SAFELOOP

[Data management plan]
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DISCLAIMER

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ABBREVIATIONS

ALLEA	All European academies
BoM	Bill of materials
CA	Consortium agreement
CEA	French Alternative Energies and Atomic Energy Commission
CERN	The European Organization for nuclear research
DOI	Digital object identifier
DPO	Data protection officer
EHS	Environment, health and safety regulations
EV	Electrical vehicle
GA	Grant agreement
HHL	HHL Leipzig Graduate School of Management
IP	Intellectual property
LIB	Lithium-ion Battery
PID	Persistent identifier
RRI	Responsible research and innovation
UOulu	University of Oulu
TENK	Finnish national board on research integrity
URN	Uniform resource name
WP	Work package

1 DATA SUMMARY

SAFELOOP consortium will focus on the development of radical innovations for electric vehicles, EV battery makers to alter the bill of materials, BoM for battery cells. Data generated in the project will be useful for all the stakeholders of the project, developers of battery materials, battery developers, research organizations, policy makers and finally indirectly to the end-users also.

The SAFELOOP project mainly generates new data rather than re-using existing data. However, new data is built on top of existing knowledge in research publications and background information from partners. These are also used to validate the data collected in the project. In addition, data and materials produced in previous WPs are re-used within the project.

The specific objectives of SAFELOOP project are:

1. Enhance the safety of automotive-grade Li-ion batteries, LIBs through material-level performance enhancements and innovations.
2. Validate the improvements in individual cell performance by showcasing measurable enhancements in LIB technologies at the materials, processes, and cell and battery pack levels.
3. Improve the reliability and sustainability of automotive LIBs.
4. Showcase improved safety across the entire EV battery value chain.
5. Demonstrate cost competitiveness while implementing domestic manufacturing and environmentally responsible manufacturing practices specific to cell manufacturing.
6. Identify IP strategies and business models for building a globally competitive, sustainable and safe battery industry in Europe.

To reach these objectives, several types of data will be collected:

- Administrative data (e.g. meeting minutes, reports etc.)
- Experimentally collected data
- Laboratory notes
- Workflow diagrams, such as input-output or life-cycle diagrams
- Description of methodologies, such as procedures for sample analysis or battery testing
- Protocols, such as test protocols or acceptance acts
- Scientific models, such as conceptual, mathematical, physical or digital models
- Software programs, such as programs for experimental data processing or battery unit control
- Source codes for computer software programs
- Computer-generated data
- Photography, audio recordings, video
- Individual and group interviews (e.g. unstructured or semi-structured)
- Focus groups and workshops (e.g. results of group discussions or concurrent design sessions)
- Questionnaires
- Diary accounts
- Unstructured observations
- Processed data
- Metadata
- Manuscript drafts
- Scientific publications produced in SAFELOOP
- Other intellectual outputs expressed in writing, such as explanations, concepts, or theories

The following subchapter presents the origin, format and estimated volume of the data of each partner. Data types are also connected to work packages where data is collected. SAFELOOP aims to store data in open and standard data formats to facilitate sharing and re-use of data.

UOULU

To reach the goals of the project University of Oulu (UOulu, partner number 1) will collect 1-5 Terabytes of data from the following origins in listed data formats:

- Administrative data (.docx, .xlsx, .pdf, .pptx) WP1
- Photography, video (.jpg, .mp4) WP1, WP3
- Laboratory notes: (.docx) WP3, WP5
- Precipitations – raw data (.txt, .xlsx, .docx, .jpg) WP3
- Battery test characterization (.mct) WP3, WP5
- Electric Microscopy (FESEM, TEM, EPMA): (.tiff, .jpeg, .txt, .docx, .pdf) WP3
- X-ray spectroscopy (XRD, XPS, XRF): (xlsx, .txt, .docx, .pdf, ASCII format) WP3
- Other spectroscopies (IR, NMR, FTIR, TG-DTA-DSC): (.jpeg, .xlsx, .docx, .pptx, .pdf) WP3
- Particle size analysis (.mmes) WP3
- BET analysis (.docx, .xlsx, .pdf) WP3
- Instrumental characterization (.jpeg, .tiff) WP3
- Analyzed and processed data (.docx, .xlsx, .pdf, .jpeg), WP3, WP5
- Metadata: (.pdf, .docx, .xlsx, .csv, .tiff, .jpeg,) WP3, WP5
- Manuscripts and final versions of the publications: (.txt, .tiff, .jpg, .pdf) WP3, WP5

MIMS software is required to open .mct files and Mastersizer to open .mmes files. However, the data can be converted into .xls or .txt files if it is shared without processing.

