OPTIC FIBRE-BASED HYDROGEN LEAK CONTROL SYSTEMS

D6.2

Data Management Plan

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TECHNICAL REFERENCES

Project Acronym	OPTHYCS
Project Title	OPTIC FIBRE-BASED HYDROGEN LEAK CONTROL SYSTEMS
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Topic	HORIZON-JTI-CLEANH2-2022-02-02
Project Coordinator	ENAGAS
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Deliverable No.	D6.2
Dissemination Level	PU - Public
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Task	T 6.2 - Data Management Plan
Lead beneficiary	ENAGAS
Contributing beneficiary(ies)	ENAGAS
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Estimated PM for deliverable	

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PROJECT SUMMARY

OPTHYCS project aims to develop a new sensor technology that will lead to reinforce the safety level of H2 applications, as well as to anticipate and therefore minimize H2 releases and limit an eventual climate impact, from production to storage and distribution, both in new infrastructure, working with pure H2, and in reused natural gas plants and pipelines, contributing to a safe and economically viable implementation of H2 production, transportation and storage processes.

OPHTYCS will increase both the safe and cost-effectiveness while minimizing environmental impact of the operation with both pure and natural gas blended H2 through the development of continuous and fast-response leak detectors based on optical fibre sensors technologies in remote locations.

These newly developed sensors will be able to adapt to existing facilities and new infrastructure and analyse and classify leak types and sources based on risk, location, leak impact, probability of severity, and predictability through continuous predictive maintenance combined with increased speed of response. This sensor technology will be tested in several use cases with both pure H2 and H2 blended with natural gas: open and closed pipelines, H2 refuelling stations (HRS), midstream sites, and existing natural gas wells; the results obtained in these use cases will be used to tailor solutions to safety, environmental, and economic considerations.

OPTHYCS consortium unites 7 partners from 3 different European countries (Spain, France, Belgium), providing a multi-stakeholder point of view that covers the whole value chain of H2 storage and distribution: TSOs, technology developers (sensors, software, interrogator), technological research centres and use case validators. The consortium was created carefully to group excellent partners together, which bring necessary knowledge, competence, experience, and critical mass which ensure the achievement of the objectives.

Figure 1: Map of OPTHYCS Consortium partners

EXECUTIVE SUMMARY

The Data Management Plan (DMP) describes the collection, generation, management, and preservation of data during OPTHYCS project.

The DMP aims at making research data findable, accessible, interoperable and reusable (FAIR) according to the European Commission rules and includes:

- The handling of research data during and after the project;
- The type of data collected, processed and generated by the project;
- The methodology and standards applied;
- Whether data will be shared/made open and how;
- How data will be curated and preserved.

The application of this document is the responsibility of all the OPTHYCS project partners. This document can be updated through the lifecycle of the project to enrich and update the current information as well as to include new issues or changes in the project procedures.

1. DATA MANAGEMENT POLICY

The OPTHYCS project will comply with the European Commmission's legislation, in particular the one concerning data management. For this reason, the consortium has elaborated a Data Management Plan, in order to make sure that the consortium members act according to EU rules.

This DMP includes information on the responsibilities concerning data collection, processing, and storage. It explains the process to be followed by the consortium members to collect and process data. Each partner will be responsible for the data it generates (identification, naming, conversion, storage) and for sharing it with the other members of the consortium. Public data will be limited to scientific publications, scientific meeting presentations, abstracts and public deliverables reports after their validation by the European Commission.

To guarantee the data reliability, scientific data will be stored on the storage system of the partner who produces it. Each partner will ensure a re-copy of this data. The shared data can also be stored on the TEAMS collaborative space dedicated to the project (which ensures a more sustainable conservation). The access to TEAMS OPTHYCS working group is reserved for project partners only and it offers a permanent storage solution for data and documents created inside the consortium. The TEAMS group is organized with entries based of the different work packages of the project.

2. DATA SUMMARY

To endorse the European Open Science Cloud (EOSC), the consortium will monitor the incorporation of EOSC resources and services to be used in the data and outputs management activities of the project. As described in the corresponding work packages, all the data and research outputs will be generated by following robust protocols and procedures that will ensure reproducibility of research outputs. In fact, a big effort has been allocated to define requirements for all project innovations, and research process and tools will be made transparent and available during and after the research until validation process in the WP4 validation phase, that will scale-up and make replicable the results of the R&D activities. OPTHYCS will also expect from the quick and open share of its results in classifying different typologies of H2 leakages that will enable the State of art of building design with smarter designs to mitigate the possible effects of these leakages and to enrich the safety protocols of all related industries.

