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D1.3-Data Management Plan


DELIVERABLE DETAILS			
Deliverable Nr	Lead Beneficiary	Dissemination Level	Status
D1.3	TopView	PU	CONTROLLED
Edition	Revision	Issue	Document Code
01	01	01.01	D1.3_01.01
File Name	D1.3-Data Management Plan_01.01		
Ref. Template	D0.0-Certiflight Document Template_01.00.dotx		

DOCUMENT HISTORY					
Issue	Date	Status	Author	Partner	Change Description
00.01	31/01/2023	DRAFT	V.M.Ascione, F. Russo	TopView	First Draft
00.02	24/02/2023	DRAFT	A. Mennella	TopView	General revision
00.03	27/02/2023	DRAFT	V.M.Ascione	TopView	Implementation of comments to the description of repositories, FAIR criteria and scientific publications
01.00	28/02/2023	CONTROLLED	A. Mennella	TopView	General revision of controlled version
01.01	01/03/2023	CONTROLLED	V.M.Ascione A.Russo A.Mennella	TopView TSP	Document integrated according to the DRSs received: <ul style="list-style-type: none"> General typos corrected. Test Data / Flight data clarification in Table 2.1 Section 4.2 (Blockchain nodes) added.

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APPLICABLE DOCUMENTS		
Ref.	File Name	Description
AD 1	Grant Agreement-101082484-CERTIFLIGHT	Project Grant Agreement
AD 2	CERTIFLIGHT Consortium Agreement v1.0 - 31 October 2022	Project Consortium Agreement


REFERENCE DOCUMENTS		
Ref.	File Name	Description
RD 1	D1.2-Project Management Plan_01.00	Project DMP, first issue
RD 2	https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/reference-documents;programCode=HORIZON	Horizon Europe DMP template
RD 3	D1.4-Ethics Issues Analysis_01.00	Project deliverable about analysis of any potential ethic issue
RD 4	D7.1-Communication, Exploitation & Dissemination Plan_01.00	Project CEDP
RD 5	https://www.openaire.eu/	OpenAIRE website
RD 6	https://creativecommons.org/licenses/by-sa/4.0/	Creative Commons, Attribution-ShareAlike 4.0 International
RD 7	https://www.monday.com	Core technology for the creation of CERTIFLIGHT repository for data and documentation

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This document is part of a project that has received funding from the EUSPA under grant agreement No 101082484 under European Union’s Horizon Europe programme.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Union Agency for the Space Programme (‘granting authority’). Neither the European Union nor the granting authority can be held responsible for them.



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Abstract

The present document is the contractual deliverable D1.3 “Data Management Plan” of the CERTIFLIGHT project, according to Grant Agreement [AD 1]. As the Project Management Plan, this document is part of the Task 1.1 - Project Management.

The CERTIFLIGHT DMP addresses the following:

- Data Summary;
- FAIR data;
- Other research Outputs;
- Allocation of resources;
- Data Security;
- Ethics;
- Other issues.

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1 Scope of the document

This document represents the CERTIFLIGHT Data Management Plan document (DMP) and it has been generated according to the Horizon Europe DMP template [RD 2].

This DMP is derived from the assessment included in the Grant Agreement.

The analysis undertaken identifies mainly 4 relevant datasets that will be produced and maintained in the lifecycle of the project. The identified datasets are the following:

- **End-users database** (contacts information collected from interviews, questionnaires and web surveys);
- **Test data** (telemetry data, maps, UAS logs, script, images...)
- **Flight data** (generated during test sessions and during campaigns executions, especially during the validation phase)
- **Dissemination / Exploitation** data (summarizing the project activities and results).

The DMP addresses both publicly available data and data internally exchanged inside CERTIFLIGHT Consortium.

1.1 DMP maintenance

A second issue of the document will be released at M17, according to the Project Gantt chart. Nevertheless, the DMP is intended to be a living document and it will be updated over the course of the project whenever significant changes arise.

1.2 Acronyms

The list of acronyms is in the table below.

Acronyms	Description
AICPA	American Institute of Certified Public Accountants
CC	Creative Commons
DMP	Data Management Plan
EULA	End User License Agreement
EUROCAE	European Organisation for Civil Aviation Equipment
FAIR	Findable Accessible Interoperable and Re-usable data
GA	General Aviation
GB	Gigabyte
GPL	General Public License
IAB	International Advisory Board
ICD	Interface Control Document
IEC	International Electrotechnical Commission
ISO	International Organisation for Standard
KB	Kilobytes
LGPL	Lesser General Public License
MB	Megabyte
ORCID	Open Researcher and Contributor ID

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PMP	Project Management Plan
PO	Project Officer
PVT	Position Velocity Time
SOC	Security Operation Center
TIFF	Tag Image File Format
TRL	Technology Readiness Level
UAS	Unmanned Aerial System
UTM	Unmanned Traffic Management
WG	Working Group
WP	Work Package

Table 1-1 Acronyms list

	CERTIFLIGHT HORIZON-EUSPA-2021 SPACE PROJECT 101082484	DISSEMINATION LEVEL PU	DELIVERABLE NR D1.3	PAGES 21
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2 Data Summary

An overview of data types, origin, format, and size is reported in the table below.

DataSet #	Data type	Origin	Format	Size
1	End-users database	Inside the project. Interviews and questionnaires	<ul style="list-style-type: none"> • .xls (when raw data) • .docx/pdf (when elaborated in final report) 	In the Order of MB
2	Test data.	Publicly available data or owned by Consortium partners. Generated by consortium Included: ground tests, bench tests, simulation tests. Flight data are excluded.	As a non-exhaustive sample: <ul style="list-style-type: none"> • PVT data (.csv, .ubx) • Payload data (i.e., Optical/Thermal images - e.g. .TIFF, .jpeg, .rjpg) • Payload cargo data (i.e., temperature, humidity e.g. csv, xml) • MQTT/ JSon Data (for UTM Box API / Remote Identification service) • Maps (.dwg, .jpg, .kmz, .kml) 	In the Order of GB
3	Flight data.	Flight logs, telemetries (PVT) and payload data generated by consortium during flight test sessions and campaigns execution with final users.		
4	Dissemination/ Exploitation data.	Elaborated data	<ul style="list-style-type: none"> • Graphics (.pdf, .ppt., .jpeg, electronic or paper media) • Video (.mp4 or any supporting media) 	In the Order of GB

Table 2-1 Data overview: type, origin, format, size

2.1 Purpose of the Data Collection and/or Generation

CERTIFLIGHT Objectives	Project KPIs	Dataset
OBJECTIVE #1 Liability chain for UAS operations	<ul style="list-style-type: none"> • Generation of at least 10 hours of highly automated flight operations (with the respective flight reports) 	#2; #3
	<ul style="list-style-type: none"> • Positive feedback (majority) by an independent board of lawyers, aeronautical engineers and members of the International Advisory Board (IAB) on the legal validity of the generated flight reports 	#1

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OBJECTIVE #2 UAS mission data traceability	<ul style="list-style-type: none"> To manufacture (TRL 8/9) a turn-key solution providing the complete service of PVT data traceability merged with UAS specific data application from collection to storage into a blockchain structure. To validate the traceability mechanism with at least one (1) real Smart Contract example implementation, activated autonomously by CERTIFLIGHT solution, when specific location-based conditions are met. 	#2; #4 #2 #3
OBJECTIVE #3 Enhance the Safety for GA/Ultralights and UAS operations at Very Low Level	<ul style="list-style-type: none"> Safety: Enhancement of safety for GA/ultralight and UAS pilots that mounts the UTM BOX with e-Conspicuity features on their aircrafts. Warning messages to pilots to be notified at least six (6) seconds before potential air proximity situations. Standardization: Contribute to standardization activities with the publication of at least one (1) key element of CERTIFLIGHT solution in at least one (1) standardization group (i.e., ISO TC20/SC16 or EUROCAE WG105) Performance: Enhancement of UTM Box data rate transmission regarding the OSNMA authenticated solution through propagation of the authenticated position. (i.e., 1 authenticated position every second) 	#2 #2; #4 #2 #3
OBJECTIVE #4 Interoperability with several UTM/U-space platforms	To connect CERTIFLIGHT to additional two (2) UTM/U-space technology providers to be identified during the project, in addition to the UTM/U-space technology providers, partners of the project (D-FLIGHT, UPV, UNIFLY)	#2 #3

Table 2-2 Association of Data types to CERTIFLIGHT Objectives and KPIs

2.2 Data Utility

The following table shows to whom data collected, generated and re-elaborated in CERTIFLIGHT will be used.

