



REDIFUEL

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Executive Summary

The document describes the way of data management in this project. The purpose of this document is to verify that the data which is managed, is treated in a so-called FAIR way, that is, data are findable, accessible, interoperable and reusable as much as possible.

As the main deliverables are experimental results, and the overall target is to derive a combustion system optimized for biomass-based fuels, only few experimentally derived test data will be made openly public. However, developed CFD-models also will allow reusability beyond and after REDIFUEL.



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1 Summary

The Data Management Plan of REDIFUEL will introduce first the storage systems in which data are stored, and subsequently the types of data that have to be managed within REDIFUEL will be listed. Then, it will be explained what type of data is stored where and comments on the data life cycle are given.

1.1 STORAGE SYSTEMS

Table 1 Overview on Storage Systems

Type of Storage	Storage Location	Indexing	Access	Versioning	Security/ Encryption	Security/Backup	Costs
Cloud – Mett	Netherlands	yes	Restricted, individual access rights	Yes	Password protected		
Cloud – Wordpress	Germany		Public	No	Password		
File Shares	Partner specific servers	yes	User access limited.	No		Incremental backup	various

For the activities within REDIFUEL, the following storage systems are being used:

1.1.1 CLOUD SERVICES

Mett

In order to manage the project coordination, data exchange between the different work packages on management level, organization of appointments and online meetings is organized using the web services provided by Mett (<https://www.mett.nl/>). The coordination data and parts of major technical results (e.g. system diagrams, topology definitions etc.) are stored on that share. Manager of the project data is the contractor UNIRESEARCH.

Wordpress

The official project website (<http://www.redifuel.eu/>) is maintained via the cloud-based hosting server Wordpress.

1.1.2 VERSION CONTROL SYSTEMS

Documents or files that undergo multiple stages of revisions or development are required to be handled with a version control system. Mainly, this applies to data created with Microsoft Office or Open Office. Since the used cloud service Mett supports web protocol-based and server-based access to the versioned repository, forking of files into different revisions and releases are supported as well as renaming of files from one repository revision to the other, no other software solution is required within REDIFUEL.



1.1.3 NETWORK FILE SHARES

Other data are stored individually at each partner on proprietary (network) file shares. Those network shares are in general only available in the intranet of each partner and are accessible only by the members of the project. The partner network shares are used for the daily work of each task to keep and manage working data.

1.2 DATA TYPES

In this section, the different data types dealt with in the project are presented.

1.2.1 DOCUMENTATION

For general documentation and presentation of project results and their communication, only commonly used data formats are being utilized:

- Text documents (.txt)
- Adobe Acrobat Portable Document Format (.pdf)
- Microsoft Office Word (.docx)
- Microsoft PowerPoint (.pptx)
- HTML

The first four mentioned file formats are used at each project partner internally, but also for exchange between the project partners and for presentation purposes. All file formats can be opened and edited not only by proprietary software of the file format developers (e.g. Microsoft Office, Adobe Acrobat), but also Open Source Software like Open Office.

In order to exchange presentations between the partners, each of them is recommended to use PDF as standard file format to control the distribution of information. However, the users are also allowed to distribute presentations in editable PowerPoint format if they would like to explicitly allow for the dissemination of presentation contents by other partners.

1.2.2 TABULATED DATA

Tabulated Data files are mainly used in the context of the simulation and testing activities but also during meetings, for simple analysis and visualisation of values. They mainly fall under the following categories:

- Simulation Data
- Testing Data
- Parameter Files

Tabulated data are mostly contained in the following types:

- Microsoft Excel (.xlsx)
- Comma Separated Values (.CSV)
- Plain text files (.txt)
- Binary data

1.2.3 PROGRAM FILES (DATA)

REDIFUEL also deals with different experimentally derived test data and simulation tools and programs. Those programs can be proprietary simulation software or commercial software like GT-SUITE, KULI, Matlab, Converge, Morphee/Xmod, etc. Depending on the license agreement situation, the program files may be exchanged freely, otherwise it needs to be ensured that each partner has the required license to perform his task or receives this license, if possible, from another partner. However, due to the very clearly defined boundaries between the work



packages and the partners, an exchange of these data is only expected to happen within work package 3, mainly between the partners RWTH Aachen University and FEV Europe GmbH.

In- and output of program data are discussed in the following section 'Model Data'.

