



Final Data Management Plan

Deliverable Number D7.6
Deliverable Type R – Document, Report
Dissemination Level PU (Public)
Deliverable Responsible Florian Feyersinger, VIF
Document Version & Status V2.2 | Final

Project Acronym greenSPEED
Project Title Green and Sustainable Processes
for Electrode Production
Grant Agreement Number 101069528
Project Coordinator Virtual Vehicle Research GmbH
Project Website www.greenspeed-project.eu



Authors

Name	Organisation	Name	Organisation
Florian Feyersinger	VIF	Medina Ćustić	VIF

Reviewers

Name	Organisation	Date
Alex Thaler	VIF	2025-08-25

Change History

Version	Date	Name/Organisation	Description
V1.0	2025-06-24	Florian Feyersinger, VIF	Creation of updated version
V2.0	2025-08-21	Florian Feyersinger, VIF	Final Version
V2.1	2025-09-01	Florian Feyersinger, VIF	Final updates after review
V2.2	2025-09-08	Medina Ćustić, VIF	Formal release of deliverable

Documentation of Delayed Submission

Planned Date	2025-08-31
Actual Date	2025-09-08
Reasons causing the delay	Unavailability to finalise the formal review and release within the coordination team.
Effects on follow-up activities and other WPs/tasks	No effects on other activities.
Mitigation measures	-

Table of Contents

1. Executive Summary	6
2. Introduction	7
3. Data Summary	8
4. FAIR Data	9
4.1 Making data findable, including provisions for metadata.....	9
4.2 Metadata Pre-definition	9
4.3 Making data accessible	11
4.4 Making data interoperable	11
4.5 Increase data re-use	12
5. Allocation of Resources.....	13
5.1 Costs for making data FAIR	13
5.2 Responsibilities of data management.....	13
5.3 Long-term preservations	13
6. Data Security, Ethics and Other Issues	14
6.1 Data Security.....	14
6.2 Ethics	14
6.3 Other Issues.....	14
7. Data Interface.....	15
7.1 Introduction	15
7.2 Description	15
8. Conclusion	16
9. Appendix	17
9.1 MANUAL for greenSPEED data interface.....	17
9.1.1 Basics	17
9.1.2 Hdf5	17
9.1.3 Metadata.....	17
9.1.4 Start up and logging in	18
9.1.5 WHAT and HOW:.....	19
9.1.6 Manual	19
9.1.7 Progress bar	20
9.1.8 “logger” tab.....	20
9.1.9 “file navigator” tab	20
9.1.10 Chosen file	20
9.1.11 Subdir.....	21
9.1.12 Metadata block.....	21

- 9.1.13 Download22
- 9.1.14 Delete (non public user)23
- 9.1.15 “data visualisation” tab23
- 9.1.16 Multi plotter.....24
- 9.1.17 Plot:.....24
- 9.1.18 “upload” tab:25
- 9.1.19 Upload:.....25
- 9.1.20 “uploaded but unmerged”27
- 9.1.21 Merge uploaded27
- 9.1.22 “terms and conditions” tab27
- 9.1.23 “feedback” tab27
- 9.1.24 Closing remarks28
- 10. Abbreviations29
- 11. References.....30

List of Figures

Figure 9-1: Metadata file format inside the .xlsx file	18
Figure 9-2: login window.....	18
Figure 9-3: tab design of the interface, up to 6 tabs.....	19
Figure 9-4: notification bar here with one of the messages everyone will see.....	19
Figure 9-5: the header or layout box available in every tab.....	19
Figure 9-6: logger tab example.....	20
Figure 9-7: left: no path was selected/starting point, right: several paths have been selected	20
Figure 9-8: a path has been selected that has no deeper layers/ we are at dataset level	21
Figure 9-9: metadata box for definition of search criteria	21
Figure 9-10: download area for file format definition as well as actual download	22
Figure 9-11: delete buttons.....	23
Figure 9-12: empty result selection areas.....	23
Figure 9-13: plotly toolbar.....	24
Figure 9-14: 2D plot on the left, 3D plot on the right	25
Figure 9-15: upload tab areas.....	25
Figure 9-16: online metadata definitions for uploaded file(s).....	26
Figure 9-17: terms and conditions, top at the beginning, bottom during usage	27
Figure 9-18: feedback tab.....	28

List of Tables

Table 4-1: Naming Conventions	9
-------------------------------------	---

1. Executive Summary

greenSPEED is a European funded project under the Horizon Europe programme, HORIZON-CL5-2021-D2-01-04.

The greenSPEED project offers solutions for new sustainable electrode and cell manufacturing processes with reduced energy consumption, lower carbon footprint and ZERO Volatile Organic Compounds (VOCs) emissions. To that aim, the project main target is developing a battery cell comprised of electrodes manufactured by innovative dry processes. Our composite cathode, based on Ni-rich NMC, is to be manufactured by scalable roll-to-roll dry electrode coating process, that fully removes the use of casting-solvents and eliminates the need of energy-intense drying-, condensate and transportation process required in state-of-the-art electrode fabrication.

The greenSPEED high-capacity pure-silicon anode is to be manufactured taking full advantage of our innovative process based on Microwave-Assisted Plasma Enhanced Chemical Vapor Deposition (MW-PECVD), which deposits porous silicon directly on the copper current-collector starting from locally produced silane gas (SiH_4). Moreover, the use of advanced modelling and simulation techniques including digital twins, artificial intelligence, and machine learning are to be employed to predict and optimise cell performance in early development stages, support the cell production process by virtually assessing the influence and importance of production parameters and thus minimising the number of experiments and to accelerate electrode production optimisation steps. The greenSPEED cell aims at increasing energy density (+69%) while reducing energy consumption (-32%) and costs (-21%) of production as compared to state-of-the-art Li-ion cells. The concepts here proposed have been already demonstrated at TRL 2/3 with the aim of reaching TRL 5/6 by the end of the project.

D7.6 Data Management Plan of the greenSPEED project is the updated version of the Data Management Plan (DMP) based on D7.2 [2]. As the data management plan is a living document, parts of D7.2 have been updated to reflect the updates done since the last version.

The data management within greenSPEED follows the relevant EU and national legislation on data protection. All project partners shall ensure that the EU (e.g. the GDPR (Regulation (EU) 2016/679) and national regulations are complied with.

2. Introduction

Data is not in the centre of interest of the greenSPEED project but supports the overall process and synchronises the information between the work packages and partners. The proposed actions for the overall data management process within greenSPEED are performed and monitored in the course of Task 7.3 Research Knowledge and Data Management Mechanism (led by VIF). It relates to all greenSPEED objectives.

Because of the competitive industrial nature of greenSPEED, not all data generated by the project can be made available to the public without compromising the legitimate interests of the partners. Nevertheless, data management within the project has a very high priority and will therefore still be carried out. The handling of sensitive data in the project is further regulated in the Consortium Agreement [3] and Grant Agreement [4] of greenSPEED. The data management process is overseen by the project coordinator (VIF).

Within the greenSPEED project, no processing of personal data is planned, except for those necessary for the administration of the project, e.g. contact details. Should this change in the course of the project, appropriate measures will be taken in due time. As the Data Management Plan (DMP) is a “living document”, has been updated on a regular basis. In any case, the project partners will observe and comply with all applicable legal provisions and regulations regarding data protection, in particular the GDPR (Regulation (EU) 2016/679), also within the framework of data management.

The data management process for greenSPEED was further defined in D7.2 [2] and updates are now provided in D7.6. This data management plan follows the structure of the Horizon Europe Data Management Plan Template [8] and further defines the methods and standards to be applied, the handling of data, the types of data, open access and the FAIR principle. In addition, data security and protection of data is included.

3. Data Summary

Following greenSPEED's vision of achieving European leadership in battery production with lower carbon footprint, data generated within the project play an important role. In general, data is categorised in one of the two data categories:

- Primary Data: New data generated within the greenSPEED project (e.g. generated from simulation activities, communication activities etc.).
- Secondary Data: Already existing data that are relevant for the greenSPEED activities (e.g. data from open access data bases, data from former projects etc.).

This is especially relevant for the datasets generated within greenSPEED (see Chapter 4).

In D7.2 [2], more details on the Deliverables, Promotional Material and Videos as well as Dissemination and Communication Activities and Publications are included. There are no updates since the first deliverable publication which is why this information will not be provided in D7.6. For the information, please refer to D7.2 which is also linked on the greenSPEED website: [greenSPEED D7.2 Initial Data Management Plan](#)

4. FAIR Data

As indicated in the previous chapters, data of different nature will be generated during the greenSPEED project implementation. This chapter will provide further inputs regarding the FAIR principle [1].

4.1 Making data findable, including provisions for metadata

The Horizon Europe Programme Guide [1] stresses the importance of data being “FAIR” (Findable, Accessible, Interoperable and Re-usable). All project partners will adhere to common data management principles to ensure that data collected, processed and/or generated during the project is properly managed, archived and retained in accordance with the FAIR principle, even if access is restricted. Data created within greenSPEED will be stored in the SharePoint specifically set up for the project by VIF and an access control list will be established according to the confidentiality levels described in the next subchapter.

Additionally, searching the data will be supported by the classifiers and metadata defined within this chapter. The idea of introducing these classifiers and metadata is to easily search through the datasets, first to provide a smooth interaction and second for synchronisation on data and information between each partner and therefore reducing time consuming communication activities. The provided SharePoint has dedicated folders for data collection where existence of metadata is assured.

All scientific publications will be identified using a DOI and the respective data that has been used for the research will be made available in open-access repositories such as ZENODO [6] or OpenAIRE [7] and an online platform generated during the project, if possible according to the CA [3] and GA [4]. More details are provided in Chapter 4.3.

In D7.1 “Quality Assurance and Risk Management Plan” [9], the naming conventions for general documents as well as deliverables have been defined. These guidelines are included in the following (see Table 4-1).

Table 4-1: Naming Conventions

Naming Conventions	
General Documents	greenSPEED_Title_yyyymmdd_vX.X.doc/pdf/xls (...)
Deliverables	greenSPEED_DX.X_Title_vX.X.doc/pdf (...)

- **Title:** Short document description (please do not use any special characters such as “.”)
- **Date:** Date of creation (format: yyyymmdd)
- **Version:** vX.Y (X = major version; Y = minor version; such as v0.1, v0.2, v1.0...)
- **File Extension:** According to the type of the file (such as docx, pdf, xls ...)

4.2 Metadata Pre-definition

The metadata of datasets are actively defined at the very beginning of the project to meet the project requirements. A first data management workshop was held, and first metadata and classifiers were defined. More details are provided in the following:

Date: date of last event, creation, manipulation or making it available

Time: time at which the event of date happened

Author: Responsible person for the given data

Description: short description of data

Number of Test Samples: amount of samples used to generate data

Link-Test Parameters: specific parameters for the given data origin

Link-Test Protocol: specific protocol fulfilled by data origin

Cell Type: one of half or full cell

Cell Format: one of single layer, multi layer or 21700

Electrode Width: dimension of electrode

Electrode Height: dimension of electrode

Number of Layers: number of used layers in a multi layer pouch cell

Status of Data Processing: one of raw, sampled or cut

Data Type:

- Primary/Secondary data: New generated or existing data (see Chapter 3)

Responsible partner: Describes who is responsible for the data generation and quality

Supporting partner: Describes who is also involved in the data generation and quality assurance

greenSPEED cell generation:

- Gen0/Gen1/Gen2: The datasets are referenced to a generation of the greenSPEED cell generations.

greenSPEED cell batch number:

- The datasets are referenced to a specific batch of the greenSPEED cells.

greenSPEED cell ID:

- The datasets are referenced to a specific greenSPEED cell.

Cell integration level:

- Anode/cathode/cell: This classifier is following the integration process of the cell, from component to full integration of the cell.

Data relation:

- Function/process/material: This classifier provides information on how the data relates to the property of the dataset. A function dataset relates to data describing the function of a cell component or the cell in general. A process classified dataset relates to production process data, most likely describing process related data like energy consumption, all relevant process parameters over time as well as the processing time. Material datasets are based on material data coming from partners, like physical characteristics on single components, e.g. foil properties, properties of active materials.

Dataset name: Describes the properties of the dataset, in a short form

Data format description: Describes the format of the dataset provided

Related task number: Task in the Project description, that generated the data

Data origin: one of measurement or simulation

Confidentiality level of datasets:

- Public (PU): Fully open (can be shared with the public)
- Sensitive (SEN): Limited under the conditions of the GA [4] (cannot be shared publicly)

Further additional classification: The greenSPEED project will extend these classifiers during the project runtime. Further information such as due date, work package of origin, supporting partners, whether it is measured or simulated data and more might be provided/added in the future.

4.3 Making data accessible

The greenSPEED SharePoint has been set up during the project proposal phase and has been updated to meet the needs for the project implementation phase. Data can be stored and accessed through SharePoint. The access is restricted to the project partners and can be requested directly from the project coordinator (VIF). As the owner of the greenSPEED SharePoint, VIF can monitor the version history, establish a regular backup policy and restore and manage the stored data. Additionally, an assembly of background scripts have been created syncing specified directories in the SharePoint with a public available server see section 7.

Publicly available information such as public project deliverables, publications or dissemination material will be accessible via the greenSPEED website [5] and other communication channels (such as LinkedIn). It is not necessary to request access data for the download, as these materials will be made available for the public. In addition, public research data will be publicly available at data platforms like ZENODO [6] or OpenAIRE [7]. The partners are committed to make publications accessible via green open access (self-archiving) or gold open access (open access via the publisher). Either way, partners can choose the option they prefer but must however ensure the open access to the deposited version of the publication.

According to Article 17 “COMMUNICATION, DISSEMINATION, OPEN SCIENCE AND VISIBILITY” and Annex 5 of the Grant Agreement [4], each beneficiary must ensure open access to the scientific publications of its results in a repository for scientific publications and the web-based greenSPEED repository, retaining sufficient IPR to meet with the open access requirements.

4.4 Making data interoperable

The interoperability is achieved by a good implementation of metadata information. Interoperability will be increased if proper metadata standards, methodologies and naming procedures are adopted. At the beginning of this chapter, a first overview of how datasets will be classified is provided. Common data formats such as .docx, .pdf, .mp4, .xls, .txt, .hdf5, .csv will be used. Publications must be “machine readable”, which means that scanned versions of publications should not be made available, but text file formats should be chosen. The reader must be able to read it online, download and print it free of charge with no access restrictions.

Usage of commonly used ontologies and a formal and broadly applicable language (e.g. English) will be applied in greenSPEED to enable and improve inter-disciplinary interoperability of (meta) datasets. However, as a living document, improvement identified throughout the project may be introduced in the updated version of the DMP.

It is important that data is stored properly according to the data management guidelines of the greenSPEED project and the FAIR principle [1].

4.5 Increase data re-use

The re-usability factor will be assessed for each dataset in a suitable and easily accessible format. The challenge here is to find a platform that is acceptable to each partner. In the first project year it has been decided to host a self-build platform providing project partners and the public with all necessary functionalities, see section 7, in addition to the used SharePoint and Zenodo etc. There, the degree of re-usability of the generated data will be determined by the field “confidentiality level”, see also “classifiers” in Chapter 4.2.

Unless otherwise stated, all the data shared and generated in greenSPEED will be considered confidential according to the Consortium Agreement [3] signed by all partners. Nevertheless, considering the collaborative spirit of the project and the academic vocation of some of the beneficiaries involved in the project, re-usable data for dissemination activities will also be generated; the field “confidentiality level” will thereby allow identifying the re-usable data generated during the project.

5. Allocation of Resources

5.1 Costs for making data FAIR

The costs for setting up and maintaining the greenSPEED SharePoint, as well as the generated data platform and automated data handling scripts, are covered by the coordinator (VIF). After the end of the project, the repository will not be updated. Nevertheless, the files stored there will still be available for access 4 years after the project end.

The costs for publications are covered by the respective partners/authors. Resources and efforts have been allocated to the partner's budgets. If eligible and allocated, costs for open access publications are covered. Further details are outlined in the Grant Agreement [4].

5.2 Responsibilities of data management

As the coordinator, VIF is responsible for the set up and update of the SharePoint as well as the generated data platform and automatization scripts, maintenance (structure, upload, downloads etc.), security assessment and respective mitigation measures as well as the access to the SharePoint and the management of user requests. The quality of the data is the primary responsibility of the data provider (the greenSPEED partners). All greenSPEED partners are responsible for handling the data according to the FAIR principle and making it available as openly as possible.