Data	Purpose	Recipients / Beneficiaries
All	market uptake of the product(s) / service(s)	Consortium partners
#2; #4	Standardization	Standardization Bodies
#4	<ul style="list-style-type: none"> Social acceptance Business/technical integration 	<ul style="list-style-type: none"> General public, Regional Authorities Other U-Space Service and /or technology providers. UTM platforms
All	<ul style="list-style-type: none"> Other research projects 	<ul style="list-style-type: none"> Other peer / sibling Research Projects Consortia

Table 2-3 Summary of Data Purpose and Beneficiaries

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2.3 Open science: open access to scientific publications

Machine readable, electronic copy of published version of the scientific publications produced by CERTIFLIGHT will be made available on the CERTIFLIGHT website, through a dedicated section with authenticated access.

Moreover, the scientific publications generated from the project will be published through conferences and journals, for which compliance with Open Science requirements will be verified. If the requirements should not be met after the publication, the project Coordinator will contact open science platforms like ORCID¹, ResearchGate² and SCOPUS³ to report the case and to request the fulfilment in case of omissions.

An initial list of the journals, magazines and conferences considered is published in the D7.1 [paragraphs 4.4 and 4.5; RD 4].

Data and publications will not include the ones relevant for the industrialization, commercialization and exploitation, according to “as open as possible as closed as necessary” principle described in the following paragraph.

The publications on the website section will be under CC-BY licence⁴ or equivalent.

The same type of licence will be applied to the respective metadata, which will include:

- Authors;
- Title;
- Date of Publication;
- Publication venue (if applicable);
- Horizon Europe Funding;
- Project details (Grant project name, acronym and number);
- Licensing terms;
- Persistent identifiers of the publication, the authors and their respective organizations, and of the Grant;
- Persistent identifiers for the research outputs (if applicable, e.g. ORCID ID).

2.4 Open science: research data management

The digital research data management is realized by following the FAIR principles and therefore by:


- The writing and the maintenance of this DMP;
- Using internal and external trusted repositories;
- Ensuring open access to the data stored in the repository under CC-BY or CC-0 licenses or equivalent, following the principle “as open as possible as closed as necessary”. However, this mechanism will consider also the industrial results of the project (both joint at Consortium level and individual at partners level) that will be kept closed, giving the relevance for the commercialization and exploitation purposes;
- Providing justification in the current and further issues of this DMP if open access is not provided.

¹ <https://orcid.org/>

² <https://www.researchgate.net/>

³ <https://www.scopus.com/>

⁴ <https://creativecommons.org/licenses/by-nc/4.0/>

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- Providing information about other tools and instruments needed to re-use or validate data via the same repository used for the publication.

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3 FAIR data

In the following subparagraph are defined the FAIR criteria applied to the research data management in CERTIFLIGHT.

Each subparagraph describes one of the criteria and contains a summary table in which it is reported, for each WP, the type of data and the respective criteria applied.

Type of data are those mentioned in Table 2-1.

The Work Packages are reported in the table below.

WP No	WP name
WP1	WP1 Project Management
WP2	Users' needs for U-space and System Specification
WP3	CERTIFLIGHT solution design & realization
WP4	Integration and verification activities
WP5	Validation and Demonstration
WP6	Economic viability
WP7	Communication, Dissemination and Standardization activities

Table 3-1 List of Work Packages

3.1 Findable Data

Metadata and data should be easy to find for both humans and computers. Machine-readable / actionable metadata are essential for automatic discovery of datasets and services.

The Findability criteria for CERTIFLIGHT project are so defined:

- F1. (Meta)data is assigned a globally unique and persistent identifier;
- F2. Data is described with rich metadata (defined by R1);
- F3. Metadata clearly and explicitly includes the identifier of the data it describes;
- F4. (Meta)data is registered or indexed in a searchable resource.

Type of Data	WP Involved	Findability Criteria	Description
1	WP2; WP6; WP7	F1; F3	Survey and questionnaires data will be discoverable through the public deliverable, in which they will be collected and/or elaborated.
2	WP3; WP4; WP5	F1; F2; F3; F4	Data will be managed within CERTIFLIGHT repositories. Data included in deliverables.
3			All the dataset, including raw data, will be used for the tests in controlled environment for running the algorithms developed in the Project, but also for other research activities in the scientific community that might benefit of the same dataset.
4	WP7	F1; F2; F3; F4	The reports will be discoverable and accessible to the public once they are delivered to the EU. They will be uploaded to the project website and promoted through the project social channels.