1.2.4 MODEL DATA

Pertinent to the simulation software described in the previous sub-section, for each simulation software model data are required, either serving as input to the simulation or as an output that requires post-processing. In general, each file format for the model data of the simulation task is proprietary and requires conversion tools to openly readable file formats.

Table 2 Overview on Data File Types

File Type	Example	Type of Storage	Access/Licensing	Versioning
Text				
Adobe Acrobat				
Word				
PowerPoint				
HTML				
Excel				
CSV				
Program File Data	MATLAB/ Simulink		Partially proprietary	
	Simapro			
	Converge	File	Commercial License	
	Tecplot	File	Commercial License	
	Uniplot	File	Commercial License	
Scripts				
	MATLAB Scripts (.M)	File	License to execute	yes
Model Data				
	MATLAB SIMULINK Models (.SLX/.MDL)	File	Commercial License. Limited access for IP protection	yes
	Tecplot (.out)			
Simulation Data				
	MATLAB Data (.MAT)		Commercial License Limited access for IP protection	yes
	Tecplot (.out)		Commercial License Limited access for IP protection	
	Simapro (.csv, ILCD format)		Commercial License Limited access for IP protection	
Testing Data				
	ADAPT test data (.csv)		Commercial License Limited access for IP protection	
	FEVIS test data (.dat)		Commercial license Limited access for IP protection	
Parameter Files				
	MATLAB Scripts (.M)		License to execute	yes
	MATLAB Data (.MAT)		Commercial License	yes

2 FAIR Data

2.1 MAKING DATA FINDABLE, INCLUDING PROVISIONS FOR METADATA

As one main goal of this project is to interconnect different simulation tools and component models with each other, it is strictly required that data in this project are findable. First of all, signal data have to be exchanged between simulation tools. In the context of this, project data from signals become findable when the naming of the signals follow a predefined structure. It is also possible to use key words to optimize reusing and finding specific data. Therefore, data exchange on Mett is organized in a very clear structure. Hence, data is either assigned to specific work packages or events, such as General Assembly. Moreover, all data file names an acronym is preceded to clearly indicate its use. This standard and easy identification mechanism helps to discover, identify and locate the data files. Another way to optimize retrace different versions of one document is to use different version numbers which will also be done.

For the exchange of large amounts of test and simulation data between the partners RWTH and FEV, common data naming rules have been established.

2.2 MAKING DATA OPENLY ACCESSIBLE

Only in exceptional cases, the consortium of REDIFUEL will make data openly accessible. Some of the test results and findings during the course of the project will of course be published, e.g. by Open Access Publications and oral / poster presentations. Also, some deliverables, mostly reports, will be made public. On the publicly accessible website, only public data are shared. But for most data, non-disclosure agreements keep the partners from publishing their research data.

2.3 MAKING DATA INTEROPERABLE

By the principles of signal data naming convention and component model interface standardization as described above, data that are generated and used above are thereby interoperable.

2.4 INCREASE DATA RE-USE

The experimentally gained data as well as simulation data will be reuseable beyond and after REDIFUEL. Particularly the CFD-models can be used later for further simulation tasks. The time when the data can be available for re-use depends on various factors, e.g. non-disclosure agreements, intellectual property rights, requested adaption of models, etc.



3

Data security

Principles of data security were taken into account when the layout of the data management was defined. All data are password protected and only made available to project members.



4 Ethical aspects

Ethical aspects are regarded in this project or are not compromised by this project. Only technically related data are treated in this project and therefore do not contain person related data. Exception are the financial reports to EU-fin reporting tool which may contain some person related data reports although no names or salaries are reported. Storage locations of data are in EU or other partner countries. For handling of sensitive personal data, deliverable D6.2 has been carried out.



5 Recommendations

It is recommended that this document will be updated in case that significant changes of the data management procedure that is used in this project will occur.

5.1 REFERENCES

- [1] European Commission, Guidelines on FAIR Data Management in Horizon 2020, URL: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf, 2016



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- 3 - CSIC – AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS - ES
- 4 - VTT – Teknologian tutkimuskeskus VTT Oy - FI
- 5 - RWTH – RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN - DE
- 6 - OWI – OWI Science for Fuels gGmbH - DE
- 7 - VUB – VRIJE UNIVERSITEIT BRUSSEL- BE
- 8 - NESTE – NESTE OYJ – FI
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