5.3 Long-term preservations

The greenSPEED partners consider the long-term preservations of the data to ensure that this is accomplished. In addition to the SharePoint, also the website and an additional data platform will be available 4 years after the end of the project. Afterwards, they will be archived. The partners will discuss this also with the Advisory Board, if necessary.

6. Data Security, Ethics and Other Issues

6.1 Data Security

The greenSPEED consortium makes every effort to protect the data, products and services from unauthorised use and provide secure access to data. All shared and processed greenSPEED data will be stored in a secure environment with access rights restricted to the respective project partners. If data is to be transferred between the partners, the respective articles in the CA [3] and GA [4] must be complied with.

6.2 Ethics

greenSPEED is carried out with the highest ethical standards and the applicable EU, international and national law on ethical principles. Ethics and legal issues are covered in the CA [3] and GA [4] of the greenSPEED project. No ethical issues have been identified by M38.

6.3 Other Issues

No other issues have been identified.

7. Data Interface

7.1 Introduction

A number of servers and platforms are available to host and distribute data. Data collected in greenSPEED specifically for batteries and reasonable metadata became unique. Additionally, experts in varying fields cooperated, leading to different needs in data handling and access. Finally, a huge problem has been the restriction of access to data while providing most comfort for data provided by using a single data server/ a single upload. Leading to the decision to generate a greenSPEED specific data server able to handle these issues as needed in the project.

7.2 Description

The following features were deemed necessary:

- Uploading data and ensuring existence of corresponding metadata
- Downloading of arbitrary number of datasets in a single step
- Handling of a number of (all) data formats as in as well as output
- filter options, due to metadata, to find data
- visual presentation of datasets in two and three dimensions
- two levels of access, public and project internal
- user friendly access via browser but able to access with automatization scripts

The platform can be entered with the link <https://greenspeed.v2c2.at/>. It is possible to enter either as project partner providing a username and password, or as a public user not providing any user credentials. The public user is limited in actions as well as access inside the platform, for example a public user is not able to upload or delete data.

Specific directories in the project SharePoint are synchronized with the data interface. A backup is created every week including the full hdf5 file with all datasets as well as all metadata, together with all provided feedback and failed sessions.

A manual for the platform can be downloaded as soon as it has been entered and is provided in section 9.1 in this document.

8. Conclusion

In a first step, the initial data management plan for greenSPEED was defined together with the consortium. The partners are aware of the regulations and recommendations of the European Commission and are willing to support these actions. In the first six months, a first data management workshop was already held with the partners. The decision on creating and hosting a self-made data platform has been made, which is publicly available since the start of the last project year and has been internally available for some time before. The general assembly meetings are used to keep all partners updated on data management development.

The greenSPEED partners will adhere to the FAIR principle [1] with respect to the IPR and regulations set in the Consortium Agreement [3] and Grant Agreement [4].

9. Appendix

9.1 MANUAL for greenSPEED data interface

This manual is aimed for users not for developers it contains information about the layout and about the features. The support is provided by the developer.

Virtual Vehicle Research GmbH

Florian Feyersinger

florian.feyersinger@v2c2.at

9.1.1 Basics

The provided interface is supposed to give a possibility to store save and access data inside of the greenSPEED project. A lot of definitions have been made before that like the design of metadata files each dataset HAS TO fulfil, and the format the database is saved in (hdf5).

9.1.2 Hdf5

Hdf5 is an easy understandable storage format it provides an internal path to data very similar to system paths, it allows the definition of metadata on “directory” (actually these are called groups) as well as on “file” (this would be called datasets) level. Additionally and very attractive for long term storage is the internal compression of data. Various compression levels can be applied data without losing access to metadata.

9.1.3 Metadata

In greenSPEED a specific format of metadata was predefined, the metadata has to be provided and in general per greenSPEED definition this is done by a “.xlsx” file. The format of the file is given in Figure 9-1. No further cells are filled. The formatting is not mandatory, but the text is. The name for the metadata file should contain the name of the file it corresponds to for example: the datafile “mysuperimportantdata.csv” has a corresponding metadata file called “metadata_mysuperimportantdata.xlsx”. You will see that there are possibilities to skip the metadata file creation and use this interface for it but keep in mind that the metadata will be FIXED for your data.

	A	B
1	Spalte1	Spalte2
2	Date	
3	Time	
4	Author	
5		
6	Description	
7	Number of Test Samples	
8	Cell Batch Number	
9	Cell ID	
10	Link- Test Parameters	
11	Link- Test Protocol	
12	Cell Type	
13	Cell Format	
14	Electrode Width	
15	Electrode Height	
16	Number of Layers	
17	Status Data Processing	
18	DataType	
19	ResponsiblePartner	
20	Supporting Partner	
21	Cell Generation	
22	Cell Integration Level	
23	Data Relation	
24	Confidentiality Level	
25	Related Task Number	
26	Data Origin	
27		

Figure 9-1: Metadata file format inside the .xlsx file

9.1.4 Start up and logging in

When the interface starts up you will be guided to the terms and conditions of use, you will have to accept them as well as the necessary cookies otherwise you will not be permitted to proceed.

The terms of use are quite long so you will have to scroll to the bottom to find the accept button. After pressing accept you get to the login, you will most likely need to scroll up to find it, see Figure 9-2.