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			Data will be created with a unique code identifier; any input file publicly found will be renamed with a unique identifier as a specified source of CERTIFLIGHT.
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Table 3-2 Data Findability

3.2 Accessible Data

The user needs to understand how data can be accessed, possibly including authentication and authorisation.

Three main repositories that are going to be used in the project are:

- Internal Repository and SharePoint (Monday.com)
 - CERTIFLIGHT.Planning and Repository
 - CERTIFLIGHT.Documentation
- Repository for Software, Hardware;
 - Gitlab Repository where only binary executable software will be uploaded. Source codes will be handled and maintained under the responsibility of each partner.
- Website public repository for public Deliverables, Communication and Dissemination material.

The first two are accessible by invitation of the coordinator and are described respectively in sub-paragraph 3.2.1 and 3.2.2. The last one does not require any registration or authentication and is described in sub-paragraph 3.2.3.

The repository implemented for CERTIFLIGHT data, based on the platform “Monday.com” [RD 7] includes a freely accessible area, reachable contacting the project Coordinator. Each user accessing the platform can access only with his/her username and password generated by the authentication mechanism offered by the platform. Once entered for the first time, user must change his/her password to keep on using the repository. The Repository used for Consortium for all type of data showed in Table 3-2 is named “**CERTIFLIGHT.Planning and Repository**”.

Moreover, a separated area of the repository has been created to manage project documentation, as per Grant Agreement, to be shared between the Coordinator and EUSPA (and experts).

This repository is named “**CERTIFLIGHT.Documentation**”.

Additional information on Repository access is provided in PMP document [RD 1]

The following criteria are used:

- A1. (Meta)data is retrievable by their identifier using a standardised communication protocol
 - A1.1 The protocol is open, free, and universally implementable.
 - A1.2 The protocol allows for an authentication and authorisation procedure, where necessary.
- A2. Metadata is accessible, even when data is no longer available.

Type of Data	WP Involved	Accessibility Criteria	Description
1	WP2; WP6; WP7	N/A	Raw data will not be made available publicly outside the project. Specific requests for external use will be evaluated case by case by the Consortium.

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			Aggregated, anonymized data will be included in dissemination and communication material.
2	WP3; WP4; WP5	A1; A2	All data will be made openly available by default. No data or metadata is cancelled and can be always recovered. Raw data (and metadata) is associated to scientific publications according to the “as open as possible as closed as necessary” principle.
3			
4	WP7	A1; A2	Communication, Dissemination and exploitation data will be created with a unique identifier and ingested on a public Repository platform (section of the CERTIFLIGHT website). Users will be able to download the documents from the website and without any fee or cost. Also, any input file publicly found will be renamed with a unique identifier as a specified source of CERTIFLIGHT. Scientific Publications will be made available to the scientific community for peer reviewing by means of journals and conferences compliant with the Open science requirements.

Table 3-3 Data Availability

3.2.1 Internal Repository and SharePoint

For the implementation of the project, the Coordinator will give partners access to an internal repository and sharing point for project documentation with a reserved area on its cloud platform **Monday.com** (platform approved by during ISO 9001 audit for the Quality Management System). This platform allows keeping record of file uploads and supports almost all the most used file extensions; moreover, it keeps continuous monitoring of the project with task assigning and automatic reminders for milestones or internal tasks.

As mentioned in the PMP [RD 1], The cloud platform is itself certified according to the main standards regarding cybersecurity, cloud services, and data protection, some of them are:

- ISO/IEC 27001:2013;
- ISO/IEC 27017:2015;
- ISO/IEC 27018:2014;
- ISO/IEC 27032:2012;
- ISO/IEC 27701:2019
- AICPA SOC 1;
- AICPA SOC 2;
- AICPA SOC 3.

The internal repository is divided into two areas, the first one reserved for consortium members, the latter to the project officer and the experts; these areas are named:

- CERTIFLIGHT.Planning and Repository (Consortium Internal Use)
- CERTIFLIGHT.Documentation (formal documentation delivered to EUSPA)

Detailed workflow about how access and operate is described in the PMP (sub-paragraph 5.2.2).

