URBANIZED

MODULAR AND FLEXIBLE SOLUTIONS FOR URBAN-SIZED ZERO-EMISSIONS LAST-MILE DELIVERY & SERVICES VEHICLES

URBANIZED D1.2: Data Management Plan

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Keywords

DMP, Data management plan, FAIR data, open data pilot

Executive summary

The URBANIZED project is committed to conform its research data to the 'FAIR' framework, that is findable, accessible, interoperable and re-usable. The Data Management Plan (DMP) therefore consists of information on how the consortium will be managing the data generated and collected during the project and will provide insight into the data management life cycle and data preservation. The DMP also describes the handling of research data during and after the project. It also describes the methodologies and standards to be applied and lists the data that is planned be made open access.

During the project duration a secure intranet will be used as data storage, only accessible to project participants which provides further access control. The project website will showcase the public deliverables. Furthermore, URBANIZED will use a data repository in order to comply with H2020 open access data requirements.

This document will be updated during the project lifetime, at least with each periodic report and in addition when significant changes will arise to the data policy of the consortium.

Table of contents

List of figures

List of tables

1. Overview of the URBANIZED project

Freight transport is an important part of urban planning policies however it also has negative impact on the quality of life of citizens, therefore Europe has set an ambitious intermediate target to achieve CO2-emissions free logistics in city centres by 2030, towards achieving a 90 % reduction from transport emissions by 2050. In parallel, the demand for more urban and suburban deliveries are growing due to the rise of on-line shopping and the on-demand economy. To achieve the European targets new generations of vehicle designs have to be introduced.

The URBANIZED project will therefore develop modUlaR and flexible solutions for urBAN-sIzed Zero-Emissions last-mile Delivery and services vehicles. It will reach its objectives via using high-performance e-powertrain components and control architectures and interchangeable, plug & play cargo modules for different use case scenarios. It will also develop integrated energy and fleet management strategies using data, connectivity and predictive control algorithms. The developed URBANIZED multipurpose swap system cargo body will be validated and tested with two relevant use cases (postal and HoReCa services).

2. The URBANIZED DMP

2.1 FAIR data

2.1.1 Data management procedure

The URBANIZED approach to data management is outlined below. Contact information and other personal data will be stored on the secure intranet (EMDESK) of the project, similarly to research data. Anonymized research data will be either protected by IPR or made available via the chosen data repository (to be agreed later). Public data will be shared on the project website.
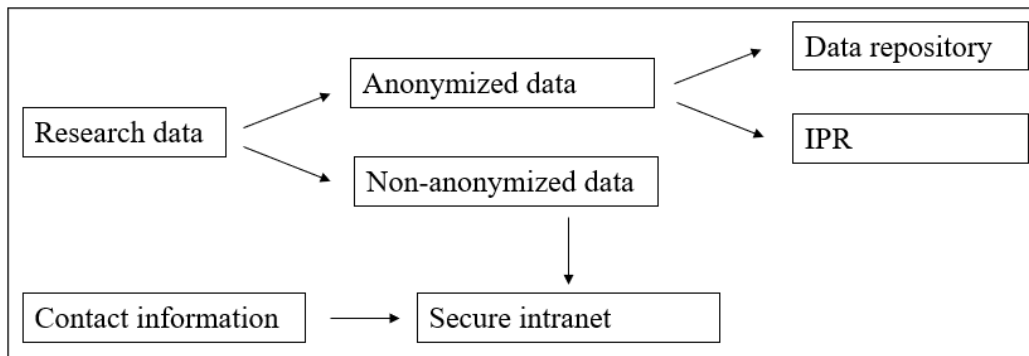
Figure 1 URBANIZED data management procedure

2.1.2 Data summary

Technical data will be mainly collected via testing for validation purposes or generated in the simulation environment. Please see more details in section "2.3 Data generated by partners".

In terms of **personal data**, the project is committed to comply with the GDPR[1]. Personal data (contact information) gathered by a consortium member remains in the care of that consortium member and will not be distributed to any other consortium member or any party outside of the consortium, without obtaining informed consent forms. Personal data needed for the impact assessment at the pilots will be treated in accordance with the GDPR and informed consent forms will be obtained, when necessary. Please refer to D8.1 (Website, project identity and Dissemination Strategy with KPIs) for more information on the collection and processing of personal data. The consortium will define the informed consent procedures to be used in the project in D9.1 (H - Requirement No. 1) and will further elaborate on the protection of personal data in D9.2 (POPD - Requirement No. 2).