The main objectives of the OPTHYCS Data Management Plan are to document and to validate the developments carried out within the project workplan. It will also allow to communicate the results of the project to the academic and industrial communities impacted by the project. During the project lifetime it will be necessary to collect, store and share data and preserve the originality of the data for the scientific community.

OPTHYCS will ensure research data is Findable, Accessible, Interoperable and Reusable (FAIR data principle) to make possible that knowledge is integrated and Associated with document available for re-use in future research and projects. Data sharing will be addressed, taking into consideration any ethical and data protection concerns and fully complying with privacy issues. Also, it will be shared within the Annual Data Collection Exercise and Programme Review Report and the Fuel Cell and Hydrogen Observatory, both in the context of the creation of the Knowledge Hub for Hydrogen in Europe by the Clean Hydrogen JU, complying with the procedures addressed within this context (sharing public data, while guarding confidential data). No data transfers to third countries or third parties are envisaged, nor personal data treatment.

The main data formats will be:

1. Written documents MS Word (.doc, .docx), Excel (.xls, .xlsx), PowerPoint (pptx) and compatible files;
2. web pages (html ...);
3. data produced by calculations and simulations;
4. Measured raw data acquired or post-processing of results: proprietary formats dependent of the acquisition modality acquisition, converted if necessary in open formats ("csv", ...) for sharing;
5. PDF (.pdf);
6. JPEG

The data volumes will depend on the type of data that will be produced, and this will be assessed regularly during the project. Each partner will be responsible of its own data produced and for storing it properly.

3.FAIR PRINCIPLES

All the future exploitable activities of the research outputs will be done under fair and reasonable conditions and will commit to exploit the Project Results rapidly and broadly.

3.1. FINDABILITY

Open science and open innovation are in the DNA of all partners of OPTHYCS. In fact, one of the main pillars of the project will be the open innovation so all the relevant knowledge actors are included in the project. OPTHYCS consortium will follow early and open sharing of research. It intends to use the preregistration repositories OSF and AsPredicted to make public the research plan followed in the technological development work from an early stage, making possible to present the research hypothesis prior to outputs confirmation. Moreover, widely employed preprint servers li will be used to upload and share the scientific manuscripts produced prior to peer-review OA publication, except the potential data that could affect the future commercialization of the exploitable results

Dataset units will be produced during the project life span. Each data set will contain, at least the WP to which it belongs, typology and format with a description and information on the origin of the data, expected size and purpose of the data collected generating a unique PID.

The research data will be firstly available only for internal purposes in each WP, all data being stored by WP in TEAMS. Afterwards, for the data that will be available for public uses, datasets will be stored on Zenodo, automatically becoming part of OpenAIRE, the EC-funded initiative supporting the Open Access policy. Each data set will be assigned a unique identifier.

In order to optimize the findability of the project data the following key words are proposed:, hydrogen leakage, hydrogen emissions, hydrogen detection, optic fiber sensors, fiber sensors, sensor coatings, Fibre Optic Leak Detection System (FOLDS), Leak Detection System (LDS), Distributed Fiber Optical Sensing (DFOS).

OPTHYCS partners acronyms that can be used are:

1. ENAGAS (ENAGAS Transporte SAU)
2. GRTG (GRTGAZ)
3. TECNALIA (Fundacion Tecnalia Research and Innovation)
4. LUM (Lumiker Aplicaciones Tecnologias Sociedad Limitada)
5. FEB (Febus Optics)
6. FHA (Fundacion Hidrógeno Aragon)
7. GERG (Groupe Européen de Recherches Gazinères)

All written documents must include a cover page according to the proposed template of the project (with the necessary information: title, date, version, authors, partner).

3.2. ACCESSIBILITY

OPTHYCS will also ensure immediate open access (OA) to all scientific publications expected to be produced related to relevant project results, while ensuring that enough intellectual property rights are maintained by the consortium. OPTHYCS counts with widely experienced profiles in OA publications, TECNALIA, LUM, FEB and FHA have demonstrated experience in OA publications having participated in several OS Journals such as Spanish Maintenance Association Journal (AEM), JICABLE2019 and WIND Europe 2021. FHA has been designated as OA Coordinator to implement Open Science during the Project. OPTHYCS will ensure immediate OA to all scientific publications expected to be produced related to relevant project results while ensuring IPR is maintained by the consortium. Thus, journals will be selected for publication not only according to their area of research but also ifthey have been identified on a search in the Directory of Open Access Journals and include Gold/Green OA options. Authors of all peer-reviewed scientific publications will ensure they are stored in OA trusted repositories (Zenodo, OSF), and after the project's life following Art. 17 and Annex 5 of the GA. OA to research outputs will be provided in OPTHYCS by employing GitHub. The consortium will also participate and contribute to the Open Access Week.