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3.2.2 Repository for Software, Hardware and Dissemination material

A dedicated Repository for Software/Hardware/Dissemination material will be provided to partners:

- **Binary/Executable files** for all development (Brochures, Fliers, Documents, Software, Hardware, will be uploaded and versioned).
- **Software source code** subjected to limitation (Partners' IPR), will be handled under each partner's responsibility.
- **Software source code** not subject to partners' IPR, needed for modules implementation (i.e., open-source code under GPL, LGPL or Creative Commons) will be uploaded on a dedicated GIT repository made available by the Coordinator.

3.2.3 Website Public repository

The website will comprehend two areas:

- **Public:** where website visitors can read news and articles, and a "Documentation" section, from which they can download all the communication material, including Public Deliverables.
- **Private:** accessible only to people directly involved in the project (project members, International Advisory Board members, project experts and EUSPA PO).

Here, upon registration, researchers and IAB members can also download scientific publications (posters, papers...) eligible for public dissemination; typically, those discoverable on the main Open Science platforms (like ORCID, ResearchGate, SCOPUS).

As shown in the following picture, public deliverables will be licensed "under a Creative Commons Attribution-ShareAlike 4.0 International License" [RD 5].

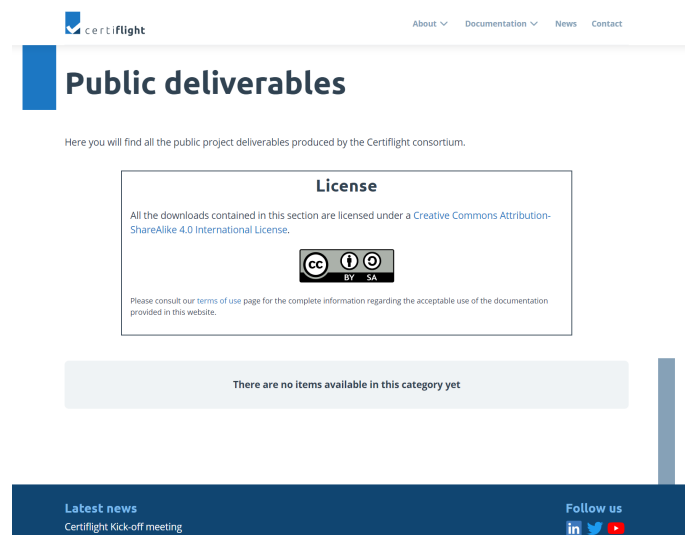


Figure 3-1 CERTIFLIGHT Website - "Documentation" section

3.3 Interoperable Data

Data need to be integrated and / or interoperable with applications or workflows per analysis, storage, and processing.

The Interoperability Criteria are so defined:

- I1. (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (Meta)data use vocabularies that follow FAIR principles.

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- I3. (Meta)data include qualified references to other (meta)data.

Type of Data	WP Involved	Interoperability Criteria	Description
1	WP2; WP6; WP7	I1; I2	Data is managed in English language. The texts of questionnaires, surveys and forms will be redacted with care to make efficient the feedback from Stakeholders.
2	WP3; WP4; WP5	I1; I2; I3	Consortium partners will define detailed ICDs (Interface Control Documents) to share data.
3			
4	WP7	I1; I2	Data is managed in English language.

Table 3-4 Data Interoperability

3.4 Re-usable Data

The Re-usability Criteria are so defined:

- R1. Meta(data) is richly described with a plurality of accurate and relevant attributes
 - R1.1. (Meta)data is released with a clear and accessible data usage license.
 - R1.2. (Meta)data is associated with detailed provenance.
 - R1.3. (Meta)data meet domain-relevant community standards.

The consortium decided not to put any constraint in term for time for data re-use which can be accessed for free both for consultation and exploitation [AD 2].

Type of Data	WP Involved	Re-usability Criteria	Description
1	WP2; WP6; WP7	R1.	Data is managed in English language.
2	WP3; WP4; WP5		Data is managed in English language. Quality assurance process about project deliverables is described in the PMP.
3			Data will be made freely available with the respective ICDs and other information useful to maximise their re-usability.
4	WP7		Data is managed in English language. Public deliverables and communication/dissemination material will be licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. Quality assurance process about project deliverables is described in the PMP.

Table 3-5 Data Re-usability

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4 Other research outputs

4.1 DMP components in WP1-Project Management

The WP1 – Project Management will make use of data, that will be generated and used only within and for the purposes of the project and will not be publicly available.

This data consists in list of members of the advisory board, including email address and organization. This data has been / will be provided by the members of CERTIFLIGHT Consortium, which suggested the names of participants to the IAB.

The expected size of these data will be in the range of few KB.