2.1.3 Findable

The URBANIZED consortium will make its data findable via identification, naming, keywords and versioning. The data will be sufficiently indexed and registered in order to be searchable and discoverable by all entities (humans or machines).

Discoverability of data	*Explain how data are documented and if metadata are provided, listing the*	Metadata will be provided when necessary, please refer to section 2.3 of this document

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[1] Regulation (EU) 2016/679 (General Data Protection Regulation)

	information made available/discoverable	
Identifiability of data	*Indicate how data are made identifiable, if a standard permanent identifier assignation scheme is used*	Standard identification mechanisms will be used in the project, namely the digital object identifier (DOI), in case of research outputs.
Naming conventions used	*Describe the system used to name and structure electronic files and folders. Refer also to any file renaming procedure or tools used*	Naming conventions were specified internally, for further information please refer to D1.1.
Search keywords approach	*Indicate the approach to keywords generation, indexing and tagging.*	Keywords are used to classify each project document.
Clear versioning approach	*Describe the versioning and traceability approach used (especially if the dataset is growing or revisable).*	The approach towards versioning was specified internally, for further information please refer to D1.1.

Table 1 Findable data

2.1.4 Accessible

The user will be able to access the data or metadata through different portals depending on the security access they require. Therefore, authentication or authorization measures might be necessary. The data will be acquired by the user using widely used standardised protocols.

Via EMDESK **project data** will be made accessible to the project partners. It allows the project partners to define specific permissions for folders or documents, to track document versions, share large documents or datasets, to share direct document links via email, to make documents accessible to public, to assign documents to related project items for easy and quick document retrieval and to receive email digests on activities in the document manager.

Public data will be made available on the project website and on the chosen data repository in order to comply with H2020 open access data requirements. Public deliverables and potential anonymised datasets are planned to be uploaded to the chosen data repository periodically and by the end of the project. Project publications will also be uploaded to the public repository, taking into account the respective embargo period depending on the publisher.

Table 2 Accessible data

Data openly available	*Indicate ownership of the data, if it is openly available or can be made openly available.*	Ownership of data is described in the Consortium Agreement. Public data will be shared on the Project website and on the chosen repository.
Data kept closed	*Indicate if data access is restricted, to what users, and explain the reasons*	The access to some data (e.g. personal data, financial information, confidential company data) will be restricted. EMDESK, the internal project tool provides the possibility to set permissions.
How data will be made available	*Indicate methods and SW tools needed to access the data. Clarify if the relevant software (e.g. in open source code) is included in the data set.*	Data will be made available via EMDESK, the project website and the chosen data repository. Software tools will not be provided at this stage of the project. If this will change, the DMP will be updated accordingly.
SW documentation and other information needed	*Indicate any specific SW documentation that is needed to access the data, or additional information that is needed to understand the data (i.e. abbreviations, supplementary notes).*	A list of abbreviations is added to each public project document.
Repository for deposit of data, metadata, documentation and code	*Indicate the (open or private) repositories in which the data, metadata, documentation and code are stored and/or those in which they will be stored in the future.*	The project will store all relevant data on EMDESK (accessible internally for the project partners) and will deposit public data on the chosen data repository, the chosen open access repository.
Access restrictions	*Indicate if there are limitations and restrictions to access the data, and if they are linked to a specific timeframe. Explain how access will be provided after these restrictions are lifted.*	Access limitation to public data and possible embargo periods will be defined, when becomes necessary due to IPR or confidentiality issues.

2.1.5 Interoperable

Standard and conventional vocabulary, nomenclature, measurement units will be used throughout the project. A full glossary of abbreviations and acronyms will also be provided if and when necessary.

Standard vocabulary or mapping to commonly used ontologies	*Refer to commonly used ontologies to map the dataset, considering also the use of existing common platforms and tools*	Will be defined if and when becomes necessary.
Data licensing for wide reuse	*If applicable, define data licensing approach for the dataset wide reuse. Indicate the chosen licenses tools*	Will be defined if and when becomes necessary.

Table 3 Interoperable data

2.1.6 Re-usable

This principle is the end goal of FAIR. The data and meta-data will be sufficiently described in order to be used in various and different cases. Any publication of the data will be accompanied with the necessary usage license.

Public domain deliverables will be published after the approval of the deliverable by the consortium and funding authority. A list of public domain deliverables can be found in section 3.2 below. Other data will be made available latest at the end of the project. Please see section 3.1.4 for more details.