The data from microscopy and spectroscopy devices will be analyzed by specific software/programs, e.g. PDXL2, HighScore, Avantage, etc. This data will be processed and shared in. xslx, .docx, and .pptx forms.

FZJ

Forschungszentrum Jülich GmbH (FZJ, partner number 2) will collect data in the tens of gigabytes range from the following origins in listed data formats:

- Galvanostatic cycling experiments (.csv; ASCII; .json) WP5
- Electrochemical impedance spectroscopy (EIS) (.csv, ASCII; .json) WP5
- Linear sweep voltammetry (LSV); cyclic voltammetry (CV) (.csv, ASCII; .json) WP5
- Other post mortem analyses (.tiff, .csv, ASCII) WP5
- Karl-Fischer titration (.csv, ASCII) WP5
- Metadata (ASCII, .txt, .json)

All data will be converted to non-proprietary formats before sharing.

IMN

Lukasiewicz Research Network - Institute of Non-Ferrous Metals (IMN, partner number 3) will collect data in the range of gigabytes from the following data formats:

- Administrative data: (.doc, .docx, .xls, .xlsx, .pdf, .ppt, .pptx) WP1
- Analyzed and processed data (.doc, .docx, .xls, .xlsx, .pdf, .ppt, .pptx) WP2, WP3,WP4,WP5, WP6,WP8
- Photography, video, audio (.jpg, .png, .tiff, .avi) WP2, WP3,WP4,WP5,WP6,WP8
- Battery test characterization (.csv, .mpr, .mps, .mpl, .mpt .dfr, .txt) WP2, WP3,WP4, WP5,WP6
- Scanning Electrochemical Microscope measurements (.tmp, .dat) WP5
- FTIR analysis (.xls, .xlxs, .pdf, .tiff) WP5

All data originated from software can be converted to standard formats before sharing.

ISPE

The research team of the Institute for Sorption and Problems of Endoecology (ISPE, partner number 4) will collect data in the range of gigabytes. This data will include:

- Administrative data within WP1(.docx, .xlsx, .pdf, .pptx, .jpeg, .tiff);
- Analyzed and experimental data within WP2, WP3, WP4, WP5, WP6, WP8: Initial experimental data of battery test characterization, particle size distribution, SEM, BET, FTIR, FRX (csv, .txt, dfr, p2s, ASCII, MPR, FRA, DTA); analyzed data (pdf, .docx, .xlsx, .pptx).

Some initial data may require special software to be accessed. However, all data can be converted to standard formats before being shared.

CEA

The CEA teams (CEA, partner number 5) will be involved in the synthesis of discrete nanoparticles of carbon coated silicon and silicon oxides (WP2 task 2.4). Structural and morphologies properties will be characterized by XRD, SEM/TEM and BET, leading to around ten gigabytes during the SAFELOOP project. Different formats will be available depending on the type of characterization, presented hereafter:

- X-rays diffractions experiments (*.brml; *.raw; *.txt) WP2
- Refinement of XRD patterns using Fullprof software (*.pcr; *.prf ; *.txt) WP2
- SEM and TEM images (*.dm3; *.tif; *.jpeg) WP2
- BET analysis (*.smp; *.xlsx; *.PDF) WP2

However, all data will be converted in standard formats before being shared.

TUBITAK

TUBITAK (Türkiye Bilimsel ve Teknolojik Araştırma Kurumu, partner number 6) will collect approximately 100 Gigabytes of data from the following origins in listed data formats:

- Battery electrical tests (.nda, .csv, .txt, .xls, .xlsx, .pdf) WP5, WP6
- Electrochemical characterization (.dfr, .csv, .ASCII) WP5, WP6
- Reseach notes, reports, (.doc, .docx, .xlsx, .pdf, .pptx,) WP5, WP6
- Visualization, photography, video (.jpg, .png, .tiff, .pdf, .mp4) WP5, WP6
- SEM/EDS analysis (.tiff, .jpeg, .txt, .docx, .pdf, .emsa., .elid, .odt) WP5, WP6
- Particle size analysis (.mmes, .pdf, .xlsx) WP5, WP6
- BMS modelling (.m, .mat, .stp, .scdoc, .mpr, .mps, .jpg, .png, .tiff,) WP 6

Data originated from special softwares can be converted to standard formats.

HHL

To reach the goals of the project HHL Leipzig Graduate School of Management, HHL, partner number 7) will collect approximately 20 Gigabytes of data from the following origins in listed data formats (another standard format might be used):

• Administrative data: (.docx, .xlsx, .pdf, .pptx)	WP1
• Description of methodologies (.docx, .pdf, .pptx)	WP6, 7
• Source codes for data analysis and mining (.txt)	WP6, 7
• Graphics (images, logos, workflow diagrams): (.jpeg, .tiff, .png)	WP1, 6, 7, 8
• Unstructured observations: (handwritten)	WP1, 8
• Diary accounts: (handwritten)	WP1, 8
• Field notes: (handwritten, .docx, .xlsx,)	WP1, 8
• Photography, video, audio (.jpg, .mp4, .mp3)	WP1, 8
• Interviews: (handwritten, .docx, .xlsx, .jpg, .mp4, .mp3)	WP1, 8
• Workshops: (handwritten, .docx, .xlsx, .jpg, .mp4, .mp3)	WP1, 8
• Questionnaires (.docx, .xlsx, .pptx)	WP1, 6, 7, 8
• Research notes: (.docx, .xlsx, .pptx)	WP1, 6, 7, 8
• Computer-generated data: (.xlsx, .txt)	WP6, 7
• Raw digital data (including raw patent data): (.xlsx,)	WP1, 6, 7
• Processed data (.docx, .xlsx, .pptx, .jpeg, .png, .html)	WP1, 6, 7, 8
• Metadata (.docx, .txt, .json)	WP6, 7
• Manuscripts and teaching business cases: (.txt, .docx .tiff, .jpg, .pdf)	WP6, 7
• Other outputs in writing and graphics (.txt, .docx .tiff, .jpg, .pdf)	WP1, 6, 7, 8

Access to unstructured observations, field notes, and diary accounts might be granted upon special request. Before sharing, the data might be edited to hide sensitive, confidential, or personal information. The data containing personal information for the purpose of research activities (e.g., field notes, interviews, or questionnaires) will be treated in accordance with the GDPR policies and stipulations outlined in Section 6 of the DMP.

KOP

Koppers (KOP, partner no. 8) will collect data in the range of megabytes. This data will be from the following sources:

• Analyzed and processed product data (.docx, .xlsx)	WP 2, 3
• Photographs (.jpg)	WP 2, 3

The data does not require specific programs to be opened.

YUNASKO

Yunasko research team (YUN, partner number 9) will collect data in a range of gigabytes. This data will include:

- Administrative data: within WP1 (.docx, .xlsx, .pdf, .pptx, .jpeg, .tiff);
- Experimental data within WP2, WP3, WP4, WP5, WP6, WP8, including experimental data of battery or material test characterization, (csv, .txt, xlsx, ASCII, MPR, FRA, DTA) as well as analyzed data (pdf, .docx, .xlsx, .pptx).

Some initial data may require special software to be accessed. However, all data will be converted to standard formats before being shared.

ENVIVA

To reach the goals of the project Enviva, partner number 10) will collect 10-50 GB of data from the following origins in listed data formats:

- Administrative data: (.docx, .xlsx, .pdf, .pptx) WP1, WP8
- Photography (.dng, .jpg) WP8
- Video, (.avi, .mp4) WP8
- Illustrations, graphics (.png, .jpg, .svg, .ai, .pdf) WP8
- Final versions of publications: (.docx, .txt, .tiff, .jpg, .pdf) WP1, WP8

The data containing personal information will be treated in accordance with the GDPR policies.

ASP

Estimated data size of ASP (Aspilsan, partner number 11) is about 20 GB and will be collected in following forms:

- Analyzed and Processed Data (.doc, .docx, .xls, .xlsx, .pdf, .pptx), WP2, WP3, WP4, WP5, WP6, WP8
- Photography and Video (.jpg, .png, .tiff, .avi) WP2, WP3, WP4, WP5, WP6, WP8
- Cell Test Results (.png, .jpeg, .docx, .xlsx, .pdf, .xml, .dta, .csv) WP6

BOZ

BOZ (BOZANKAYA OTOMOTIV MAK IMALAT ITH VE IHR ANONIM SIRKETI, partner number 12) is set to gather around 50 gigabytes of data from the specified sources in the listed formats.