4.2 Blockchain nodes

One of the key elements of the project is to integrate the blockchain technology to manage the flight logs recorded by the UTM BOX: these data must be usable. This is done by providing pointers to the data within the blockchain so that they can be verified by anyone with access to a blockchain node. Given the technological barrier to run an own blockchain client for regular users, the verification of blockchain data, on both public and private blockchain, is eased through what are called “explorers” which provide a web-based window on the blockchain information. Finally, for platforms and applications focused on an homogeneous set of services, like the one object of this project, the traceability information to verify blockchain data can be included in the report issued by the certification portal (so the information is accessible by the user independently from the portal) and make sure that the certification portal verifies them through a blockchain node before releasing the report.

4.3 UTM BOX

As key part of the research, two versions of UTM BOX will be realized and used in the alpha/beta tests for verification and validation campaigns.

These devices will be made available to the End Users (members of the advisory board) and to the Consortium partners in charge of the verification and validation campaign without any fee or charge, but under a set of condition for use described in the EULA proposed in the Appendix B of the D1.4 [RD 3].

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5 Allocation of resources

The Project Coordinator has already made available a section of its Monday.com repository, as well as for the repository for software, hardware and dissemination binaries.

The public repository available on the website relies on the hosting and domain services covered by the communication and dissemination budget. It will stay available at least for a year after the end of the project. However, it will be interest of the Consortium Members to evaluate to keep the communication channels and the website active, considering that the website will act also as entry point for the CERTIFLIGHT service once developed.

Concerning the Open science approach, publication fees in full open access venues for peer-reviewed scientific publications are eligible for reimbursement.

6 Data Security

Backup copies of the entire data package will be held locally on a dedicated cloud service and, ultimately, on local server as additional backup.

All repositories, storages, services, and servers for internal use will provide access only to registered and/or invited subjects, namely consortium members.

7 Ethics

Ethics aspects involve the Data Protection and are described in the Del 1.4 [RD 3], where is also provided the template for the informed consent for interview responders.

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8 Other Issues

Project Coordinator has made available its methodology to the document management for project deliverables. The methodology, hereby reported, also defines deliverables metadata: Deliverable name, Lead Beneficiary, Author(s), Revision, Edition and Issue, Dissemination level.

Quick compilation instructions

Please work with revision mode activated.

The information on page 1 in the **Deliverable Details** table, the **Document Title** and the content of the **Header** must be modified by accessing the Document Properties (<https://support.microsoft.com/en-us/office/view-or-change-the-properties-for-an-office-file-21d604c2-481e-4379-8e54-1dd4622c6b75>), according to these steps:

- 1) go to "File"->"Info"->"Properties"->"Advanced Properties"
- 2) Then, on the Summary tab, edit the Title of the Document, **confirm with Enter or with Ok key also for the next steps.**
- 3) For the remaining properties, select "Custom", then:
 - a) Deliverable Nr: The Author edits the field (example D2.2) according to the Grant Agreement.
 - b) Lead Beneficiary: The Author edits the field with the company/institution name.
 - c) Dissemination Level: The Author edits the field according to the classification available in the Grant Agreement (SEN or PU).
 - d) STATUS insert:
 - i) **DRAFT** from creation the first Release Major (see point e.);
 - ii) **CONTROLLED**: when a version is examined by the Beneficiary leader of the Deliverable in order to verify formal and substantial correctness and for the following Minor release by a Reviewer;
 - iii) **APPROVED**: version (issue) approved by the EUSPA.
 - e) Edition, Review and Issue: Each document starts with 00.01, where
 - i) Revision: edit the field with the versioning number for drafts and low-level changes, accepted values 01 to 99;
 - ii) Edition: indicates the controlled (by the Coordinator) and approved (by EUSPA) versions of the document, accepted values 01 to 99;
 - iii) Issue: the combination of Edition and Revision, the field is filled in automatically
 - f) Remaining fields in the deliverable details are filled-in automatically.
- 4) The **History of the Document** table must be filled in manually for each minor and major release.
- 5) To update all fields, after editing them: select all doc (CTRL+A)->Right button->Update Field.
- 6) **To save the file**: save as "**Document code**" + "**Filename**": example D1.1-First Quarterly Progress Report_01.01"


Page Header

Select all the fields (CTRL+A) and update all as in point 5) above.

Page Footer

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Table 8-1 CERTIFLIGHT Document management instructions

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