Timing of data availability for re-use (incl. indications on embargo)	*If applicable, define the timeframe for making data available for re-use. Indicate any embargo period if required*	Will be defined if and when becomes necessary.
Data usability by Third Parties (after the end of the project)	*Indicate any limitation to the use of the data by Third Parties, after the end of the project.*	Data usage by Third Parties is governed by the Consortium Agreement.
Restrictions to data re-use	*Indicate and explain any restriction to the re-use of data (i.e. confidentiality*	Restriction to the re-use of data is governed by the Consortium Agreement. If further restrictions arise during the project, the DMP will be updated.

	agreements, other issues).	
Quality assurance process	*Explain how quality of the data is assured, how the consistency and quality of data collection is controlled and documented.*	For quality assurance procedures please refer to D1.1.
Length of time of data reusability	*Indicate the time limit for the data reusability, if any.*	Will be defined if and when becomes necessary.

Table 4 Re-usable data

2.2 Data sharing

The following outputs have been initially identified to be made public in the project:

- publications, either made available immediately by open access publishing or after they have passed the embargo period.

- Public summaries of the confidential deliverables (If approved by the consortium).

- Dissemination materials.

- Public deliverables (see the list below).

No.	Title	Lead	Dissem. Level	Due date
D1.2	Data management plan	VUB	Public	31 Mar 2021
D2.1	Mission profiles, KPIs, assessment plan, List of vehicle requirements, design specifications and shared interfaces	TNO	Public	30 Jun 2021
D3.2	Multi-layer EMS architecture and interfaces	TNO	Public	28 Feb 2022
D4.4	Optimised self-adaptive, multi-layer EMS design and virtual validation. Fleet management algorithm	TNO	Public	30 Apr 2023
D5.2	Component test report for: eAxleDrive, on-board charger, and PE performances	VIT	Public	28 Feb 2023
D7.1	Impact assessment results	CER	Public	31 Dec 2023

D7.2	Standards for electric and modular freight vehicles	IDI	Public	31 Dec 2023
D7.3	Agenda for a structured policy response: SUMPs/SULPs integration, includes roadmap of policy initiatives	CER	Public	31 Dec 2023
D7.4	Knowledge transfer performed across missions and use cases replicability guidelines of novel concept (eAxleDrive, body swap and modular cargo body systems)	BAX	Public	31 Dec 2023
D8.1	Website, project identity and Dissemination Strategy with KPIs	BAX	Public	31 Mar 2021
D8.2	Observatory: summary of first insights collected	BAX	Public	31 Dec 2021
D8.3	Position paper: URBANIZED, our vision on modular commercial vehicles for future urban logistics	BAX	Public	30 Jun 2023
D8.4	Evaluation of KPIs related to dissemination, including collection of newsletters	BAX	Public	31 Dec 2023
D8.5	Definition of relevant business cases under different future scenarios	BAX	Public	31 Dec 2023

Table 5 Public deliverables

2.3 Data generated by partners

Below information is given by each partner on the datasets and models planned to be generated during the project lifecycle. These data sets and models are not planned to be publicly shared. To see the public data from the project, please refer to section 2.2 Data sharing.

2.3.1 Partner 1: IDIADA

Table 6 IDIADA **Models**

IDIADA	WP3, WP4	WP3, WP4	WP3	WP6
Model	CAD: Body parts, (new and re-styling) & PWT components	CAE Analysis & virtual simulations	Styling: Sketches, Re-Styling Body parts	Full crash test data & reporting

Platform	CATIA V5 Release R29	ANSA, LSDyna, Meta	ALIAS, Icem Surf	Adobe Acrobat Reader, Excel
Metadata	*Formats: CATPart, CATProduct, .iges, .stp*	*ANSA, LSDyna*	*.jpg, .png, .wire, Kddat ,Edf, iges*	*.pdf, .avi, .jpeg, .xlsx*

2.3.2 Partner 2: VUB

Table 7 VUB **Datasets**

VUB	48V inverter (WP3, WP4)	Cooling for e-powertrain electronics and motor (WP3, WP4)
Data	- semiconductor parameters - dc-link capacitor - switching frequencies - passive filters - e-motor parameters	- power losses - ambient temperature - coolant temperature - thermal resistance of the heatsink - geometries of cooling system
Format	.xlsx, .mat	.xlsx, .mat
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

Table 8 VUB **Models**

VUB	48V inverter (WP3, WP4)	Cooling for e-powertrain electronics and motor (WP3, WP4)
Model	- Electro-thermal model of GaN/SiC inverter - Closed-loop controller	- CAD model
Platform	MATLAB/Simulink	ANSYS, 3D CAD, MATLAB/Simulink
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