Username:	<input type="text" value="enter your username"/>
Password:	<input type="password" value="Enter password"/>
<input type="button" value="LOGIN"/>	<input type="button" value="ENTER AS PUBLIC USER"/>

Figure 9-2: login window

You may enter as a public user without needing to enter any username or password as stated in the notice box. A public user is not able to manipulate the data and is not able to upload, features like filtering, download and visualization should work fine. Project partners will have their specified username and password and should login with them to use all features of the interface.

The login will take some time since all data has to be loaded, be patient and wait for the load bar.

9.1.5 WHAT and HOW:

The interface has 5 to 6 tabs depending on the server call, in general it will show in a 5 tab version.

The 4 possible tabs are “logger”(optional), “file navigator”, “data visualisation”, “upload”, “terms and conditions” and “feedback”.



Figure 9-3: tab design of the interface, up to 6 tabs

Each tab has 2 areas that are always the same.

One is the notification area, see Figure 9-4. It contains information for you. You can always reset it by closing it with the red “x” button, it will nevertheless pop up again if there is new information for you.

In general if you are unsure what happened just now or if anything happened at all you might get some hints about that in the notification area so check it out.

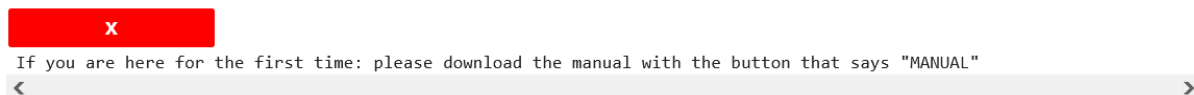


Figure 9-4: notification bar here with one of the messages everyone will see

The other one is the layout box containing the greenSPEED logo, a button to download this manual, a progress bar and the exit button to actually **SAVE** the changes you did and clean **EXIT** the application, see Figure 9-5



Figure 9-5: the header or layout box available in every tab

9.1.6 Manual

You most likely already pressed this button to download this document so yes, it provides you with this document.

9.1.7 Progress bar

The progress bar will indicate the progress of various subprocesses running in the background. This also means it will be filled for a number of times. To be sure that your main process passed check out the notification area mentioned above, it sometimes provides you with more information.

9.1.8 “logger” tab

This tab is used for debugging and will most likely not be shown for you as a user. If it is shown you can ignore it, it provides more information than the usual notifications see below. It has a clear logger button that removes all previous logger output.



Figure 9-6: logger tab example

9.1.9 “file navigator” tab

This will be the first visible tab after login. This tab enables to search for data inside the greenSPEED database.

First lets focus on the first two areas depicted in Figure 9-7, called “data – walker”.

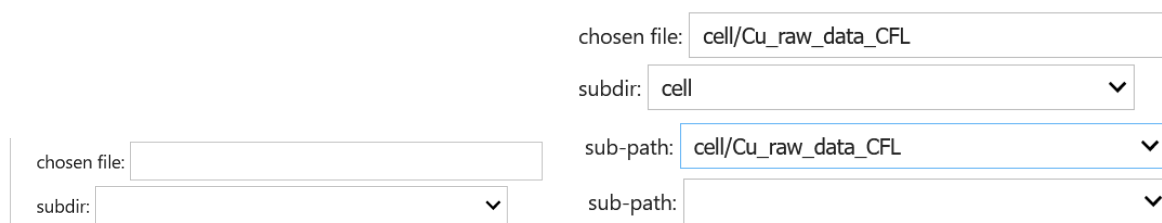


Figure 9-7: left: no path was selected/starting point, right: several paths have been selected

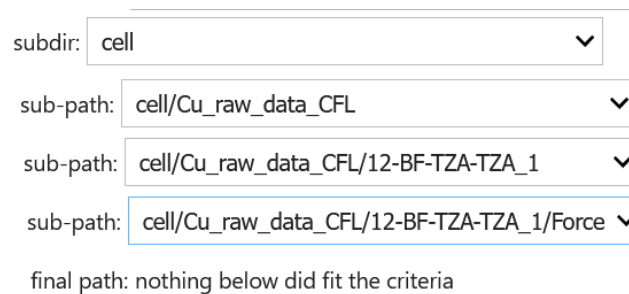
9.1.10 Chosen file

This gives the internal path to the file that is selected. In the moment you are not supposed to write something in there, it purely exists to provide you some idea of where you are right now located in the database, similar to a working directory.

9.1.11 Subdir

This is a dropdown area, you can select any given option. Selecting a NEW possibility will trigger a search in the new position inside the database for a new subdir tag which again can lead to new subdirs etc. It also updates the given path in “chosen file”. You can change any layer of the subdirs, also called path, at any time it will always trigger new subdirs and new “chosen file”. An example is given in Figure 9-7. This will go on until you reach a point in the database that has no more choices available, either because there is nothing inside or because you reached the level at which there is only (raw) data available. This point will be indicated by a message directly below the path and no new dropdown, see Figure 9-8.

