



Holistic Approach for Providing Spatial & Transport Planning Tools and Evidence to Metropolitan and Regional Authorities to Lead a Sustainable Transition to a New Mobility Era

D10.9 Data Management Plan Version 2

Submission date: 28/02/2022



[@Harmony_H2020](https://twitter.com/Harmony_H2020)

[#harmony-h2020](https://twitter.com/Harmony_H2020)



<https://www.linkedin.com/company/harmony-h2020/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 815269



Part of:



SUMMARY SHEET

PROJECT

Project Acronym:	HARMONY
Project Full Title:	Holistic Approach for Providing Spatial & Transport Planning Tools and Evidence to Metropolitan and Regional Authorities to Lead a Sustainable Transition to a New Mobility Era
Grant Agreement No.	815269 (H2020 – LC-MG-1-2-2018)
Project Coordinator:	University College London (UCL)
Website	www.harmony-h2020.eu
Starting date	June 2019
Duration	45 months

DELIVERABLE

Deliverable No. - Title	D10.9 – Data Management Plan Version 2
Dissemination level:	Public
Deliverable type:	Report
Work Package No. & Title:	WP10 - Dissemination, Exploitation & Innovation Management
Deliverable Leader:	ICCS
Responsible Author(s):	Efthimios Bothos (ICCS), Babis Magoutas (ICCS)
Responsible Co-Author(s):	UAEGEAN, UoW, TRT, MOBY, OASA, TUD, CDT, GROT, OCC
Peer Review:	Panagiotis Georgakis (UoW)
Quality Assurance Committee Review:	Maria Kamargianni0 (UCL)
Submission Date:	28/02/2022

DOCUMENT HISTORY

Version	Date	Released by	Nature of Change
0.1	15/12/2021	ICCS	Initial Version with ToC
0.2	04/01/2022	ICCS	Data templates updated
0.3	17/01/2022	ICCS	Summary of updates added
0.7	01/02/2022	ICCS	First consolidated version for the consortium.
0.8	25/02/2022	ICCS	Internal review comments addressed
1.0	28/02/2022	ICCS	Final version for submission

1 TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	4
1 Introduction.....	5
2 Data Summary.....	6
2.1 Purpose of Data Collection.....	6
2.1.1 Data required to build the HARMONY Models	6
2.1.2 Data emerging from the Pilot Studies.....	6
2.2 Relation of Data to the project's objectives	6
2.3 Types and formats of the project's data.....	6
2.3.1 Primary data from surveys.....	7
2.3.2 Primary data emerging from HARMONY workshops	7
2.3.3 Secondary data from the pilot sites	7
2.3.4 Data generated by the models and are provided as input to the different levels	14
2.3.5 Data generated by the HARMONY use-cases and will be potentially published as open data	15
3 Fair Data	16
3.1 Making data findable, including provisions for metadata	16
3.1.1 Naming Convention Strategy.....	16
3.1.2 Version Numbering Strategy	16
3.1.3 Metadata & Search keywords	17
3.2 Making data openly accessible	17
3.2.1 Datasets.....	17
3.2.2 Scientific Publications	17
3.2.3 Source code	18
3.3 Making data interoperable	18
4 Allocation of Resources	18
5 Data Security and Protection	18
5.1 Storage of sensitive data.....	18
5.2 Adherence to the General Data Protection Regulation	18
6 Ethical Aspects	20
6.1 Informed Consent	20
6.2 Exchanging, archiving and preservation of data	20
7 Conclusions	21
8 APPENDIX I: Secondary data definition template.....	22
9 APPENDIX II: Model Outputs data definition template.....	30
10 APPENDIX III: Data Sharing Agreement Template.....	31
11 APPENDIX IV: Data Processing Agreement Template	34

LIST OF ABBREVIATIONS

Abbreviation	Explanation
DMP	Data Management Plan
FAIR	Findable, Accessible, Interoperable and Re-usable

EXECUTIVE SUMMARY

Management of data is an important element of large scale multi-disciplinary projects. As such, HARMONY is collecting, using and generating a heterogeneous set of data throughout its lifecycle. This deliverable is the second version of the project's Data Management Plan and provides an updated view of the identified datasets based on the knowledge acquired since its first version which was delivered on M6. Moreover, this deliverable reports on the data sharing agreements that have been put in effect over the course of the project in order to adhere to the GDPR regulations for primary data emerging from the HARMONY surveys.

HARMONY continues to apply practices for safeguarding that the research data are findable, accessible, interoperable and re-usable (FAIR) and provides measures for data security and protection.



1 Introduction

The Data Management Plan (DMP) explains the proposed actions for the overall control of HARMONY's data and publications. The DMP is a "living document" that will be constantly updated during the project. More specifically, two further versions (2 and 3) of the DMP will be produced in M30 and M42 respectively.

In order to derive the data sources which are used and created within the HARMONY project a collaborative methodology is followed where all partners dealing with data are involved. Templates to record existing and new datasets were created and were provided to relevant partners. More specifically, one template was provided to pilot cities to gather available datasets and another was provided to transport modellers to gather the data that will be the outputs of the different models. The templates are provided in Appendix 1 and include information regarding the dataset's description, purpose and utility, reference and name, partner involved, format, related metadata and standards, relation to the project's objectives, whether it is a new or existing dataset and expected size. A list of datasets from the HARMONY project partners was initially listed in the first version of the Data Management Plan which was submitted on M6 of the project.

The present, second version of the Data Management Plan, provides an updated view of the identified datasets based on the knowledge acquired since M6. In order to reach the updated view of the HARMONY datasets, partners were asked to revise the data templates based on recent and relevant information. The outcome of this process is described in Sections 2.3.1 and 2.3.2 of this deliverable. Moreover, this deliverable reports on the data sharing agreements that have been put in effect over the course of the project in order to adhere to the GDPR regulations for primary data emerging from the HARMONY surveys. A description of the corresponding agreements is provided in Section 2.3.1, whereas the templates for the signed agreements are added in Appendix III and Appendix IV of this document. Last but not least, this deliverable provides a set of new datasets which are expected to be generated and published by the HARMONY project. These datasets are described in Section 2.3.5.

The remainder of the deliverable is structured as follows. In Section 2 the document embarks with an updated summarisation of the types and sources of data and continues in Section 3 with the description of the practices for safeguarding that the HARMONY research data are findable, accessible, interoperable and re-usable (FAIR). An account of the allocated resources for data management is included. Then as an appreciation of the data security and ethical considerations, principles to be adopted is provided in Sections 4 and 5. The conclusions and next steps are part of Section 6.

2 Data Summary

2.1 Purpose of Data Collection

The goal of HARMONY is to develop a new generation of harmonised spatial and multimodal transport planning tools which comprehensively model the dynamics of the changing transport sector and spatial organisation, enabling metropolitan area authorities to lead the transition to a low carbon new mobility era in a sustainable manner. The HARMONY model suite is designed to assess the multidimensional impacts of the new mobility concepts and technologies. The model suite integrates: 1. land-use models (strategic/long-term), 2. people and freight activity based models (tactical/mid-term), and 3. multimodal network (operational/short-term) models allowing for vertical planning. This integrated approach is necessary for authorities to understand if policies are sustainable, while also contribute to meeting COP22 targets, social equality and wellbeing.

To achieve its goal, HARMONY makes use of existing data from cities where it is piloted, and generates new data in terms of travel surveys and actual deployment and use of new mobility services. These data are fed into the HARMONY models which in turn generate data for transport and spatial designs.

2.1.1 Data required to build the HARMONY Models

These data are used with the aim to build transport and spatial models at three levels: strategic, tactical and operational and include both primary data, i.e. data collected in the course of the project and secondary data, i.e. data that have been collected for some other purpose outside the project's scope, but can be utilized for feeding the HARMONY models. More specifically the following data types have been identified:

- Primary data emerging from the HARMONY surveys
- Primary data emerging from HARMONY workshops in the form of requirements
- Secondary data from the HARMONY pilot sites
- Data generated by the models and are provided as input to the different levels

2.1.2 Data emerging from the Pilot Studies

HARMONY will apply the HARMONY model suite in six (6) pilot studies (Athens, Trikala, Katowice, Oxfordshire, Turin, Rotterdam). It is expected that the models will generate evidence which will allow the identification of sustainable and eco-rational mobility solutions, measures, policies, and business models to address current and future challenges in metropolitan areas.

2.2 Relation of Data to the project's objectives

The following table summarizes the relation of the different data categories to the project objectives. Note that O1, O2, O3, O4 are related to the implementation of the HARMONY models whereas O5, O6, O7, O8, O9 are related to the application of the models and dissemination of results.

O1, O2, O3, O4	Data required to build the HARMONY models, including: <ul style="list-style-type: none"> - Primary data emerging from the HARMONY surveys - Primary data emerging from HARMONY workshops in the form of requirements - Secondary data from the HARMONY pilot sites - Data generated by the models and are provided as input to the different levels
O5, O6, O7, O8, O9	Data emerging from the HARMONY pilot studies

2.3 Types and formats of the project's data

In the following sections, we describe a number of datasets which have currently been identified within the HARMONY project. Note that the datasets will be updated as the project advances and further information will be added to this document.

2.3.1 Primary data from surveys

A number of surveys are planned within the HARMONY project to gather data from travellers which will support the development of the models. These include:

- Passenger survey in Oxfordshire and Turin: for these surveys the software-as-a-service smartphone-based travel survey tool of MOBYx will be used to host the HARMONY questionnaires and collect the travel data. In order for the participants to use the MOBYapp smartphone app, they have to create an account, where they will be asked to provide their e-mails. The MOBYapp tracks the travel patterns of the individuals. In addition, a further validation of the tracking data is required, where the individuals will be asked to verify the type of the location (i.e. home, work, shopping etc.).
- Passenger survey in Trikala: in order to materialise the demonstration with drones delivering medicines from the city to the rural areas, we need to have the name, the home address and the home phone number of the individuals that will participate in the demonstration (address is needed to navigate the drones). Due to the fact that most of these participants are elderly and technology-illiterate, only personal interviews with paper-based questionnaires will be conducted.

As part of the Harmony surveys, personal data of survey participants are collected by Harmony project partners. Following the GDPR regulations the Harmony consortium has established a set of data sharing and processing agreements between project partners in order to facilitate data exchange and processing. The templates for the corresponding agreements are provided in Appendix III and Appendix IV.

In order to be able to process the corresponding data a joint data controller agreement has been signed by UCL (the project coordinator), Moby X (the partner who collects the data through the Moby app) and UAegean (the partner who contributes to the collection of data).

Moreover, a data processing agreement (template provided in Appendix IV) has been signed between partner UCL (the project coordinator) and partners ICCS (the partner managing Harmony's Transport and Spatial Data Warehouse) for potential storage of primary data in Harmony's data warehouse as well as partner TRT who will be processing the HARMONY survey data for Turin.

Data sharing agreements between other partners have not been signed at this point as they will have access to anonymized, aggregate and processed data from the primary surveys. In case a need for data sharing emerges separate agreements between the project coordinator and the partners will be put in place using the template provided in Appendix III.

2.3.2 Primary data emerging from HARMONY workshops

The project will organise a series of stakeholder engagement events (WP1, WP9, WP10) and primary data collection from passengers and freight actors (WP9). The data emerging from the workshops provide requirements for the implementation of the HARMONY models.

2.3.3 Secondary data from the pilot sites

Secondary data are provided by the pilot partners and will be used as input to the HARMONY models. At this point the consortium is in the process of collecting the information for the available secondary data including information for accessing the data and related access rights. The next step involves an evaluation regarding their fit-for-purpose for the HARMONY models. The following tables provide an overview of the available datasets listed by the pilot partners as of M10 of the project. Note that this list is continuously updated and revised. An updated list will be provided in the next version of D10.3.

2.3.3.1 City of Turin, Italy

2.3.3.1.1 Land Use Data

Data Type	Data Format	Data Year	Description
Economic			
Employment (jobs)	csv, shapefile	2011 to 2018	National Census with local area disaggregation by economic sector. Available at: http://dati-censimentoindustriaeservizi.istat.it/FileView2.aspx?IDFile=5355745c-6bfa-4663-b602-4d1c53991d46

http://dati.istat.it/OECDStat_Metadata/ShowMetadata.ashx?Dataset=DICA_ASIA_UE1P&ShowOnWeb=true&Lang=it

Land use			
Land Use Data	csv, shapefile	2019	Available at: https://webgis.arpa.piemonte.it/ags101free/rest/services/suolo/Consumo_Suolo_2017/MapServer/WMTS/1.0.0/WMTSCapabilities.xml
Demographics			
Population	csv, shapefile	2019	Census Regione Piemonte, Available at: https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2019-09/elenco_comuni_agg.2019.xls
Population Projections	csv, shapefile	2019	Only regional percentage rate ISTAT. Available at: http://dati.istat.it/Index.aspx?DataSetCode=DCIS_PREVDEM1#
Occupational Class	csv	2017	ISTAT, Available at: http://dati.istat.it/
Ethnicity	csv	2019	ISTAT, Available at: http://dati.istat.it/Index.aspx?DataSetCode=DCIS_POPSTRCIT1#
Income	csv	2017	Income groups for classes and types. Available at: http://dati.istat.it/
Urban density	csv, shapefile	2017	Income groups for classes and types. Available at: http://dati.istat.it/
Housing			
Housing Tenure	csv	2011	National Census with local area disaggregation. Available at: http://www.datigeo-piem-download.it/direct/Geoportale/RegionePiemonte/OMI/ValoriOMI2016_su_Edifici_oBDTRE2017.zip
House Prices	csv	2011	National Census with local area disaggregation. Available at: http://www.datigeo-piem-download.it/direct/Geoportale/RegionePiemonte/OMI/ValoriOMI2016_su_Edifici_oBDTRE2017.zip
Topography			
General topography	Shapefile	2019	Available at: http://www.geoportale.piemonte.it/cms/bdtre/modalita-di-pubblicazione-e-fruizione
Digital Elevation Model	shapefile	2013	Maximum detail GSD: 1 m. Available at: http://wms.pcn.minambiente.it/ogc?map=/ms_ogc/WMS_v1.3/servizi-LIDAR/LIDAR_PIEMONTE.map
Administrative Boundaries			
Municipal Boundaries	Shapefile	2019	Available at: http://www.istat.it/storage/cartografia/confini_amministrativi/archivio-confini/non_generalizzati/Limiti_2016_ED50.zip
Local Authority Boundaries	Shapefile	2019	Available at: http://www.istat.it/storage/cartografia/confini_amministrativi/archivio-confini/non_generalizzati/Limiti_2016_ED50.zip
Building Data			
Building Footprints	Shapefile	2019	Building footprint outlines. Available at: https://webgis.arpa.piemonte.it/ags101free/rest/services/suolo/Consumo_Suolo_2017/MapServer/WMTS/1.0.0/WMTSCapabilities.xml
Building Floorspace / Heights / Storeys	Shapefile	2019	Estimated volumetric unit per building. Available at: http://www.geoportale.piemonte.it/cms/bdtre/modalita-di-pubblicazione-e-fruizione
Building Function	Shapefile	2019	Available at: http://www.geoportale.piemonte.it/cms/bdtre/modalita-di-pubblicazione-e-fruizione
State / Public Housing Estates	Shapefile	2017	Location of large public housing estates. Available at: http://geovector3.territorio.csi.it/OGCProxyV2/bdtre_imm?service=WFS&request=getCapabilities
Planning Policy Data			
National Forest Inventory	Shapefile	2010	PTC 2 - AREE VERDI URBANE (http://www.geoportale.cittametropolitana.torino.it/geonetworkpto/srv/ita/meta-data.show?id=481&currTab=rndt) PTC 2 - AREE BOSCATI (http://www.geoportale.cittametropolitana.torino.it/geonetworkpto/srv/ita/meta-data.show?id=513&currTab=rndt)
Other data			
Utility Networks	Shapefile	2019	Only river. Available at: http://www.geoportale.piemonte.it/cms/bdtre/modalita-di-pubblicazione-e-fruizione

2.3.3.1.2 Transport Supply Data

Data Type	Data Format	Data Year	Description
Network data			
GIS shapefile of TAZ system and	shapefile	2019	Available at:

<i>georeferences of centroids and connectors</i>			http://www.istat.it/storage/cartografia/basi_territoriali/WGS_84_UTM/2011/R01_11_WGS84.zip
<i>GIS shapefile of study area</i>	shapefile	2019	Available at: http://www.istat.it/storage/cartografia/basi_territoriali/WGS_84_UTM/2011/R01_11_WGS84.zip
<i>Open Street Map data</i>	shapefile, OSM file	2020	Available at: http://download.geofabrik.de/europe/italy/nord-ovest-latest-free.shp.zip
<i>Bike lane network</i>	shapefile	2019	Available at: http://geovector3.territorio.csi.it/OGCProxyV2/bdt_re_viab?service=WFS&request=getCapabilities
Traffic Control Data			
<i>Fixed Signal Control data</i>	shapefile, Visum network	2019	source: 5T, Restricted access
<i>Signalized Intersections (for each signal groups, signal phases, control plans, coordinates)</i>	shapefile, Visum network	2019	source: 5T, Restricted access
<i>(Semi) Actuated Signal Control data</i>	csv	2020	Only for Municipality of Turin, source 5T, Restricted access.
<i>Loop detector data</i>	csv, shapefile	2019	source: 5T, Restricted access.
Public Transport Data			
<i>GTFS files availability</i>	GTFS format	2019	source: 5T, Restricted access.
<i>Line routing (ideally GIS based)</i>	shapefile	2019	source: GTT, Restricted access.
<i>Stops location (ideally GIS based)</i>	shapefile	2019	source: GTT, Restricted access.
<i>Type of vehicles used to operate each line</i>	csv	2020	source: GTT, Restricted access.
Parking Data			
<i>GIS files availability</i>	shapefile	2019	Only for Municipality of Turin, source 5T, Restricted access.
<i>Parking space availability system</i>	shapefile, csv	2019	Only for Municipality of Turin, source 5T, Restricted access.
Energy, emission, noise data			
<i>Vehicle Engine Type data</i>	csv	2018	Disaggregated for Municipalities; ACI, Available at: http://www.aci.it/fileadmin/documenti/studi_e_ricerche/dati_statistiche/Prov_Categ_2014.xls
<i>Classification of vehicles</i>	csv	2018	Category 1: Light motor vehicles, Category 2: Medium heavy vehicles, Category 3: Heavy vehicles, Category 4: Powered two wheelers. Disaggregated for Municipalities; ACI Available at: http://www.aci.it/fileadmin/documenti/studi_e_ricerche/dati_statistiche/Prov_Categ_2014.xls

2.3.3.1.3 Transport Demand Data

Data Type	Data Format and source	Data Year	Additional Comments
Passenger Demand Data			
<i>Household travel demand surveys</i>	csv	2013	IMQ2013 (source AMP), Available at: http://mtm.torino.it/it/dati-statistiche/indagine-imq-2013/base-dati-imq-2013/IMQ2013_opendata.zip
<i>Static OD matrix</i>	csv	2011	National Italian Census disaggregated for local area, passenger trips, period: from 7.00 to 8.00. Matrix from 5T by vehicle type, Available at: http://www.istat.it/storage/cartografia/matrici_pendolarismo/matrici_pendolarismo_2011.zip
<i>Static OD matrix per vehicle type</i>	csv	2019	source 5T: private car, freight vehicles (and public transport), Restricted access
<i>Data used for static OD matrix estimation and calibration</i>			1700 loop detectors, Restricted access.
<i>Skim matrices</i>	csv	2019	source 5T, travel time, distance and free flow, Restricted access
Pedestrian Data			
<i>Pedestrian counts at crossings per direction (estimated or observed)</i>	csv	2019	Only for main historical and commercial streets, Restricted access
<i>Bicycle counts or occupancy at</i>	csv	2020	Max. 5 counts for entire municipality area, Restricted access

exclusive bicycle
lanes (in case of
sharing lanes
with other modes
provide
occupancy share)

2.3.3.1.4 Calibration Data

Data Type	Data Format and source	Data Year	Additional Comments
Calibration Data			
Loop detector data	csv	2019	Traffic flow by vehicle type (car and trucks) and speed
Loop detector data	csv	2019	aggregation interval: 5 min
Loop detector data	csv	2019	time period: 2019, every day
Loop detector data	csv	2019	data status: processed data

2.3.3.1.5 New Mobility Services Datasets

Data Type	Data Format and source	Data Year	Additional Comments
Traditional Taxis (Cabs) - Supply data			
Fleet size	csv	2019	Restricted Access
Station-based or free-floating Carsharing (DriveNow, car2go, etc.) - Supply data			
Fleet sizes	csv	2020	Restricted Access
Fleet composition/Vehicle Types/Number for each type	csv	2020	Restricted Access
Vehicle Capacities	csv	2020	Restricted Access
Station capacity/dock-parking numbers	csv	2020	Restricted Access
Fuel Consumption	csv	2020	Restricted Access
Station-based or free-floating Bikesharing (Santander bikes, Lime, Ofo, OBiike, etc.) -Supply data			
Fleet sizes	csv	2019	Restricted Access
Fleet composition/Vehicle Types/Number for each type	csv	2019	Restricted Access
Station capacity/dock-parking numbers	csv	2019	Restricted Access
Station-based or free-floating Scooters (Lime, VOI, etc.) - Supply data			
Fleet sizes	csv	2020	Restricted Access
Fleet composition/Vehicle Types/Number for each type	csv	2020	Restricted Access
Vehicle Capacities	csv	2020	Restricted Access
Station capacity/dock-parking numbers	csv	2020	Restricted Access
Fuel Consumption	csv	2020	Restricted Access
Station-based or free-floating Bikesharing (Santander bikes, Lime, Ofo, OBiike, etc.)			
Static or dynamic daily station/zone stock level data	csv	2020	Restricted Access
Trips /ODs	csv	2020	Restricted Access
Rentals/Bookings	csv	2020	Restricted Access
Station-based or free-floating Scooters (Lime, VOI, etc.)			
Static or dynamic daily station/zone stock level data	csv	2020	Restricted Access
Trips /ODs	csv	2020	Restricted Access
Rentals/Bookings	csv	2020	Restricted Access

2.3.3.2 Oxfordshire County, UK

2.3.3.2.1 Transport Supply Data

Data Type	Data Format / Description
Network data	
GIS shapefile of TAZ system and georeferences of centroids and connectors	Shapefile
GIS shapefile of study area	Shapefile
Open Street Map data	Shapefile
Bike lane network	
Walking network	
Intersection (node) coordinates	Shapefile
Section: Road category, speed limit	Shapefile
Number of lanes	Shapefile
Lane widths	Shapefile
Airport location data	Shapefile
Traffic Control Data	
Fixed Signal Control data	Fixed control plans, traffic lights position, phases and groups; traffic control plan
(Semi) Actuated Signal Control data	Data to correctly code controllers (for adaptive signals): SCOOT, MOVA, etc.. + turn movement counts + the details of each phase must be obtained, such as minimum green time, maximum green time, yellow change interval time, and red clearance interval time.
Loop detector data	SCOOT loop locations
Ramp Meter Control Data	The metering rate (or headway) associated with a ramp meter and how the metering rate is determined (fixed, ALINEA, HERO, etc.)
Location of variable message signs and set of possible pre-fixed messages	Only one site in Oxfordshire which is owned and managed by HE but we do have data
Location of variable speed signs, operational rules and algorithms used	From Argonaut the UTM common database
Public Transport Data	
GTFS files availability	Compressed TEXT files updated as of 2018
Line routing (ideally GIS based)	Compressed TEXT files updated as of 2018
Stops location (ideally GIS based)	Compressed TEXT files updated as of 2018
Stops assigned to each line	Compressed TEXT files updated as of 2018
Timetable covering the simulation period/day	Compressed TEXT files updated as of 2018
Energy, emission, noise data	
Classification of vehicles	Category 1: Light motor vehicles, Category 2: Medium heavy vehicles, Category 3: Heavy vehicles, Category 4: Powered two wheelers ATC, Vivacity labs.

2.3.3.2.2 Transport Demand Data

Data Type	Data Format and source	Data Year	Additional Comments
Passenger Demand Data			
Household travel demand surveys			https://www.gov.uk/government/statistical-data-sets/ad-hoc-national-travel-survey-analysis
Static OD matrix	CSV files	JAN-FEB 2016	OD matrix data between wards of Oxfordshire. Sourced as part of Google's Better Cities project.
Pedestrian Data			
Pedestrian counts at crossings per direction (estimated or observed)	CSV files	AUG 2019-present	Data produced by Vivacity Lab camera sensors
Bicycle counts or occupancy at exclusive bicycle lanes (in case of sharing lanes with other)	CSV files	AUG 2019-present	Data produced by Vivacity Lab camera sensors

modes provide
occupancy
share)

Other Data

Mobile phone
data

CSV files

Data from INRIX

2.3.3.2.3 Data for New Mobility Services

Data Type	Data Format	Data Year	Additional Comments
Station-based or free-floating Bikesharing (Santander bikes, Lime, Ofo, OBiike, etc.) -Supply data			
Fleet sizes	JSON files	Few months in 2018	
Station capacity/dock-parking numbers	JSON files	Few months in 2018	All dockless bike-sharing operators have ceased operations. There is some supply data from 2018.

2.3.3.3 City of Athens, Greece

2.3.3.3.1 Land Use Data

Data Types	Data Format	Data Year	Additional Comments
Land use			
Land Use Data		census 2011	land use classification of buildings
Demographics			
Population		census 2011	
Work force participation		2011-2019	by sector (NACE 2 digit codes)
Tourists		2011-2019	total yearly arrivals in the region
Income			average real income per capita

2.3.3.3.2 Transport Supply Data

Data Type	Data Format	Data Year	Additional Comments
Network data			
GIS shapefile of TAZ system and georeferences of centroids and connectors	Shapefile, MS-ACCESS file	2014	1284 internal zones plus 12 external zones.
GIS shapefile of study area	Shapefile	2014	Core road network with directions and all necessary link data (speed, capacity and so on), coded turn prohibitions, coded traffic lights in some intersections (no signaling program coded)
Aerial photography and/or CAD for refinements (Google Streetview can be a replacement for this requirement)	JPG	2020	Obtained from VISUM aerial photography applet
Intersection (node) coordinates	Shapefile, CSV	2014	
Section: Road category, speed limit	Shapefile, MS-ACCESS file	2014	
Number of lanes	Shapefile, MS-ACCESS file	2014	
Link free-flow speed	Shapefile, MS-ACCESS file	2014	
Lane widths	Shapefile, MS-ACCESS file	2014	
Airport location data	Shapefile, MS-ACCESS file	2014	
Traffic Control Data			
Fixed Signal Control data	Shapefile, MS-ACCESS file	2014	Traffic light positions, phases and groups, no signalling program
Signalized Intersections (for each signal groups, signal phases, control plans, coordinates)	Shapefile, MS-ACCESS file	2014	Traffic light positions, phases and groups, no signalling program
Public Transport Data			
GTFS files availability	Shapefile, MS-ACCESS file	2020	data available for bus, trolleybus
Line routing (ideally GIS based)	Shapefile, MS-ACCESS file	2020	

<i>Stops location (ideally GIS based)</i>	Shapefile, MS-ACCESS file	2020
<i>Stops assigned to each line</i>	Shapefile, MS-ACCESS file	2020
<i>Timetable covering the simulation period/day</i>	Shapefile, MS-ACCESS file	2020
<i>Type of vehicles used to operate each line (provide fleet size and composition including length, number of doors and which are used for boarding, number of seats, passenger capacity)</i>		2020

2.3.3.3.3 Transport Demand Data

Data Type	Data Format and source?	Data Year	Additional Comments
Passenger Demand Data			
<i>Household travel demand surveys</i>	text file, csv	2006	household survey (socioeconomic data, trips, mode choice, trip purpose etc)
<i>SP experiments (mode, route or vehicle purchase choice)</i>	text file, csv	2006	stated-preference (time/cost) about mode choice
<i>Static OD matrix</i>	ms access	2014	24 h and peak period matrices for Private and Public Transport (both per trip purpose and aggregated)
<i>Static OD matrix per vehicle type</i>	ms access	2014	Private Vehicles, Public Transport
<i>Skim matrices</i>	ms access	2009	Time, distance, generalized cost
Freight Demand Data			
<i>Freight OD matrix</i>	ms access	2006	OD Matrix from 2006 survey

2.3.3.4 City of Rotterdam, Netherlands

2.3.3.4.1 Transport Supply Data

Data Type	Data Format	Data Year	Additional Comments
Network data			
<i>GIS shapefile of TAZ system and georeferences of centroids and connectors</i>	Shapefile		A zoning system was created for the study area consisting of 6668 zones The zoning is based on the V-MRDH transport model within the Province of South-Holland (6625 zones) and on the NUTS3-regions outside the Province of South-Holland (43 zones)
<i>GIS shapefile of study area</i>	Shapefile		
Freight-related data			
<i>City constraints</i>	Shapefile		Regulations imposed by local governments (e.g. forbidding trucks on specific times, vehicle weight restrictions)
<i>Locations for trans-shipment</i>	CSV		Transfer locations (intermodal facilities). This data is not available from a supply model but from a different dataset that was provided
<i>Distribution centers</i>	CSV		Received from Rijkswaterstaat (Dutch road authority)
<i>Parcel depots</i>	CSV		Collected using OpenStreetMap API and Google Maps searches.
<i>Customer locations</i>	CSV		Synthetic population was created by TUD

2.3.3.4.2 Transport Demand Data

Data Type	Data Format and source	Data Year	Additional Comments
Freight Demand Data			
<i>Truck trip diaries</i>	Basibestanden goederenvervoer: SAV Automated XML trip data collection: ASCI		"Basisbestanden Goederenvervoer" and XML transport microdata are both collected by CBS, and consists of large numbers of truck trip diaries for the Netherlands. Source (micro)data are proprietary and only available for analysis under strict conditions
<i>Freight OD matrix</i>	ASCI		Freight vehicle OD matrix can be derived from National Freight model BasGoed (7 vehicle types, 10 NSTR, 24 hour), can be made available by RWS
<i>Data used for static OD matrix estimation and calibration</i>	ASCI		Road counts for freight vehicles. Count data are available from the V-MRDH transport model.

Skim matrices Binary self-defined format (.mtx) Derived from the road network of the V-MRDH transport model using a Dijkstra route search on congested travel times.

2.3.3.4.3 New Mobility Services Data

Data Type	Data Format and source	Data Year	Additional Comments
Traditional freight operators (Trucks)			
Fleet composition/Vehicle Types/Number for each type			aggregate descriptives
Zone to zone travel times and loading/unloading times			see transp_demand section

2.3.4 Data generated by the models and are provided as input to the different levels

In this section a preliminary and limited list of datasets generated by the HARMONY models is provided. Note that the list is being updated and refined as the technical work progresses. A complete list will be provided in the next version of D10.3.

2.3.4.1 Employment Data

Description: The Regional Economy model generates future employment in terms of jobs by economic sector (including services, health and educational activities) which influence the demand for physical travel (used as input in the following models).

Partner: Provided by TRT.

2.3.4.2 Average income Data

Description: The Regional Economy model generates future development of average income of households.

Partner: Provided by TRT.

2.3.4.3 Parcel Deliveries Trip chains

Description: The operational freight controller generates trip chains for different types of cargo vehicles for the delivery of parcels. It has as input the freight demand and generates schedules by the integration of crowdshipping, micro-freight logistics (e-cargo bikes, delivery bots, electric vans) and air transport (drones).

Partner: Provided by UoW.

2.3.4.4 Route Rescheduling

Description: The freight controller receives information from the simulator environment on congestion and delays to optimize freight operations. This data is used to generate/reschedule routes for the trips.

Partner: Provided by UoW.

2.3.4.5 Demographic forecasts

Description: The Demographic Forecasting model generates synthetic populations of people and households over time (used as input in the following models).

Partner: UCL CASA.

2.3.4.6 People flows

Description: The Land-Use Transport-Interaction (LUTI) model estimates flows of people in different activities (journey to work, to schools, hospitals and retail centres) for different mode of transport.

Partner: UCL CASA.

2.3.4.7 Drive cycle/vehicle movement data

Description: Projections of vehicle movements which are supplied to the energy and emissions model to estimate emissions.

Partner: AIMSUN (Oxfordshire) and VISUM (Turin).

2.3.4.8 Freight demand

Description: The Tactical Freight Simulator creates freight demand in the form of individual shipments and trip chains. GHG emissions are calculated for each shipment and trip.

Partner: Provided by Significance / TU Delft

2.3.4.9 Parcel demand

Description: The Tactical Freight Simulator creates B2B- and B2C-parcels per zone and then assigns these to the different parcel couriers, for which trip chains are formed to deliver the parcels. GHG emissions are calculated for each trip.

Partner: Provided by Significance / TU Delft

2.3.5 Data generated by the HARMONY use-cases and will be potentially published as open data

HARMONY focuses on a set of modelling use cases to showcase the value of its integrated Model Suite. The simulation results of the different use cases are expected to generate datasets which will be published by the project. In the following a list of the expected datasets to be generated is provided. The list will be updated towards the end of the project, once the simulation use cases are finalized and run.

Use Case	Expected datasets
Athens UC1: Land-use changes in Elliniko	Updated OD travel matrices per mode to account for the effect of land-use changes Updated output of VISUM assignments
Athens UC2: Remote work	Updated OD travel matrices per mode to account for the effect of remote work Updated output of VISUM assignment
Turin UC1: New public transport infrastructures and Land use development	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, motorisation rate, accessibility
Turin UC2: MaaS demand	Dataset indicating the impact of MaaS on modal split, congestion, air quality, GHG emission, operators revenues (based on MaaS demand), motorisation rate
Turin UC3: Remote working / activity schedule	Dataset indicating the impact on modal split, congestion, air quality, GHG emission
Turin UC4: Urban Vehicles Access Regulation measures	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, car ownership and car fleet composition

OCC UC1: Impact of Autonomous Demand-responsive Transit service operations	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, car ownership and fleet composition, activity participation, other KPIs
OCC UC2: Impact of Autonomous Demand-responsive Transit services in demand for mobility and travel patterns (demand and supply interactions)	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, car ownership and fleet composition, activity participation, other KPIs
OCC UC3: Impact of MaaS schemes (traditional + shared- + micro- + on-demand mobility) in travel patterns and network performance (demand and supply interactions)	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, car ownership and fleet composition, activity participation, other KPIs
OCC UC4: Operational evaluation of crowdshipping last-mile logistic services in Great Oxford Area (supply-oriented) – MS demonstration use-case	Dataset indicating the impact on modal split, congestion, air quality, GHG emission, car ownership and fleet composition, activity participation, other KPIs. Detailed agent schedules.
Rotterdam UC1: Zero-emission zones	Excel sheet and road network shapefile indicating the impact on CO2/NOx/PM/SO2-emissions and vehicle kilometres.

3 Fair Data

3.1 Making data findable, including provisions for metadata

In order to make the project data findable, a Digital Object Identifier (DOI) will be requested for each artefact. In more details, DOIs from Crossref will be used for research publications, while DOIs from DataCite will be pursued for labelling each dataset of the project. In addition, a metadata record for each output of the project will be created and stored in the data directory. Amongst other fields, each metadata record will have a set of keywords that will make searches easier for external parties.

3.1.1 Naming Convention Strategy

In HARMONY, each data source will be provided with a specific name that is composed by different parts/elements, containing information about pilot country, data type or format and naming structure as follows:

ORIGIN_ORG_TOD_FORMAT_Info_VERSION

- **ORIGIN**: A prefix denoting if the dataset is pre-existing or new, followed by the first letters (three max) of the pilot's country (IT, UK, GR and NL) or GEN if the data artefact is pilot agnostic
- **TOD**: The type of data
- **FORMAT**: The data format/extension
- **Info**: Additional (abbreviated) information about the dataset. For example, the year when the dataset was published.
- **VERSION**: The version of the dataset.

3.1.2 Version Numbering Strategy

In HARMONY, we are following a data versioning strategy similar to software versioning, applying a two-part numbering rule: Major.Minor (e.g. V2.1). Major data revision indicates a change in the

formation and/or content of a dataset that may bring changes in scope, context or intended use. For example, a major revision may increase or decrease the statistical power of a collection, require change of data access interfaces, or enable or disable answering of more or less research questions. A Major revision may incorporate:

- substantial new data items added to /deleted from a collection
- data values changed because temporal and/or spatial baseline changes
- additional data attributes introduced
- changes in a data generation model
- format of data items changed
- major changes in upstream datasets.

Minor revisions often involve quality improvement over existing data items. These changes may not affect the scope or intended use of initial collection. A Minor revision may include:

- renaming of data attribute
- correction of errors in existing data
- re-running a data generation model with adjustment of some parameters
- minor changes in upstream datasets.

3.1.3 Metadata & Search keywords

All datasets that will be openly available will be accompanied with metadata information which will render them findable by interested third parties. Search keywords will be defined and will be part of the related metadata for each dataset.

At this point we plan to use the CERIF <https://www.eurocris.org/cerif/main-features-cerif> metadata format. However, in the course of the project we will check and identify any other applicable formats.

3.2 Making data openly accessible

A number of datasets that will be used as part of the project will be offered by previous studies. Some of these datasets are already open to the public, while others are proprietary and have high commercial sensitivity. In the cases where private data are processed and aggregated (e.g. as part of a model, or functionality of a component) permission will be requested by the provider prior to making the altered data publicly available.

In reference to the nature of the user data involved, some of the results that will be generated by each project phase will be restricted to authorised users, while other results will be publicly available. As per our Ethics commitment during the negotiation phase of the project, data access and sharing activities will be rigorously implemented in compliance with the privacy and data collection rules and regulations, as they are applied nationally and in the EU.

Since the DMP is expected to mature during the project, the subsequent releases of the deliverable will specify the repositories where the data will be stored and go into more detail on how this data can be accessed by the wider research community.

3.2.1 Datasets

Datasets characterised as “openly accessible” will be published in the following open repositories in OpenAire: <https://www.openaire.eu>

3.2.2 Scientific Publications

As required by the Grant Agreement, research publications will be made available through Green Open Access, where each publication needs to be made available at the HARMONY and Institutional portals. If applicable, Gold Open Access may be necessary, where the publication will be openly available through the publisher’s website. The publications of the project will be disseminated through the project’s dissemination and exploitation channels and follow the process described in the relevant project strategies.

3.2.3 Source code

It will be at the discretion of individual consortium members to decide whether the source code of their developed software is openly accessible. In such cases, different free and open-source software licenses will be investigated and the appropriate ones will be selected. Open source code from the HARMONY project will be made available through a common GitHub Repository.

3.3 Making data interoperable

HARMONY partners will use metadata vocabularies when possible to render the provided datasets interoperable. The formats that will be used will be described in later versions of the data management plan.

4 Allocation of Resources

Regarding the resources related to data management activities, the project includes a work package that is responsible for data warehousing and travel surveys (WP3), a task for identifying pilot areas' data (T9.1) and a task for the data management plan. In total, ~105 person-months of effort have been allocated to the relevant WPs and Tasks. In addition, around €13,000 have been allocated for the generation of Open Access publications. The data management plan task is led by ICCS who together with all the partners will handle the management of data related to the technological aspects of the platform.

5 Data Security and Protection

The HARMONY platform will provide all required measures for secure data access with the usage of the latest encryption tools and protocols as well as data access control practices to prevent data misuse or manipulation. The data security mechanisms will be defined and implemented as part of WP3. It is envisaged that the starting candidates will be TLSv3 protocol for secure data connections and OAuth for access control.

5.1 Storage of sensitive data

Data privacy and user data protection issues will strictly follow the "user decides" principle. End-users will always have the possibility (and only the user) to decide which personal or private data to be used and all user referenced data will always be grouped and combined via anonymization tools to avoid the possibility of breaking it down to one user. All personal data stored within the HARMONY project will be archived for the lifetime of the project only, and will be coded, stored and kept privately in a secure location. No information will be shared with any external to the HARMONY consortium party without the prior express permission of the user. Sensitive information will be stored in an encrypted form, and all data will be protected by password access.

5.2 Adherence to the General Data Protection Regulation

The General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679)¹ concerns issues related to the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). The regulation has been proposed and established by which the European Parliament, the Council of the European Union and the European Commission. It intends to strengthen and unify data protection for all individuals within the European Union (EU) and addresses issue related to the export of personal data outside the EU.

The GDPR aims primarily to give control to citizens and residents over their personal data and to simplify the regulatory environment for international business by unifying the regulation within the EU. GDPR has been adopted on 27 April 2016, while it became enforceable from 25 May 2018, allowing a

¹ <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32016R0679>

two-year transition period for member states. It is important to note that GDPR does not require national governments to pass any enabling legislation, and is thus directly binding and applicable. The HARMONY consortium is taking measures so that any user and personal data gathered from the project as well as related process adhere to GDPR. More specifically we have focused on twelve main steps which have been proposed by the ICO organization (Information Commissioner's Office) in the UK².

Step 1: Awareness. All partner organizations, corresponding decision makers and key persons within the HARMONY consortium have been informed of the GDPR enforcement and have been provided with related material in order to understand the impact of GDPR in their work. Partners will be requested to identify areas that could cause compliance problems under the GDPR and proceed to resolution actions if needed.

Step 2: Information held. The consortium, starting from this deliverable, is documenting the personal data that will be held along with information related to where these data came from and with whom they will be shared with. Records of data processing activities will be maintained. The aforementioned actions will allow the consortium to comply with the GDPR's accountability principle, which requires organisations to be able to show how they comply with the data protection principles, for example by having effective policies and procedures in place.

Step 3: Communicating privacy information. The HARMONY plan for providing privacy notices already considers the GDPR guidelines. Users who will participate in the pilot surveys will be provided with all needed information, including the project's identity and how we intend to use the collected information through privacy notices. End-users will also be informed of the lawful basis for processing the data, the data retention period and that they have a right to complain to HARMONY if they think there is a problem with the way we are handling their data. All related information will be communicated to end-users in concise, easy to understand and clear language.

Step 4: Individuals' rights. The HARMONY consortium will provide procedures to cover all the rights individuals have, including how personal data are deleted as well as provide data electronically and in a commonly used format. More specifically, the following rights for individuals are considered:

- the right to be informed;
- the right of access;
- the right to rectification;
- the right to erasure;
- the right to restrict processing;
- the right to data portability;
- the right to object; and
- the right not to be subject to automated decision-making including profiling.

Step 5: Subject access requests. Handling data access requests in HARMONY considers the following points:

- No charging will apply for complying with a request.
- Data access requests will be handled within a maximum period of one month.
- The project will refuse requests that are manifestly unfounded or excessive.

² <https://ico.org.uk/for-organisations/guide-to-the-general-data-protection-regulation-gdpr>

- If a request is refused, a clear justification will be provided and which will also inform the individual of the right to complain to the supervisory authority and to a judicial remedy. Any justification will be provided within a maximum period of one month.

Step 6: Lawful basis for processing personal data. A lawful basis for data processing activities has been established and relies on informed consent and privacy notices.

Step 7: Consent. The informed consent forms which will be provided to end-users will comply and meet the GDPR standard. The consent will be freely given, specific, informed and unambiguous. Moreover, it will be separate from other terms and conditions, and will provide simple ways for users to withdraw consent.

Step 8: Children. Although we do not expect underage pilot participants, the age of the users will be verified and parental or guardian consent for any data processing activity will be obtained for underage users.

Step 9: Data breaches. HARMONY establishes procedures to detect, report and investigate a personal data breach. Where a breach is likely to result in a high risk to the rights and freedoms of individuals, these individuals will be notified directly.

Step 10: Data Protection by Design and Data Protection Impact Assessments. HARMONY implements a privacy by design approach. We have already defined WP12 which handles all related aspects.

Step 11: Data Protection Officers. The responsibility for data protection compliance falls under the Data Protection Officers of the partners involved in sensitive data handling, who have the knowledge, support and authority to ensure that the project, its procedures and outcomes adhere to GDPR.

6 Ethical Aspects

Given that HARMONY looks to involve citizens in travel surveys, it is necessary that a governance and ethics framework is embedded within the project. Ethical aspects related to the activities of the project will be managed within WP12 “Ethics requirements”. This work package establishes an effective ethical management, rooted in the project, with a thorough understanding of both the underlying science as well as the associated ethical principles. It covers the management of the project ethical issues related to user studies ensuring the adherence to corresponding regulations. It also includes the provision of consent forms, information sheets and anonymity to participants in the different surveys, while it foresees the monitoring of data sharing frameworks, privacy laws and information law.

6.1 Informed Consent

Participation of persons will be entirely voluntary and we will obtain (and clearly document) their informed consent in advance of their involvement in the HARMONY project. The informed consent form with information sheets will be in a language and in terms fully understandable to participants, describing the aims, methods and implications of the research, the nature of the participation, the amount and nature of the data being stored, any benefits, risks or discomfort that might be involved and the nature of any resulting dissemination. Consent forms will explicitly state that participation is voluntary and that anyone has the right to refuse to participate and to withdraw their participation, samples or data at any time, without any consequences. We will indicate what procedures will be implemented in the event of unexpected or incidental findings. We will ensure that the potential participant has fully understood the information and does not feel pressured or forced to give written consent. Templates of the informed consent/assent forms and information sheets covering the voluntary participation and data protection issues (in language and terms intelligible to the participants), similar to the one submitted in the proposal, will be kept on file and submitted to the Agency upon request.

6.2 Exchanging, archiving and preservation of data

The consortium, within its competences and available infrastructure, will assure secure storage, delivery and access of personal information, as well as managing the rights of the users. In this way, there is complete guarantee that the accessed, delivered, stored and transmitted content will be managed by

the right persons, with well-defined rights, at the right time. State-of-the-art firewalls, network security, encryption and authentication will be used to protect collected data (specific details will be developed in the course of the project, within WP3). Firewalls prevent the connection to open network ports, and exchange of data will be through consortium known ports, protected via IP filtering and password. Where possible (depending on the facilities of each partner) the data will be stored in a locked server, and all identification data will be stored separately. Intrusion Detection systems will monitor anomalies in network traffic and activate restraint policy if needed. A metadata framework will be used to identify the data types, owners and allowable use.

This will be combined with a controlled access mechanism and in the case of wireless data transmission with efficient encoding and encryption mechanisms. Data security will be implemented across all the research sites, and will cover procedures for storage, encryption and transmission of personal data in addition to any national data protection legislation.

The collected data will be stored in a secure server, only visible to the research site network. Anonymous and identifiable data will be stored separately, and only the project authorized person(s) will have access to the stored data. Anonymity will be guaranteed by separating identifiable data from anonymous data. Anonymous data will be available to researchers. If any identifiable data is required for the research purposes, access and distribution to it will be granted only after explicit permission and after agreement of the data holders (participants providing the data). Authentication will be required to access stored data on the research site.

Authorized researchers will have access to the recorded anonymous data after authentication with a centralized server and on a need-to-know basis. Researchers will have access rights to add data to the identity database. No editing or reading rights will be granted to them to prevent alteration/disclosure of private data, if a specific permission is not granted by the data holder.

Those researchers handling and processing personal and sensitive data within the project will be asked to sign a statement that they are familiar with and abide by the contractual obligations of the consortium. If not included in this obligation, they will sign a statement that commits them to make sure project data are not provided to persons outside the project consortium.

When conducting research with vulnerable people and groups honouring and protecting anonymity and confidentiality is especially important. Potential physical, emotional and social dangers to which participants could be exposed through participation will be highly discussed and taken into account. The project consortium will ensure the avoidance of inadvertent reinforcement of negative social stereotypes concerning particular groups and unfair exploitation of vulnerable research participants.

A Data Protection Officer (DPO) will be appointed by all partners involved in personal data handling and the contact details of the DPOs will be made available to all data subjects involved in the research.

As part of follow-up activities and for the preparation of the next version of this initial DMP long term data preservation mechanisms will be explored. Our intention is to preserve non-sensitive data for a predetermined period after the completion of the project. Furthermore, we will identify appropriate archiving institutions that might serve as long term data preservation entities, so that the data produced as part of HARMONY are accessible by the research community in the long term.

7 Conclusions

The second version of the Data Management Plan, provided an updated view of the identified datasets based on the knowledge acquired since M6, and an overview of the data sharing agreements that have been put in effect over the course of the project in order to adhere to the GDPR regulations for primary data emerging from the HARMONY surveys. This live document will be updated until the end of the project and a final version will be produced at M42.

HARMONY remains focused on FAIR usage of the data being collected by the research community. In addition, the data security and ethical considerations, as well as the resources available for managing data as part of the project continue to apply.

8 APPENDIX I: Secondary data definition template

Land Use-Transport Interaction Model Data							
1. Contact Details of Representatives							
Full Name:							
Organisation/Department:							
E-mail:							
2. Existing Software and Model Information - if any							
Do you have any operational land-use model for your metropolitan area? (if no then proceed to section 3)							
Simulation Software Type (e.g. Tigris XL, LUISA, URBANSIM, TRANUS, MEPLAN, ILUTE, etc.):							
Model spatial coverage (e.g. boundary area or screen shot of the area):							
Model baseyear:							
Number of Zones							
License costs:							
3. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions							
Data Types	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution) please provide (if available) maximum disaggregation (e.g. by zone)	Additional Comments
Economic							
Employment						e.g. disaggregation by SIC (Industry type), by occupation, by wage, by floorspace - if by SIC then all data to be indexed by point in time; if by occupation then more than one point in time to be given; if by floorspace then location referent is required	
Retail Activities						e.g. disaggregation by floorspace, retail sales, employment, sales/expenditure flows - if floorspace then data to be indexed by location, if retail sales then different referents to be given from points to areas to networks	
Freight Flows						e.g. By Industry /Employment Class	
Land use							
Land Use Data						e.g. by type of land use, e.g. Industrial, commercial, office, residential; correlated with activity data;	
Demographics							
Population						e.g. Usual resident population, resident population in employment, usual workplace population	
Population Projections						e.g. Estimated future resident population	
Occupational Class						e.g. NSOC groups 1-9 (Managers, Professional, Assoc. Prof...)	
Ethnicity						e.g. WHITE BRITISH, SOUTH ASIAN, BLACK/AFRO-CARIBBEAN, OTHER	
Income						e.g. Mean income, median income, income percentiles	
Urban density						ideally GIS based	
Firm data by industry						e.g. By firm level	
Housing							
Housing Tenure						e.g. housing tenure proportions percentages by type: Owner occupied, private rented, social rented	
House Prices						e.g. Average Price Paid	
Travel							
Car Ownership						e.g. Number cars per household	
Journey to Work Mode						e.g. mean commuting mode percentages- car, bus, rail, metro, cycle, walk	
Commuting Flows Matrix						e.g. residence to workplace commuting flows, binary disaggregated by mode of travel and by residential zone	
Trip Distributions						e.g. disaggregation by mode or hour of the day	
Mobile Phonecalls						e.g. related to trip making	
Topography							
General topography						Urban area; land/coastline geography; rivers and waterbodies	
Point of Interest Data						e.g. from Google Maps, National Mapping Agencies	
Digital Elevation Model						digital elevation model; digital surface model (excluding buildings)	
Administrative Boundaries							
Municipal Boundaries						e.g. Municipality/Metropolitan area Boundaries	
Local Authority Boundaries						e.g. County/District boundaries	
Transport Infrastructure							
Road network						Road network geography including road class (motorway, etc.)	
Walking network						e.g. walk paths, parks, etc.	
Metro Network						Metro lines and stations geography	
Rail Network						Rail lines and stations; high speed rail lines and stations.	
Bus Stops						Bus stop locations	
Airports						Airport locations	
Building Data							
Building Footprints						Building footprint outlines	
Building Floorspace / Heights / Storeys						building density datasets- commercial floorspace or building height- residential units	
Building Function						Function data- office, retail, industrial, residential	
State / Public Housing Estates						Location of large public housing estates	
Planning Policy Data							
Locations for major future urban development						New town locations; opportunity areas; areas for densification	
Planning zoning						zoning restrictions on urban development; zoning height restrictions	
Environmental or other development restrictions						green belt restrictions; national park/reserve restrictions; flood development restrictions	
Major future transport infrastructure development						Major rail, metro and road planned developments	
Other data							
Utility Networks						e.g. water, electricity, waste, telecoms, river	

Organisation: E-mail:							
2. Existing Software and Network Model Information							
Scope (e.g. Passenger and/or Freight): Simulation Software Type (e.g. AIMSUN, VISUM, VISSIM, EMME, SUMO, PARAMICS, TRANSYT, etc.): Network model spatial coverage (e.g. boundary area or screen shot of the area): Network Model Baseyear: Traffic Analysis Zones (in study area): Traffic Analysis Zones (external): Number of OD pairs: Vehicle classes (car, truck, bus, rail, bike, etc.): License costs:							
3. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions							
Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., oem, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments
Network data							
GIS shapefile of TAZ system and georeferences of centroids and connectors						e.g. OD matrix scale: (number of OD pairs, number of Origin centroids, number of Destination centroids, year)	
GIS shapefile of study area						GIS shapefile content information (e.g. does contain lane details, directions and lane-to-lane connectivity in nodes, lane connection information crossings information)	
Open Street Map data						Open street Map data (e.g. does contain lane details, directions and lane-to-lane connectivity in nodes, crossing information)	
Aerial photography and/or CAD for refinements (Google Streetview can be a replacement for this requirement)						Aerial images of the network (potentially Google aerial images can substitute if not available)	
Bike lane network						Required	
Intersection (node) coordinates						Required	
Section: Road category, speed limit						Required	
Number of lanes						Required	
Length of turn bays						Required	
Lane drop locations						Required	
Lane add locations						Required	
Lane connection information						Required	
Lane channelization						Required	
Link free-flow speed						Required	
Link slope/Grade						Optional	
Lane widths						Optional	
Curvature data						Optional	Available in google maps
Truck info in network geometry. See section NETWORK GEOMETRY						e.g. link accessibility for freight vehicles (by vehicle class)	
Location of multimodal transshipment terminals						e.g. transshipment terminals in maritime ports, road-rail terminals, road-barge terminals, etc	
Location of distribution centers						e.g. location of distribution centers for local or regional distribution channels	

Traffic Control Data		
Sign data (e.g., location of sign data, stop, yield, exit signing and/or lane turning assignment)		
Fixed Signal Control data		fixed control plans, traffic lights position, phases and groups; traffic control plan
Signalized Intersections (for each signal groups, signal phases, control plans, coordinates)		
(Semi) Actuated Signal Control data		Data to correctly code controllers (for adaptive signals): SCOOT, MOVA, etc., + turn movement counts + the details of each phase must be obtained, such as minimum green time, maximum green time, yellow change interval time, and red clearance interval time.
Loop detector data		
Ramp Meter Control Data		the metering rate (or headway) associated with a ramp meter and how the metering rate is determined (fixed, ALINEA, HERO, etc.)
Location of variable message signs and set of possible pre-fixed messages		
Location of variable speed signs, operational rules and algorithms used		
Public Transport Data		
GTFS files availability		
Line routing (ideally GIS based)		
Stops location (ideally GIS based)		
Stops assigned to each line		
Timetable covering the simulation period/day		
Type of vehicles used to operate each line (provide fleet size and composition including length, number of doors and which are used for boarding, number of seats, passenger capacity)		
Public transport data on vehicle positions (AVL) – what resolution is it available? Offline or real-time?		
Signal Priority scheme		
Parking Data		
GIS files availability		
On-street parking areas, parking regulation and percentage of occupancy for the period/day to be simulated		
Parking space availability system		
Priority lanes, lane closures for parking during time-of-day/type-of-day, lane or turning closures		
Freight-related data		
City constraints		Regulations imposed by local governments (e.g. forbidding trucks on specific times, vehicle weight restrictions)
Locations for trans-shipment		Transfer locations (intermodal facilities)
Terminal locations		Required
Customer locations		Required
Energy, emission, noise data		
Vehicle Engine Type data		
Noise emission data	Text file	Leq noise level data
Building height	Text file	Height of all structural characteristics e.g. buildings
Type of road surface	Text file	Type and condition of road surface: Smooth road, rough etc
Classification of vehicles	Text file	Category 1: Light motor vehicles, Category 2: Medium heavy vehicles, Category 3: Heavy vehicles, Category 4: Powered two wheelers

Data requirements for Transport Demand Modelling
1. Contact Details of Representative(s)

Full Name:
Organisation:
E-mail:

2. Existing Software and Network Model Information

Scope (Passenger and/or Freight):
Simulation Software Type (e.g. AIMSUN, VISUM, VISSIM, EMME, SUMO, PARAMICS, TRANSYT, MATSim, etc.):
4-step or activity-based demand model:
Study area:
Baseyear:
Traffic Analysis Zones (in study area):
Number of OD pairs:
Modes (car, truck, bus, rail, bike, etc.):
License costs:

3. Data Requirements Specification – Please, provide information regarding the availability of the requested data types and further descriptions

Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments
Passenger Demand Data							
Household travel demand surveys						e.g. generic household travel demand surveys, most of which include vehicle and parking availability, trips, mode choice, usage and other relevant information	
SP experiments (mode, route or vehicle purchase choice)						Any available market research or stated-preference experiment about mode, route or other travel related choice	
GPS or other geolocation data survey						Detailed trip, activity or time-use diary of individuals containing a typical day or	
Trip or activity or time-use diaries						e.g. OD matrix data: Time Period (e.g. 24 hour, AM and PM peak hour, 07:00-10:00, etc., working day, weekend, year)	
Static OD matrix						e.g. OD matrix data: vehicle type (car, heavy track, taxi, light track)	
Static OD matrix per vehicle type							
Data used for static OD matrix estimation and calibration						e.g. A skim matrix provides: travel time, distance, costs, or a combination (Generalized Costs), per vehicle type (travel for single-occupancy vehicles, shared-ride 2 and shared-ride 3+, etc.)	
Skim matrices						e.g. OD matrix data: Time Period (e.g. 15min over 24 hour, 07:00-10:00 with 5, 10, 15 min departure times, etc.,	
Dynamic OD matrix						e.g. OD matrix data: vehicle type (car, heavy track, taxi, light track)	
Dynamic OD matrix per vehicle type							
Public transport Data on passenger flows (via on-board counts APC or fare collection AFC) – for what sample? When do people validate? Offline or real-time?							
Pedestrian Data							
Pedestrian counts at crossings per direction (estimated or observed)							
Bicycle counts or occupancy at exclusive bicycle lanes (in case of sharing lanes with other modes provide occupancy share)							
Freight Demand Data							
Freight demand surveys						e.g. Shipper surveys, Firm level surveys	
Truck trip diaries						e.g. Truck trip diaries are collected in most EU regions to estimate freight flows and vehicle type	
Freight OD matrix						e.g. OD matrix data: Time Period (e.g. 15min over 24 hour, 07:00-10:00 with 5, 10, 15 min departure times, etc.,	
Freight OD matrix per mode and/or vehicle type						e.g. OD matrix data: vehicle type (car, heavy track, taxi, light track)	
Data used for static OD matrix estimation and calibration						e.g. loop detector data, by lengths or weight class	
Skim matrices						e.g. A skim matrix provides: travel time, distance, costs, or a combination (Generalized Costs), per vehicle type (travel for single-occupancy vehicles, shared-ride 2 and shared-ride 3+, etc.)	
Other Data							

Data requirements for Transport Demand Modelling

1. Contact Details of Representative(s)

Full Name:
Organisation:
E-mail:

2. Existing Software and Network Model Information

Scope (Passenger and/or Freight):
Simulation Software Type (e.g. AIMSUN, VISUM, VISSIM, EMME, SUMO, PARAMICS, TRANSYT, MATSim, etc.):
4-step or activity-based demand model:
Study area:
Baseyear:
Traffic Analysis Zones (in study area):
Number of OD pairs:
Modes (car, truck, bus, rail, bike, etc.):
License costs:

3. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions

Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., oem, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments
Passenger Demand Data							
Household travel demand surveys						e.g. generic household travel demand surveys, most of which include vehicle and parking availability, trips, mode choice, usage and other relevant information	
SP experiments (mode, route or vehicle purchase choice)						Any available market research or stated-preference experiment about mode, route or other travel related choice	
GPS or other geolocation data survey						Detailed trip, activity or time-use diary of individuals containing a typical day or	
Trip or activity or time-use diaries						e.g. OD matrix data: Time Period (e.g. 24 hour, AM and PM peak hour, 07:00-10:00, etc., working day, weekend, year)	
Static OD matrix						e.g. OD matrix data: vehicle type (car, heavy truck, taxi, light track)	
Static OD matrix per vehicle type							
Data used for static OD matrix estimation and calibration						e.g. A skim matrix provides: travel time, distance, costs, or a combination (Generalized Costs), per vehicle type (travel for single-occupancy vehicles, shared-ride 2 and shared-ride 3+, etc.)	
Skim matrices						e.g. OD matrix data: Time Period (e.g. 15min over 24 hour, 07:00-10:00 with 5, 10, 15 min departure times, etc.,	
Dynamic OD matrix						e.g. OD matrix data: vehicle type (car, heavy truck, taxi, light track)	
Dynamic OD matrix per vehicle type							
Public transport Data on passenger flows (via on-board counts APC or fare collection AFC) - for what sample? When do people validate? Offline or real-time?							
Pedestrian Data							
Pedestrian counts at crossings per direction (estimated or observed)							
Bicycle counts or occupancy at exclusive bicycle lanes (in case of sharing lanes with other modes provide occupancy share)							
Freight Demand Data							
Freight demand surveys						e.g. Shipper surveys, Firm level surveys	
Truck trip diaries						e.g. Truck trip diaries are collected in most EU member states. Available data includes: origin, destination, date, time, mode, etc.	
Freight OD matrix						e.g. OD matrix data: Time Period (e.g. 24 hour, AM and PM peak hour, 07:00-10:00, etc., working day, weekend, year)	
Freight OD matrix per mode and/or vehicle type						e.g. OD matrix data: vehicle type, mode, and/or vehicle type	
Data used for static OD matrix estimation and calibration						e.g. loop detector data, by lengths or weight class	
Skim matrices						e.g. a skim matrix provides: travel time, distance, costs, or a combination (Generalized Costs), per vehicle type	
Other Data							

Model Calibration Data

1. Contact Details of Representative(s)

Full Name:
Organisation:
E-mail:

2. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions

Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g. 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments
Calibration Data							
Loop detector data						<u>observation of:</u> traffic flow, speed, occupancy, ...?	
Loop detector data						<u>aggregation interval:</u> 1 min	
Loop detector data						<u>time period:</u> 2017, every day	
Loop detector data						<u>data status:</u> raw data or processed data	
Loop detector location data						number of loop detectors	
Travel time for routes with details of the measurement sampling and a clear description (ideally GIS based) of the routes							
Automatic vehicle identification (AVI) data (e.g., cameras, bluetooth stations) - penetration rate, location and semantics of data collection, e.g. aggregation time, offline or real-time availability							
Automatic vehicle location (AVL) data (e.g., Floating car data, GPS, GSM, etc.) - penetration rate, location and semantics of data collection, e.g. aggregation time, offline or real-time availability							
Saturation flow data							
Delay and queue data							
Zone to zone taxi travel times/waiting times/speed data							
Other							

Mobility Service Data							
1. Contact Details of Representative(s)							
Full Name: Organisation: E-mail:							
2. Data Requirements Specification - Please, provide information regarding the availability of the requested data types and further descriptions							
Data Type	Can data be used in the project? (Yes/No)	When data will be available to the consortium (indicate project month e.g. M4; M1 is May 2019)?	Would you like to collect this data during the project? (Yes/No)	Data Format and source? (e.g., omx, text file, ASCII, csv, shapefile...)	Data Year (e.g 2019)	Description (e.g. Level of Disaggregation - Temporal/Spatial resolution/scale)	Additional Comments
Traditional Taxis (Cabs) - Supply data							
Fleet size: Fleet composition/Vehicle Types/Number for each type: Vehicle Capacities: Fuel Consumption: Others ...							
Ridehailing service data (e.g. Uber, