
   ……
2. **Link to data Repository:**
   ……
3. **Links to other publicly accessible locations of the data:**
   ……
4. **Links to publications that cite or use the data:**
   ……
5. **Was data derived from another source? If yes, list source(s):**
   ……

DATASET & FILE OVERVIEW

1. **This dataset contains X sub-dataset as listed below:**
   A. Datasheet name:
   B. Datasheet name:
   C. Datasheet name:
   D. Datasheet name:
2. **What is the status of the documented data? – "complete", "in progress", or "planned."**
3. **Plans to update the data**

METHODOLOGICAL INFORMATION

1. Description of methods used for experimental design and data collection: *<Include links or references to publications or other documentation containing experimental design or protocols used in data collection>*……
2. **Methods for processing the data:** *<describe how the submitted data were generated from the raw or collected data>*……

3. **Instruments and software used in data collection and processing-specific information needed to interpret the data:**
   ……
4. **Standards and calibration information, if appropriate:**
   ……..
5. **Environmental/experimental conditions:**
   ……
6. **Describe any quality-assurance procedures performed on the data: ……..**

List of Figures

No table of figures entries found.

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