TIP/WARNING: The “path - walker” should be used AFTER defining the metadata you would like to use since it defaults to empty as soon as the metadata is entered, even if the file fits the metadata. This might be counter intuitive since the metadata form is below the data walker but in most cases the creator of the interface believed that the data-walker will be the way to search data, so it got a higher priority. Additionally if you downloaded a file you will need to change the path directly above the added entry to trigger it as a possible selection.



subdir: cell

sub-path: cell/Cu_raw_data_CFL

sub-path: cell/Cu_raw_data_CFL/12-BF-TZA-TZA_1

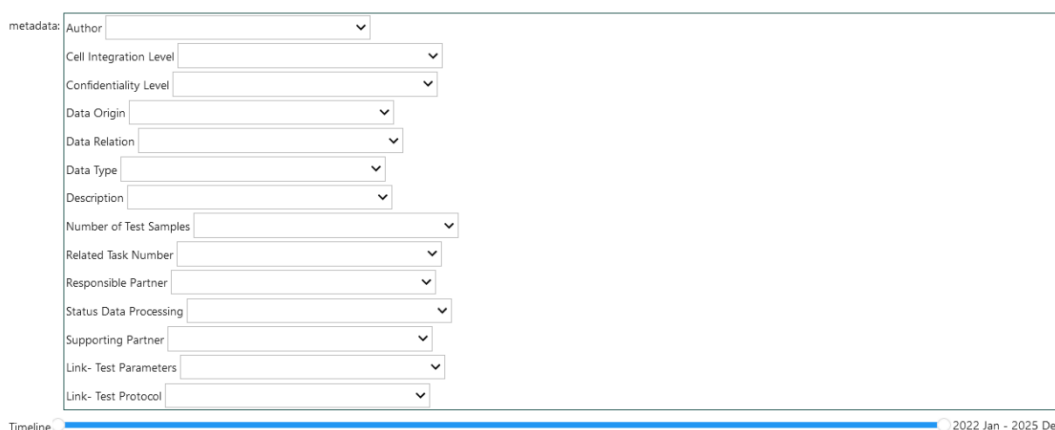
sub-path: cell/Cu_raw_data_CFL/12-BF-TZA-TZA_1/Force

final path: nothing below did fit the criteria

Figure 9-8: a path has been selected that has no deeper layers/ we are at dataset level

9.1.12 Metadata block

Now let us talk about the “metadata block” that is below the “data – walker”, and is given in Figure 9-9.



metadata:

Author

Cell Integration Level

Confidentiality Level

Data Origin

Data Relation

Data Type

Description

Number of Test Samples

Related Task Number

Responsible Partner

Status Data Processing

Supporting Partner

Link- Test Parameters

Link- Test Protocol

Timeline 2022 Jan - 2025 Dec

Figure 9-9: metadata box for definition of search criteria

These areas let you narrow down your searched data. All non-default inputs in these areas will influence the possibilities in the “path – walker” and therefore ANY CHANGE in the “metadata block” triggers a reset of the “path – walker” to the default empty path. This is done since the path you are currently in might not be reachable with the current metadata options and this

might lead to problems. Most of the metadata areas are dropdowns and should be easy enough to understand.

9.1.13 Download

Beneath the metadata area is the “download area”, Figure 9-10.



Figure 9-10: download area for file format definition as well as actual download

Here you can define the format you would like to download the selected data and then by pressing the download button a converter will create the format you decided on and provide the data as automatically started download. The data converter may TAKE SOME TIME, especially if you want to have a huge amount of data as “excel”. The progress bar will jump quite often (for every dataset) and if you are unsure if the progress is done you can have a look at the notification area where a “data converter is done” should appear as well as a “download will start automatically”. If this is the case and the download did not start properly after a few seconds, then there is something off and you might need to contact support. The possible data formats are “binary”, “pdf”, “hdf5”, “csv” and “excel”. If you would prefer another format, please contact support.

The “binary” format is used for all formats that are not included in the other formats. This sounds unusual, but it is the default format and the interface as well as the database do NOT care about the content. This can be anything from a code snippet to a zip file. A download with “binary” selection will NOT assume any file ending as WINDOWS would like to have it, so make sure to know the filetype the data you download is in. You can in general download everything in binary format, but it will not be as easily readable as other formats.

The “pdf” format allows to store pdf type files and directly get a readable version after download, but in reality this is just a special case of binary since it assumes the pdf file ending, for this to work please select the dataset that actually is data so in the file navigator you might find a data group with “_pdf” ending indicating its format to be pdf, selecting the “binary_” dataset in the level below results in readable pdf download.

WARNING: the formats “binary” and “pdf” allow only to download a single dataset or in other words a single entry in the database. Since the interface cannot assume how to concatenate binary files or files with varying content.

The “hdf5” file format is the fastest way to download your data since this is provided directly from the database. It is also the only way for you to download the metadata information as well. Depending on the position of the “path – walker” as well as the selected metadata a sub database is created and provided to download.

Data format “csv” will provide all datasets below the currently selected path in the “path - walker” as columns in a csv file. The data entries are separated with semicolon “;”.

Data format “excel” will write all datasets below the current path in the “path - walker” in a single excel sheet as columns. This is very similar to the csv format but since it is Excel, it will take MUCH LONGER.

9.1.14 Delete (non public user)

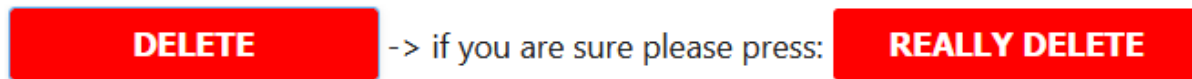


Figure 9-11: delete buttons

Below the download area you can find a button that says “DELETE” this button can be used to delete some files in the database. This delete functionality will delete all files that are selected/ are in path so if you press it without selecting anything YOU WILL DELETE THE COMPLETE DATABASE. Since this could be a pain in the neck, we provide some safety measurements by an additional button that asks if deleting is alright. The additional button pops up if you press the “DELETE” button and it says “REALLY DELETE”, after pressing this the data **will be permanently deleted**.

WARNING: be careful with the delete function it WILL delete the data from the database as soon as you sync your data with the actual server database as you do when you use the “EXIT” button. Therefore please ONLY DELETE FILES THAT YOU ARE THE AUTHOR OF.

TIP: if for some reason you did delete stuff you should not, you have but one option: NOT SYNCING your session with the server which is done by NOT exiting with the “EXIT” button. If you simply close your session your progress is lost which includes the deletions.

Public users also see the delete button, but nothing is triggered by clicking it.

9.1.15 “data visualisation” tab

This tab in general only includes 4 areas, see Figure 9-12.

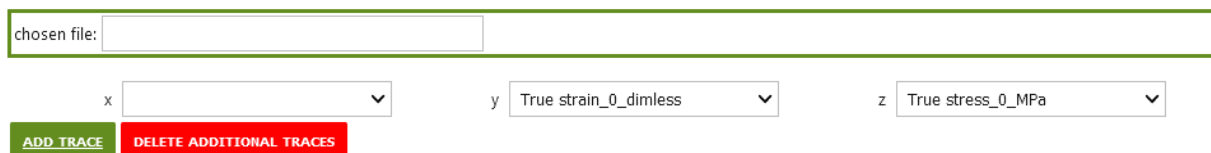


Figure 9-12: empty result selection areas

The left top is the same as the “chosen file” area in the “file navigator” and gives you an idea of which data is actually selected.

The other areas are x, y and z respectively, together called dimensions. Each of them is a dropdown selection for data available inside of “chosen file”. If you once have been in a layer that could provide data to x, y and z this will stay until you reached another layer to do so.

TIP: do NOT choose a dataset in the file-walker if you want to plot the complete data in it since you will only be able to select single points in the dataset. To plot a full dataset you have to select one layer above the dataset in the file-walker.

By selecting one of the dimensions you will trigger a plotter. If the data is of a numeric type, the data will be plotted. With a single dimension selected you will always end up with a 2D plot with the selection as y axis. This can be counter intuitive especially if “x” was set to values, but it makes more sense this way. If two dimensions are selected a 2D plot will be triggered that has “x”, or if no x was selected “y”, as x axis and “y”, or if no y selected “z”, as y axis. Selecting all 3 will provide a 3D plot.

You can select multiple times the same dataset, but it is questionable if this will provide you with more insight.

It is NOT POSSIBLE to select datasets from various groups. This feature is not allowed since data will not be consistent and plotting it will in most cases not make any sense.

9.1.16 Multi plotter

There is a button “ADD TRACE” which lets you add another dataset to the plot, which is a trace. You can again choose as many datasets as you please and plot them to the first value-plot. You may add an arbitrary number of traces and can delete all of the additional traces/datasets with the “DELETE ADDITIONAL TRACES” button. But things do get complicated if we plot more things at once. For example the plotter will not care about your dimensions anymore because how could he? Therefore only “dimension” will be written on any axis. The name of the trace will provide insight into the plotted data. The name is given as z + “_VS_” + y + “_VS_” + x missing parts will be skipped and the corresponding “_VS_” is also not shown.

For example a trace that shows “myx” on x axis will be named “myx”, adding the data “myy” as y data will plot a trace called “myy_VS_myx”. Adding “myz” as z data provides us with “myz_VS_myy_VS_myx”.

WARNING: the “multi plotter” feature is still in progress there is some known issue with the naming of the base plot trace but in general basic features work so have fun and provide feedback.

9.1.17 Plot:

The plots can be separated into 2 possibilities, a 2D plot and a 3D plot, see Figure 9-14. Both plots are generated with plotly and have the plotly-like interface, seen in Figure 9-13.



Figure 9-13: plotly toolbar

This interface appears on the top right corner of the plot, this is most likely directly below the z dropdown.

The first icon gives you the possibility to download the plot as png. Unfortunately downloading the plot as a png will not allow you to change the name of the plot, due to some bug inside of plotly, we hope this will be fixed in an upcoming release.

The second icon gives you some zoom options which are also available with the mouse-wheel. the third option lets you move the plot, also available via right click and drag.

Fourth icon gives access to the rotation option, also available via left click and drag.

A special case of the rotation, the rotation along Z axis, is given by the fifth icon.

Resetting the perspective to the original/start view can be done by clicking the sixth icon.

The second to last icon resets to a save state most likely the start point. The last icon is a link to plotly documentation.

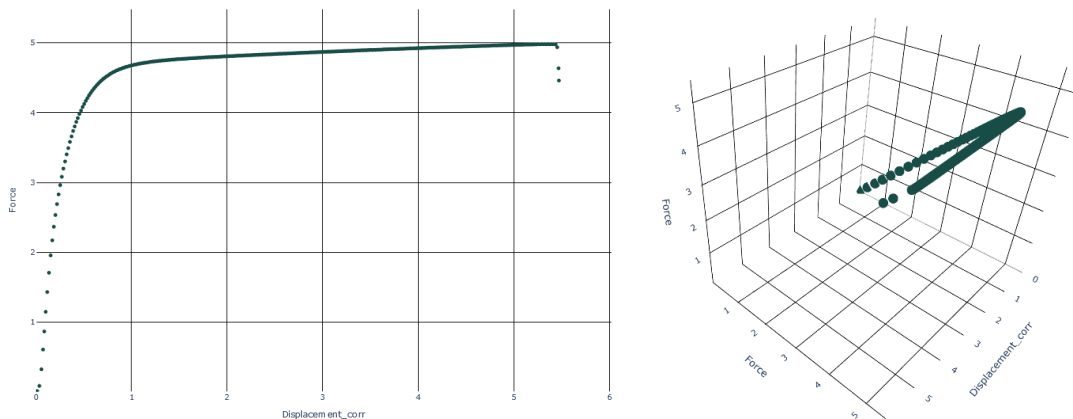


Figure 9-14: 2D plot on the left, 3D plot on the right

9.1.18 “upload” tab:

This tab provides you with the possibility of uploading your data to the database and allow other members to see your data (if you at the end exit with the “EXIT” button). For public users, this tab is empty.



Figure 9-15: upload tab areas

9.1.19 Upload:

The upload button will let you navigate your file browser. You are allowed to have multiselection. There are three possible cases.

- 1 You directly select the metadatafile you have written in “.xlsx” as well as a corresponding data file. The names should then be “mydata.something” and

“metadata_mydata.xlsx”, this is needed to correlate the two files to each other. In this mode you are also able to select an arbitrary number of data with their metadata files.

As a new feature you are also allowed to add an arbitrary number of datafiles with a single metadata file, this does reduce the number of metadatafile copies you have to create for the same information, the interface will nevertheless create those files.

- 2 You only select a single file, the data file. After uploading it you will be prompted to enter your metadata for this file which leads to Figure 9-16:

ALL are needed and default to SOMETHING but the * need to be taken special care of so please provide them!

author *

description

number of test samples*

cell batch number

cell id

link- test parameters

link- test protocol

electrode width[mm]

electrode height[mm]

number of layers

status data processing

data type *

responsible partner *

supporting partner

cell generation *

cell integration level *

data relation

confidentiality level *

related task number *

data origin *

date *

ACCEPT METADATA

Figure 9-16: online metadata definitions for uploaded file(s)

- In this area in the upload tab you have to provide the metadata of the datafile you uploaded. NOTHING ELSE WILL WORK IN THE MEANTIME. This looks similar to

the “metadata box” but allows to not select available metadata but to provide new ones. The metadata areas with “*” will not have a useful default value and need to be taken care of. Additionally those without “*” might be optional or at least can be left blank for example the “supporting partner” if you as a partner created this data by your own. Also areas like “cell id” might also be left at the default value if no cell was used. For a useful data management please provide as much of the information as possible, while still keeping it accurate, if you are unsure and the input is not mandatory it is preferable to skip it.

- 3 You tick the check box that says “use online metadata”, then you only select datafiles in the uploader. You will be prompted to add online the metadata ALL these files share, same as for 2.

9.1.20 “uploaded but unmerged”

This text area gives you all files that have been uploaded but not merged into the database yet, so if you would like to exit, please take a look if there is something left → there should nothing be in here otherwise it is NOT accepted in the database.

9.1.21 Merge uploaded

In the end you will always have to press the “merge uploaded” button to actually merge your uploaded files into the database.

9.1.22 “terms and conditions” tab

You will find yourself in this tab when you enter the interface. Legal information about the interface are given here and you are asked to accept the inherit terms and conditions to work with the interface, see on the top of Figure 9-17. Later during interface usage you can review the terms in this tab, and you may also revoke your cookie acceptance (bottom of Figure 9-17), which will kick you out of the interface and NOT save any of your data.

Funded by the European Union (GA: 101069528). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



AGREE

Funded by the European Union (GA: 101069528). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



REVOKE ACCEPTANCE

Figure 9-17: terms and conditions, top at the beginning, bottom during usage

9.1.23 “feedback” tab

This tab is a very important one and we hope you use it a lot Here you are able to provide feedback that will be saved for our development team. Please provide as much information as possible everything helps. In the case of urgent issues it is better to send a mail directly to the development team (the email addresses can be seen in the “terms and conditions” tab), since the feedback will be saved in your log file as well as an additional feedback file on the server.

To actually provide feedback, you will have to enter you text in the textbox and then click on the “send” button, see Figure 9-18.

feedback:

SEND

Figure 9-18: feedback tab

WARNING: Do NOT provide personal data in the feedback, the feedback files are unencrypted and anonymous.

9.1.24 Closing remarks

With reading this manual you did the first and right step into correctly using the greenSPEED data management interface congratulation and thank you VERY much.

The data management interface has undergone some testing in Virtual Vehicle Research GmbH but it could happen that something was not detected, so please do not hesitate about feedback especially if something is not working as it should. Of course also positive feedback is welcome.

10. Abbreviations

Term	Definition
CA	Consortium Agreement
DM	Data Manager
DMP	Data Management Plan
DOI	Digital Object Identifier
D(7.2)	Deliverable (7.2)
FAIR (data)	findable, accessible, interoperable and re-usable (data)
GA	Grant Agreement
GDPR	General Data Protection Regulation
Gen	Generation
greenSPEED	Green and Sustainable Processes for Electrode Production
M6	Month 6
MW-PECVD	Microwave-Assisted Plasma Enhanced Chemical Vapor Deposition
Ni-rich NMC	Nickel-Mangan-Cobalt cathode material with high Ni content
PU	Public
R	Document, Report
SEN	Sensitive
SiH ₄	Silane gas
TRL	Technology Readiness Level
VOCs	Volatile Organic Compounds
WP	Work Package

11. References

- [1] Horizon Europe Programme Guide: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf, Version 2.0, 2022-04-11 (last accessed December 2022)
- [2] greenSPEED Deliverable D7.2 „Initial Data Management Plan” v1.0, 2022-12-21
- [3] Consortium Agreement greenSPEED, Version [final 7.0], 2022-08-01
- [4] Grant Agreement Number 101069528 – greenSPEED, 2022-06-15
- [5] www.greenspeed-project.eu
- [6] www.zenodo.org
- [7] www.openaire.eu
- [8] Horizon Europe Data Management Plan Template, Version 1.1, 2022-04-01
- [9] greenSPEED Deliverable D7.1 “Quality Assurance and Risk Management Plan” v2.0, 2022-10-28