Type data	Access	Lijke
Scientific publication		Open to public in scientific journals
Laboratory testing data		confidential data, only access inside the consortium
Results of the validation tests		The techno-economic assessment of the system after the tests will be open to public

		The specific results for each test is sensible information and will be confidential.

Confidentiality level of each data will be defined, considering Intellectual Property Rights (use restrictions and licensing information). This table will allowsetting up a standardized access protocol and specifying the data access during and after the project.

Open Access will be implemented in peer-review publications, conference proceedings and workshop presentations according to the European Commission requirements.

OPTHYCS consortium will follow early and open sharing of research. Non-confidential results will be firstly shared with the community as preprints or registered reports as soon as possible, while protecting IPR, and then, reinforced through dissemination and diffusion tools (Congress, talks, etc.). The consortium is aware and fully supportive of the benefits of publishing in the Open Research Europe and will study its use to deliver some of the expected publications, where open peer review publications would be selected.

Furthermore, relevant negative data, if produced, will be published in OA repository or journal aligned with FAIR principles (such as Data in Brief) to enrich H2 leak detection technologies knowledge and avoid duplication of efforts in the scientific community.

3.3. INTEROPERABILITY

Proper metadata, including keywords, facilitates transparency and re-usability. Metadata will be open under a Creative Common Public Domain (CC 0) and indexed by a standardized metadata framework.

This section will be compiled during the project as datasets will be made available and shall include information on:

- Use of open software applications
- Use of standard vocabularies and methodologies

3.4. REUSABILITY

The data which are part of a project public deliverable will only be made available after the deliverable will be published on the website of the European commission. The re-usable data will be limited to all scientific published data on open access, based on the rules of ethics for the use of published results. Published articles will be made public on the OPTHYCS website and Zenodo, other open access data bases chosen by the partners can also be used

We suggest that scientific data to be stored on the storage systems of the partner who produces it. Each partner will ensure a re-copy of its data. This data will be available at least up-to ten years after the end of the project.

Open Access will be implemented in peer-reviewed publications, conference proceedings and workshop presentations. Where applicable, peer-reviewed OA data sharing journals may be used (e.g., Data in Brief). ENAGAS will include information on licensing of data, their availability, re-use of data, duration of data for re-

use, reproducibility of research outputs, location of the data and a summary of the plans, even discarded ones, to reuse the data, among other issues.

4.STORING AND SHARING DATA

4.1. DATA MANAGEMENT

ENAGAS will oversee data management, while quality control of each dataset, and effective data management is the responsibility of every WP leader. Details on ethical and GDPR aspects, as well as roles and responsibilities of the involved partners will be covered in the overarching data management approach, as well as procedures for long-term preservation of datasets during the project and up to 5 years after. All WP leaders will design a suitable tested backup strategy to allow full recovery of the locally stored data. WP leaders will also ensure to have all appropriate security measures in place for data not stored in the shared project repository.

The data storage costs are the responsibility of each partner who produces them. All partners are responsible for the management and storage of the data generated by them. The coordinator is responsible for the management and the storage of official periodic reports.

Data and publications given open access shall be submitted to the OPTHYCS Consortium for review and approval before being uploaded in the repository. The Consortium shall be informed 45 days to review the data / publications and has 30 days to provide its feedback.

4.2. DATA SECURITY

Foreseen personal data collection and processing as well as protection measures shall comply with the Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons about the processing of personal data and on the free movement of such data (GDPR) and national legislations.

When dealing with confidential data, partners will ensure that they comply with the non-disclosure policy detailed in section 10 of the Consortium Agreement.

NB: Zenodo allows users to upload files under closed access, which means that zenodo.org users will not be able to access the files you uploaded. The files are however, stored unencrypted and may be viewed by Zenodo operational staff under specific conditions. Therefore, secret or confidential data will not be stored In Zenodo.

5.REFERENCES

- DMP OPIDoR https://dmp.opidor.fr/
- OpenAIRE Guides and Factsheets: https://www.openaire.eu/support.
- Open access (Digital Agenda site): http://ec.europa.eu/research/openscience/index.cfm.
- European Commission. Grant Agreement N° 101101415
- OPTHYCS Consortium Agreement