- Module electrical tests (.csv, .txt, .xls, .xlsx, .pdf, .doc) WP6
- Battery Pack requirements and specifications (.doc, .docx, .xlsx, .pdf, .pptx,) WP6
- Battery pack design (.doc, .docx, .xlsx, .pdf, .pptx, .stp, .dxf, .CATPart and .CATProduct) WP6
- Battery Pack and Vehicle Simulation Modelling (.mlx, .doc, .docx, .xlsx, .pdf, .pptx) WP6
- Vehicle Road Test Photography and Video: (.jpg, .png, .tiff, .avi) WP6, WP8
- Experiences with battery explosions and E-Bus fires in the field. (.doc, .docx, .xlsx, .pdf, .pptx,) WP6,WP7

AETC

In accordance with this project, AETC (American Energy Technologies Company) will produce approximately 100 gigabytes of data, in total. This data will include:

- Battery Cycling (.csv) WP2 and WP6
- Battery Cycling graphs (.jpeg, .png) WP2 and WP6
- Progress Report Updates (.docx, .xls, .ppt, .pptx) WP2, WP6, WP8
- Data summaries to include laboratory testwork, pilot and production results (.docx, .xls, .ppt, .pptx) WP2, WP6 and WP 8
- Scanning Electron Microscopy Images (.jpeg, .png) WP2 and WP6
- Lab Notes and Scans (.pdf) WP2 and WP6
- CAD models (.STL) WP6

Some data may require special permission in order to be accessed, especially if it includes proprietary data, personal information, or data which is currently protected under United States IPR regulations. While some data from AETC will be regulated and protected due to US law, that which is earmarked as safe for public and global consumption will be shared within the appropriate capacity for the project. The deliverable for WP6 as CAD files will require AutoDesk inventor to read, all other files will not require a program.

CCM (FYI)

To reach the goals of the project Cadoux Limited (CCM, formerly FYI Resources Limited, associate partner number 14) will collect up to 1 gigabyte of data from the following origins in listed data formats:

- Administrative data: (.docx, .xlsx, .pdf, .pptx) WP1
- Laboratory notes: (.docx) WP3, WP5
- Electric Microscopy (FESEM, TEM, EPMA): (.tiff, .jpeg, .txt, .docx, .pdf) WP3
- BET analysis (.docx, .xlsx, .pdf) WP3
- Analyzed and processed data (.docx, .xlsx, .pdf, .jpeg), WP3, WP5
- Metadata: (.pdf, .docx, .xlsx, .csv, .tiff, .jpeg,) WP3, WP5

All data will be converted to non-proprietary formats before sharing.

ICL

ICL (associate partner number 15) leads all tasks in WP7 and will generate up to 5 gigabytes of data from the following origins in listed data formats:

- System and process mapping: (.docx, .xlsx, .pdf, .pptx) WPs 2, 3, 4, 5 and 6;
- Interviews: (.docx) stakeholders and targeted WPs;
- Workshop material: (.docx, .xlsx, .pdf, .pptx);
- Analysed and processed data: (.docx, .xlsx, .pdf), WP3, 2, 3, 5 and 6;
- Metadata: (.pdf, .docx, .xlsx).

All data will be converted to non-proprietary formats before sharing.

2 FAIR DATA

2.1 MAKING DATA FINDABLE, INCLUDING PROVISIONS FOR METADATA

Metadata, open access publications and relevant data sets will be shared in Zenodo repository which will create the persistent identifier for the data (DOI or URN).

In Zenodo, the metadata is stored internally in JSON-format which can be exported in several standard formats such as MARCXML, Dublin Core, and DataCite Metadata Schema. SAFELOOP's metadata will cover at least the following information:

- License determined for the metadata
- Access type (open, restricted, embargo)
- Title
- Description text (content and provenance of the data, etc.)
- Creators/contributors
- Publication date
- Keywords
- Language (English)
- Grants or awards (SAFELOOP: This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement 101147342)
- A reference to the open access publication if already published.