2.3.3 Partner 3: TNO

Table 9 TNO **Datasets**

TNO	Mission profiles
Data	- Vehicle speed profile - Vehicle GPS profile - Ambient temperature profile Ambient humidity profile - Vehicle cargo mass profile - GPS charger locations
Format	.xlsx, .mat
Metadata	*Documentation (general model description, how to run, input & output, conditions)*

Table 10 TNO **Models**

TNO	Virtual simulation platform	Modular energy management strategy vehicle control model
Model	- Powertrain model, containing component models - Driver model - Thermal model	- ECO driving function - ECO routing function - ECO charging function - ECO comfort function
Platform	Matlab/Simulink	Matlab/Simulink
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

2.3.4 Partner 4: VITESCO

Table 11 VIT **Datasets**

VIT (WP2, WP3, WP4)	Component Functions	Component Dimensions
Data	- Functional data, cooling requirements of:	CAD-models

	• E-machine • Reducer • Charger	
Format	Excel, MATLAB/Simulink	Creo, Step
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

Table 12 VIT **Models**

VIT (WP2, WP3, WP4)	
Model	Thermal model of: - E-machine - Charger
Platform	Ansys, MatLAB/Simulink (Plecs), CarMaker
Metadata	*Documentation (general model description, how to run, input & output, conditions)*

2.3.5 Partner 5: ALKE

Table 13 ALK **Datasets**

ALK	**Vehicle requirements specifications**	**Vehicle design**
Data	User requirements for the EV platform target of the project and linked subsystems.	3D CAD design of the EV platform target of the project including submodules, cargo body system and interchangeable body modules
Format	xlsx, .docx, .pdf, .jpeg	.step, .pdf
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

Table 14 ALK **Models**

ALK		
Model		
Platform	Excel, Word, Autodesk Inventor	Autodesk Inventor
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description, how to run, input & output, conditions)*

2.3.6 Partner 6: CERTH

Table 15 CER **Datasets**

CER				Training evaluation
Data	Operational data of COIs case: loading factors, weekly routing schedules, location of final points of delivery, types of products to be delivered (dry cargo or fresh cargo), frequency of deliveries, vehicle types used for last mile operations	Operational data of COIs case: loading factors, weekly routing schedules, location of final points of delivery, types of products to be delivered (dry cargo or fresh cargo), frequency of deliveries, vehicle types used for last mile operations	Synthetic data for developing the fleet management algorithms and the simulation module based on the data provided by the case study partners and the existing data of Thessaloniki owned by CERTH.	- Evaluation data for In-house training - On-line training assessment feedback
Format	Structured text or mark-up file containing metadata information (XML file)	Textual	GIS files for the network, mission data in SQL databases, python for the fleet management algorithms, anylogic for the simulation environment	- xls file - csv file (online feedback)

| Metadata | *Documentation including metadata details will be provided* | *N/A* | *Documentation including metadata details will be provided* | *Documentation* |

Table 16 CER **Models**

CER		
Model	VRP/Deep Reinforcement Learning/ Combinatorial Optimization	CAD/ CAM/ CAE models of the e-hand-truck
Platform	Anylogic/ Libraries: Pytorch/ Pypeline/PulP	Fusion 360
Metadata	*Documentation (general model description, how to run, input & output, conditions)*	*Documentation (general model description)*

2.3.7 Partner 7: BAX

Table 17 BAX **Datasets**

BAX				
Data	External stakeholders for liaison workshops	Input requirements for SUMP/SULP and effective urban integration	Synthetic data for transferability algorithms	Business case and market data for replicability of solutions
Format	Spreadsheet (Excel)	.xls	.xls / python	.xls
Metadata	*N/A*	*N/A*	*N/A*	*N/A*

Table 18 BAX **Models**

BAX	
Model	Decision-support tool for transferability of solutions, including modules for future scenarios and economic impact assessment
Platform	Baseline in Excel, webtool coded in python
Metadata	*Documentation (general model description, how to run, input & output, conditions)*

2.3.8 Partner 8: BPOST

At this stage BPOST is not planning to generate/process data in the project.

2.3.9 Partner 9: CLEPA

Table 19 CLEPA **Datasets**

CLEPA	Potential organisation of an event
Data	List of attendees of a physical/virtual event
Format	Spreadsheet (Excel)
Metadata	*Documentation (general model description, how to run, input & output, conditions)*