

uCARE

You Can Always Reduce Emissions
because you care

GA 815002

Deliverable number: D6.4
Deliverable title: Data Management Plan

Document ID: uCARE-D6.4-v1.0
Dissemination level: Public
Main Author(s): P.A.J. Tilanus (TNO)
Issue date: 16-8-2019



Disclaimer and acknowledgement



This project has received funding from the European Union's Horizon 2020 Programme Research and Innovation action under grant agreement No 815002

Disclaimer

This document reflects the views of the author(s) and does not necessarily reflect the views or policy of the European Commission. Whilst efforts have been made to ensure the accuracy and completeness of this document, the uCARE consortium shall not be liable for any errors or omissions, however caused.

uCARE consortium
















Document information

Additional author(s) and contributing partners

Name	Organisation

Document Change Log

Version	Date	Comments
v0.1	30-07-2019	First draft of document
V1.0	16-08-2019	Revised version based on the comments of Claus Matzer - TUG

Document Distribution Log

Version	Date	Distributed to
v0.1	6-8-2019	Claus Matzer – TUG (for review)
V1.0	16-8-2019	GA (for GA check)
V1.0	26-8-2019	Uploaded to the Participant Portal

Verification and approval

	Name	Date
Verification Final Draft by WP leader	Paul Tilanus	16-8-2019
Check before upload by coordinator	Paul Tilanus	16-8-2019

Executive summary

In this deliverable the approach to the data generated by the project is described.

A distinction is made on deliverables and publications of the project and the other data generated by the project.

For the deliverables and publications the data management strategy is straightforward open access publishing.

In particular for the data generated by the project, other than project deliverables, a description is given how the data is published such that it can be found and accessed, and how the data is made interoperable and available for re-use (FAIR principle). Also for these data the uCARE project aims at maximum openness and re-use, within the constraints of the ethics guidelines.

It is noted that this document describes the initial data management plan (DMP) and that, in particular when pilots within the uCARE are being defined, the DMP might require updates for the pilot specific data.

Table of contents

Executive summary	4
Table of contents.....	5
List of Tables	6
Definitions & Abbreviations	6
1 Introduction.....	7
1.1 Background uCARE.....	7
1.2 Purpose of the document.....	8
1.3 Document Structure	8
1.4 Deviations from original DoW.....	8
1.4.1 Description of work related to deliverable as given in DoW	8
1.4.2 Time deviations from original DoW	8
1.4.3 Content deviations from original DoW	8
2 uCARE Project handbook	9
3 Open access and open research data	9
3.1 Open access strategy for publications	10
3.2 Data management for research data.....	10
3.2.1 Normalized and Augmented Emission Maps	12
3.2.2 Normalized and Augmented Emission Maps metadata	12
3.2.3 Citizen Science on pollutant emissions results.....	12
3.2.4 Citizen Science on pollutant emissions metadata.....	13
3.2.5 Material for promotion and execution of pilot x	13
3.2.6 Pilot x measurement data	13
4 Conclusions and recommendations	13
References	14

List of Tables

Table 3-1: Primary research data sets.....	11
--	----

Definitions & Abbreviations

AEM	Augmented Emission Map
CA	Consortium Agreement
COPERT	COmputer Programme to calculate Emissions from Road Transport
EC	European Commission
DMP	Data Management Plan
DoA	Description of Action, a.k.a. DoW
DoW	Description of Work, a.k.a. DoA
DPO	Data Protection Officer
FAIR	Findable, Accessible, Interoperable, Re-usable
GDPR	General Data Protection Regulation
HBEFA	Handbook Emission Factors for Road Transport
NEM	Normalized Emission Map
OBD	On-Board Diagnostics
OEM	Original Equipment Manufacturer
PCP	(uCARE) Pilot Contact Person
WP	Work Package

1 Introduction

1.1 Background uCARE

With four million people dying annually due to outdoor pollution, improvement of air quality has become one of society's main challenges. In Europe, traffic and transport have a large effect on air quality, specifically passenger cars and commercial vehicles and to a lesser extent non-road mobile machinery. While technical improvements and more stringent legislation have had a significant impact, traffic and transport emissions are still too high and air quality is still poor. Although the use of electric and other zero-emission propulsion technologies may drastically reduce the pollutant exhaust emissions from traffic, the slow introduction of such vehicles as well as the trend of increasing vehicle lifetimes means that vehicles with internal combustion engines are expected to dominate the fleet beyond 2030. This project is the first opportunity to improve emissions of vehicles, not by improving vehicle technology, but by actively involving vehicle users and enabling their contribution to clean driving.

So far, expertise on pollutant emissions has mainly been used to advise European policy makers on limited effectiveness of emission legislation (through real-world emission factors such as HBEFA and COPERT) and how to reduce traffic and transport pollutant emissions. The numerous mitigation methods are rarely extended to include the perspectives of users uCARE enables a next essential step: providing user targeted emission reduction measures. These measures will be implemented and evaluated in real-life pilot projects.

The overall aim of uCARE is *to reduce the overall pollutant emissions of the existing combustion engine vehicle fleet by providing vehicle users with simple and effective tools to decrease their individual emissions and to support stakeholders with an interest in local air quality in selecting feasible intervention strategies that lead to the desired user behaviour*. The overall aim is accompanied by the following objectives:

1. To identify **user-influenced vehicle emission aspects** (such as driving behaviour and vehicle component choice).
2. To determine the **emission reduction potential** of each vehicle emission aspect with help of the uCARE model developed within a toolbox.
3. To develop a **toolbox**, containing models and emission reduction measures, that enables stakeholders to identify the most appropriate intervention strategies that reflect the specific users and their motivation.
4. **Support policy makers** and other **stakeholders with an interest in air quality**, such as municipalities and branch organizations, **in identifying intervention strategies** that translate the measures into desired behaviour of the user.
5. **To test and evaluate** intervention strategies in a set of pilot projects conducted with various target user groups in at least four European countries. The pilot projects illustrate effectiveness and feasibility of the toolbox and intervention strategies developed on its basis.
6. Perform an **impact assessment** of the intervention strategies effectiveness, in terms of cost, penetration, achieved emission reduction and lasting effects.
7. **Actively feed** European cities and international parties with uCARE learning and results, via awareness raising campaigns, communication tools, interactive web application and other dissemination activities. Open access to the broad public to the toolbox, data and developed tools.
8. Summarise the findings **in blueprints for rolling out** different user-oriented emission reduction programmes, based on successful pilots.

This document is the result of Work Package 6, Consortium and project management, and describes the data management. The guidelines for the Open Research Data [1] are followed.

1.2 Purpose of the document

In this deliverable the approach to the data generated by the project is described. In particular for the data generated by the project, other than project deliverables, a description is given how the data is published such that it can be found and accessed, and how the data is made interoperable and available for re-use (FAIR principle).

1.3 Document Structure

This deliverable is structured as follows:

- Chapter 1 provides the uCARE context in which this deliverable was created.
- Chapter 2 introduces the uCARE Project handbook which plays a role in connecting the Data Management Plan (DMP) to the pilot definition procedure, and also to the ethics requirements involved.
- In chapter 3 the actual DMP with the approach to publications (including deliverables) and the management of other produced research data, including data from the uCARE pilots is described.
- Chapter 4 provides the conclusions.

1.4 Deviations from original DoW

1.4.1 Description of work related to deliverable as given in DoW

In the DoW [2] the document is described as: "This is the data management plan conform the Open Research Pilot."

1.4.2 Time deviations from original DoW

None

1.4.3 Content deviations from original DoW

None

2 uCARE Project handbook

The uCARE pilots are not yet defined at the start of the project. In cooperation with cities, regions, NGOs and other stakeholders the pilots will be defined *during* the project. The pilots definition procedure is strongly related to the ethics requirements and the data management procedures. Also a relation exists, though less strong, with the other procedures in the project, such as the review process.

For that reason it was decided to have a uCARE Project handbook, D6.1, a living document with an integrated view of all procedures. The uCARE Project handbook will be updated with every pilot being defined, to reflect all procedural changes.

In addition, the pilot description documents of WP3, D3.1 (M18) and D3.4 (M36), will be updated for the content description.

The consequence of the pilots being defined during the uCARE project for this deliverable is that

- the data collected by each pilot is not yet known and has to be agreed with the external pilot partner (a.k.a. pilot stakeholder),
- the metadata has to be described on a per pilot basis.

It is recommended not to read this document in isolation, but combined with D6.1 to get a good understanding of the ethics procedures in relation to the other project procedures, in particular the pilot definition procedure.

3 Open access and open research data

The uCARE project firmly believes in openness to be a major factor for innovation. There are many examples of how open innovation and open source are successful models, especially in domains where many different stakeholders are required to bring about effective change. Openness has many facets. The most important ones for the uCARE consortium are:

1. **Open project collaboration.** All partners are committed to developing (working for) relationships with external partners for mutual benefit. Making contacts with similar projects and establishing collaboration with potential pilot partners is considered beneficial for all. Open collaboration in uCARE is understood in a trans-disciplinary way, opening research processes to the wider public and in particular allowing stakeholders to build upon the pilot results of WP3.
2. **Open source technology.** Tools, e.g. for the production of normalized engine maps, are intended to be made available as open source. However, considering the liability associated with tools for in-car use, the consortium members consider these as not suited for open source.
3. **Open access to scientific results.** From a scientific perspective, the consortium clearly favours open access to its scientific output, which is supported by several project members' internal policies of supporting open access in general.
4. **Open access to research data.** uCARE is part of a pilot on open access to research data and is thus committed to providing access not only to project results and processes, but also to data collected during that process. The general policy of the uCARE project is to apply "open by default" to its research data, with exceptions being made based on privacy, competitiveness, and ethical rules on

anonymity as described in [3, section **Error! Reference source not found.**] are thus highly relevant and need to be agreed with each of the pilot participants.

The open access strategy will be detailed in the following sections.

3.1 Open access strategy for publications

In line with the EC policy initiative on open access¹, which refers to the practice of granting free online access to research articles, the project is committed to follow a publication strategy considering a mix of both 'Green open access' (immediate or delayed open access that is provided through self-archiving) and 'Gold open access' (immediate open access that is provided by a publisher) as far as possible.

All deliverables (reports, software, data, media, other) labelled as "public" will be made accessible via the uCARE website (<https://www.project-ucare.eu/>) as well as on the TNO Repository (<https://repository.tudelft.nl/tno/>). Since the TNO Repository does not provide permanent identifiers, data sets and or documents that require such a permanent identifier will also be published on the Zenodo platform (<https://zenodo.org/>) in the section "European Commission Funded Research (OpenAIRE)". The publications originating from the project work will also be made available on the uCARE website as well as on the Zenodo platform provided this does not infringe the publishers rights.

Where appropriate, the results will also be published via ResearchGate (<https://www.researchgate.net/>), preferably via the accounts of scientists that already have a track record in this domain (i.e. we will not make a specific uCARE account).

All outcomes of the project labelled as "public" will be distributed under specific free/open license, where the authors retain the authors' rights but the users can redistribute the content freely. In particular the supporting material for pilots such as leaflets, instruction video, etc. will be free for exploitation to facilitate replication and/or scaling up of these pilots.

3.2 Data management for research data

This is a first version of the DMP for uCARE, which provides an analysis of the main aspects to be followed by the project's data management policy. The DMP evolves in the course of the project and will be updated accordingly as research data is collected.

The DMP is in particular relevant to the pilot execution and pilot reporting as described in [3, sections **Error! Reference source not found.** and **Error! Reference source not found.**].

At the time of writing it is expected that the project will produce the following open research data:

- WP1: NEM - Normalized Emission Maps,
- AEM - Augmented Emission Maps,
- NAEM-m Normalized and Augmented Emission Maps metadata (D1.2),
- CS-xx Citizen science on pollutant emissions results
- CS-m Citizen science on pollutant emissions metadata

¹ <http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1294&lang=1>

WP2: None other than the deliverables of the project; for liability reasons, the software tool is only available for free for uCARE controlled pilots.

WP3: PPE-x-yy Material for promotion and execution of a pilot

PMD-x Pilot measurement data

The data will be different for each pilot (x). For some pilots, providing the measurement data as open research data might violate the GDPR. In those cases the pilot measurement data will not be made available. For those pilots where the measurement data can, potentially after suitable anonymization, be made available as open research data, this will be elaborated on a per pilot basis.

WP4: None other than the deliverables of the project.

In the following subsections the detailed information on the different sets of open research data is provided. Table 3-1 summarises the main characteristics per data set.

Table 3-1: Primary research data sets

Data set reference & name	Data set description	Standards & metadata	Data Sharing	Archiving & preservation
NEM	Normalized Emission Maps	xml; NAEM-m	Open source platform, e.g. Zenodo CC-BY-SA and/or GNU/FDL	Platform based
AEM	Augmented Emission Maps	xml; NAEM-m	Open source platform, e.g. Zenodo CC-BY-SA and/or GNU/FDL	Platform based
NAEM-m	Augmented Emission Maps metadata	PDF document	uCARE website, Zenodo CC-BY-SA and/or GNU/FDL	At least 5 years after the end of the project
CS-xx	Citizen Science experiments	Video or PDF document (depends on xx)	YouTube or uCARE website and Zenodo CC-BY-SA and/or GNU/FDL	YouTube policy; Zenodo policy
CS-m	Citizen Science metadata	PDF document	uCARE website, Zenodo CC-BY-SA and/or GNU/FDL	At least 5 years after the end of the project
PPE-x-yy	Pilot x material for promotion and execution of	Depends on yy D3.1	Platform to be decided (yy dependent) CC-BY-SA and/or	To be decided (yy dependent)

	the pilot		GNU/FDL	
PMD-x	Pilot x measurement data	Depends on x D3.1	Platform to be decided (x dependent) CC-BY-SA and/or GNU/FDL	To be decided (x dependent)

3.2.1 Normalized and Augmented Emission Maps

A Normalized Emission Map (NEM) is the hot emission maps for a specific engine (OEM, year of production, engine type, ...). The NEMs allow for linking the known emission control problems, relevant technologies and test results to a specific vehicle make and model, incorporating the different emission aspects.

NEMs will be based on the existing, unique and extensive collections of data and expert knowledge of the uCARE consortium partners. Assessing the data might require revisiting old tests results and studies, and some additional testing (like OBD monitoring, utilising existing vehicle sensors and remote sensing) to fill the gaps and to evaluate the developed vehicle emission maps. Since each partner is selected based on their state-of-art knowledge of specific emission aspects, analysis and reviews of available studies will be performed by data owners within the consortium.

An Augmented Emission Map (AEM) is used to describe the isolated effects of different modes, like cold start, tampering, retrofitting, etc. The AEM describes how the NEM is altered due to the mode it describes.

AEMs will also be based on the existing, unique and extensive collections of data and expert knowledge of the uCARE consortium partners. Data analysis per emission aspect will focus on the impact of user behaviour on pollutant emissions.

3.2.2 Normalized and Augmented Emission Maps metadata

No standard format is available for NEM or AEM. uCARE will define an xml-based format for both NEM and AEM and document this format in D1.2.

D1.2 will provide a graphical representation of the NEMs and AEMs and provide links to the underlying data.

Furthermore, D1.2 describes how the NEM and AEM can be used, e.g. by tool builders.

On Zenodo a document with metadata can be coupled to one or more data sets.

3.2.3 Citizen Science on pollutant emissions results

The individual results are not known at the moment of writing this document. These results are the outcome of the work in Task 1.4.

During the project the description of the citizen science experiments/tests will be provided, either as a document or a video clip. For video clips YouTube is currently considered the preferred channel. For documents the uCARE website will be used for the initial publication. Combined with the CS-m the documents will also be published on Zenodo.

3.2.4 Citizen Science on pollutant emissions metadata

In deliverable D1.5 the citizen science tests/experiments are described with reference to websites where documents can be downloaded, YouTube video clips and possibly other media outcome. It provides all the metadata for the correct use and interpretation of the tests/experiments.

D1.5 is intended to be used by WP3 in a pilot, and the material will be available for any organisation that wants to replicate and or scale-up the WP3 pilot.

3.2.5 Material for promotion and execution of pilot x

PPE-x-yy is the collection of materials for pilot x. During the projects the pilots will be defined, and the PPE-x-yy follows from that definition.

D3.1 will provide the metadata on the materials for promotion and execution of all the pilots.

3.2.6 Pilot x measurement data

PMD-x is the collection of measurement data derived from pilot x. During the projects the pilots will be defined, and the PMD-x follows from that definition.

D3.1 will provide the metadata on the pilot data from all the pilots. This includes the anonymisation method if that was required (see [3, section 5.2]).

4 Conclusions and recommendations

Though the data produced by the uCARE project, apart from the uCARE deliverables, are to a large extent not yet known, the initial DMP how to deal with this data to meet the requirements of making the data findable, accessible, interoperable, and re-usable (FAIR principles) is clear.

It is likely the DMP will need to be updated during the execution of the project, in particular each time a pilots has been defined. These updates will be made in the Project handbook, D6.1, since that allows these updates to be in line with the updates of the ethics aspects related to the same pilots. These ethics requirements have an impact on the data that can be made public.

References

- [1] uCARE consortium, 815002 uCARE proposal, ANNEX 1 (part A), Ares(2019)1843548 – 20/3/2019

- [2] European Research Council (ERC), *Guidelines on Implementation of Open Access to Scientific Publications and Research Data in projects supported by the European Research Council under Horizon 2020*, 21 April 2017, http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/oa-pilot/h2020-hi-erc-oa-guide_en.pdf (accessed 16/7/2019)

- [3] P.A.J. Tilanus, *D6.1 Project handbook*, uCARE-D6.1-v1.0, August 2019