In Zenodo, metadata is exported via open archives initiative protocol for metadata harvesting (OAI-PMH) and can be harvested.

Data manager and data specialists coordinate the documentation and publication of metadata via the shared workspace of the consortium in cooperation with WP leaders. This action aims to ensure high-quality and consistent metadata with uniform vocabularies. Persons working in WPs are guided to be proactive what metadata is collected during the experimentation and formalize the documentation to support interoperability within the consortium.

Metadata will be linked to scientific open access publications written by SAFELOOP partners which will be linked to project webpages and SAFELOOPs page in CORDIS - EU research results -sites.

2.2 MAKING DATA ACCESSIBLE

Repository:

SAFELOOP project deposits relevant research data to trusted repository Zenodo, which generate persistent identifier (DOI or URN) to the data.

Data:

Since the SAFELOOP consortium fully commits to the principles of the Open science approach data sharing will be driven by the principle "as open as possible and as closed as necessary".

In practice SAFELOOP partners publish the results of the project in open access publications within a year from the moment of making the publication notice to the Exploitation Steering Group. In accordance with the Grant agreement (article 17, open science) a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication, is deposited in a trusted repository under CC BY license at the latest at the time of publication and immediate open access is therefore provided to the deposited publication via the repository.

Relevant datasets which validate the conclusions of the scientific publication will be made available in trusted repositories at the latest when the scientific results are published in the open access journals under CC BY licenses. Repositories provide free and standardized access protocols.

It is recommended that relevant datasets are shared openly in the Zenodo repository, which provides free and standardized access protocols. However, it is also possible to share the data only upon request to assigned researcher to control the right use of the data, but the data creators must ensure they respond to requests for at least three years after the project concludes.

Although it is recognized that the data must be disseminated as soon as feasible, *no data* which is possibly worth protecting with intellectual property, commercialization, or non-commercial exploitations will be shared or disseminated outside the project before meeting the beneficiaries' *best effort obligation to exploit* the data and *the obligation to adequately protect* the data. See specific rules for exploitation and protection of the results in GA (Annex 5) and CA.

To meet these obligations, the following steps in managing data are introduced. These steps will enable participants to perform the analysis for the potential protection of intellectual property and ensure the compliance with security rules or legitimate interests of partners interested in exploitation:

1. The members of the consortium shall mark and treat data related to the project as "confidential", following the procedure outlined in Section 10 of the CA (Non-disclosure information). This procedure will ensure that other members of the consortium who gain access to the data do not disclose or use it in ways unapproved by the data creator.
2. To comply with the results protection obligation, before dissemination, the disclosing party shall contact the Exploitation Steering Group of the project at least 45 days before the prior notice of the planned submission to assess the potential protection of data and related results with intellectual property.
3. If the Exploitation Steering Group and the data owners see no possibility and cannot justify the protection of results and related data with intellectual property, the dissemination of project results shall follow Section 8.4 of the CA (Dissemination) and the instructions for the prior notice of project participants with mechanisms for raising and managing the objections.

More detailed information about these procedures can be found in the SAFELOOP's IP strategy.

Metadata:

Metadata describing the data collected in SAFELOOP will be made openly available to Zenodo which means that it is shared with the public domain dedication CC0 as stated in GA (Article 17, Open science).

Original data in the organizational services will be stored at least three years after the project. However, at the latest when the scientific results are published in the open access journals, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication will be also made openly available to Zenodo repository under CC BY license. In addition, relevant datasets will be made available in Zenodo either openly or upon request under CC BY license at the same time.

Openly available data will be converted to standard file formats to ensure the accessibility and re-usability of the data and Zenodo repository promises the lifelong storing of the data.

2.3 MAKING DATA INTEROPERABLE

In Zenodo metadata is exported in several standard formats such as MARCXML, Dublin Core, and DataCite Metadata Schema.

To make data interoperable, the format of data files should be accessible/readable with the most common software, such as Microsoft tools. Non-standard file formats, obtained for example from analysis devices, are converted to standardized file formats (e.g. .csv, .txt, .pdf).

In addition, data should be curated in a way that makes it easy to understand which data is related to which experiment e.g. a subfolder structure for measurement days and experiments.

2.4 INCREASE DATA RE-USE

To ensure communication and easy re-use of the data, English language and SI-units are used in the files created in SAFELOOP project. Relevant data is stored in logically ordered folders and files with self-explanatory naming including:

- project abbreviation,
- WP number,
- content description,
- date (i.e. YYYY-MM-DD),
- location,
- author initials,
- version and
- status information (draft/final).

Quality Assurance Plan (QAP) of SAFELOOP (Deliverable 1.1.) introduces systematic naming convention for the deliverables, meeting documents and conference presentations.

Partners are instructed to add README.txt files to the shared folders to help readers to easily find out which content the folder includes. README.txt file includes e.g. the following information:

- Creator of the data/person made the experiment
- Delivery date
- Description of the files
- Experiment procedure
- Variable definitions
- Units of variables
- Analyses
- Tools, instruments, software needed to re-use or validate the data
- Information if the data has been cleaned, analyzed, or modified after the experiment.

If the files are kept in good order from the beginning of the project metadata is easy to create based on the information found in folders and README.txt file.

The quality of the experimental research data is controlled by thorough documentation of the research activities. Researchers are responsible for documenting laboratory experiments and results. In addition, the laboratory experiments are carried out in accordance with good laboratory practices, i.e. the equipment is calibrated regularly, parallel measurements are made of the experiments, etc. Research articles are sent to open access peer-reviewed publications.

Metadata describing the data collected in SAFELOOP will be made openly available in Zenodo under CC0 license, which guarantees their easy re-use. In addition, a machine-readable electronic copy of the published version or the final peer-reviewed manuscript accepted for publication and relevant datasets will be made available in Zenodo under CC BY licenses at the latest when the scientific results are published in the open access journals.

3 OTHER RESEARCH OUTPUTS

Other research output types in SAFELOOP

The total body of research work consists—in addition to data—of other various research outputs generated by researchers in a regular course of their activities. These outputs can be both tangible or intangible, with the potential to be protected by intellectual property rights and without. They might include but are not limited to:

- Chemical substances, such as reagents or compounds
- Samples and battery components, such as materials, anodes, cathodes, or electrolytes
- Device prototypes, such as battery cells or management units
- Description of methodologies, such as procedures for sample analysis or battery testing
- Scientific models, such as conceptual, mathematical, physical or digital models
- Software programs, such as programs for experimental data processing or battery unit control
- Workflow diagrams, such as input-output or life-cycle diagrams
- Protocols, such as test protocols or acceptance acts
- Innovative manufacturing techniques
- Innovative materials processing techniques
- Enhanced or novel manufacturing techniques
- Materials processing methods
- Other intellectual outputs expressed in writing, such as explanations, concepts, or theories

Applying the FAIR data principles to management of other research outputs

The following means ensure that the other research outputs are findable, accessible, interoperable and re-usable within the project:

Documentation in the different stages of the work plays a significant role. Researchers and other people who perform development work in SAFELOOP take thorough notes during the research steps in English, store the results in systematically ordered folders and files with self-explanatory naming (described in chapter 2.4.). README.txt files in folders serve as a guide for re-users. WP leaders coordinate the activities and take care in regular meetings and reporting that information flows within and between WPs.

A shared workspace is used to share information and data within the project. Through it, the data manager and data specialists together with the WP leaders also coordinate the reuse of other research outputs in the following work phases in different WPs.

Other research outputs are communicated to parties outside the project according to the dissemination guidelines (CA, sec. 8.4) in the same way as data, i.e. metadata is shared in data repositories, open access publications are written, or patenting is sought if such decision is approved by the Exploitation Steering Group.

Guidelines for managing project samples/battery components

In SAFELOOP project material development work is done in collaboration with the several partners meaning that the same sample is processed in several research groups in a row. Actions performed on materials for each partner and process of material transfers are systematically documented to ensure that the samples do not get mixed up and that the project retains an overall picture of what materials are used when assembling batteries from components produced in cooperation. Therefore, the samples to be sent to other partner are e.g. named/numbered systematically (includes always initials of the names of the persons who have performed any experimental actions to samples). WP leaders encourage the persons working with the same samples to share the information about what operations have already been done for each sample. This can be done for example via shared folders in the project's electronic workspace with README.txt files.

4 ALLOCATION OF RESOURCES

SAFELOOP will use Zenodo repositories, which are free up to a certain amount of data. Items will be retained for the lifetime of the repository. In the case of Zenodo, lifetime refers to the lifetime of the host laboratory CERN.

Data is also stored in the organizational disc spaces. The internal disk spaces of the organizations are free for their users. Data stored in the organizational services will be stored at least 3 years after the project. Partners will ensure that the data stored in their organizational services (or other trusted service, e.g. for UOULU, CSC's IDA) will be accessible at least 3 years after the project.

UOulu has allocated budget of the project for the work of the data manager and other partners for the work of data specialists. Partners have also allocated working time for other personnel/researchers to prepare data and documentation for archiving. In addition, several partners have reserved money in their budget for open access fees of publications.

All the partners are responsible for the data they collect, and the WP leaders are responsible for the fair data use in the WPs and inform coordinator of potential problems. The data manager together with the data specialists guides the overall process of data management in the SAFELOOP project.

5 DATA SECURITY

SAFELOOP partners use the services provided by their organizations to store the original data during the research activities and are responsible for the data security. Original research data is available to the members of the research project of the partner organization for three years after the project. Each partner is also responsible for making back up files for the data. Partners are reminded not to store the data on laptops, stand-alone hard drives, or external storage devices such as USB sticks. Backups must be made regularly if they are not made automatically.

UOulu creates a shared workspace for the consortium, where the most relevant files such as deliverables, confidential data and files needed for collaboration, are shared to whole consortium. Only the coordinator can give access to this workspace and will give it only if a trusted partner organization representative requests an addition to people working on the SAFELOOP. Workspace is available to the consortium for three years after the project and is highly fault-tolerant and distributed with the file version control.

SAFELOOP uses Zenodo repository for the sharing of (meta)data of the project. In Zenodo all files uploaded are stored in CERN's disk cluster and each file copy has two replicas located on different disk servers.

6 ETHICS

Technical research in the SAFELOOP project does not include human subject research. Therefore, the activities of SAFELOOP are not regulated by predetermined ethical guidelines (e.g., approval procedures of ethical committees).

SAFELOOP does not collect sensitive data.

Personal data are collected during project activities from:

- participants of project meetings and events;
- members of the newsletter;
- project stakeholders who provide feedback about project results;
- industry experts or potential end-users during interviews, workshops, and focus groups about the exploitation of project results.

For the purposes outlined above, the collected personal data might include the following types:

- a name and surname;
- organization;
- job title;
- email address;
- telephone number;
- photograph, video or voice record.

Personal data shall be processed in accordance with the data protection principles described in data protection legislation. Projects participants carry out any personal data collection/processing in accordance with the GDPR (EU 2016/679) and country-specific regulations (*e.g.* the Finnish Personal Data Act,1050/2018) for all WPs.

Project partners shall also check their respective institutional ethical guidelines, data privacy guidelines and data security policy and prepare to follow the instructions given in these guidelines.

The personal data of people outside the project are collected when, for example, events, interviews, workshops, or focus groups are organized. In these cases, participants will receive an organization-specific privacy notice. For example, the announcements listed in the following webpage are used if University of Oulu is organizing these actions: Data privacy notice of the University of Oulu | University of Oulu. For interviews, workshops, or focus groups, the personal data can only be collected and processed if the informed consent was obtained from the participants according to Article 7 of the GDPR.

The collected personal data are stored in accordance with GDPR regulations by the project participant that collected the data and are kept for a maximum of five years after the end of the project

University of Oulu has an appointed data protection officer (DPO) and the faculty has a data protection steward, who will assist with data protection issues (reachable through project coordinator via dpo@oulu.fi).

Project activities in SAFELOOP will be carried out in compliance with the highest standard of ethical principles as set out in the European Code of Conduct for Research Integrity (ALLEA code) and the Finnish Advisory Board on Research Integrity (TENK) guidelines to promote the responsible conduct of research.

Furthermore, all the operations and consortium partners are compliant with national and European EHS regulations and legislation. All research and development work carried out in the SAFELOOP project will respect fundamental ethics principles, including those reflected in the Charter of Fundamental Rights of the European Union, principles of responsible research and innovation (RRI), European Code of Conduct for Research Integrity and other relevant ethics rules of Horizon Europe, and national and European laws and safety regulations and guidelines for work safety.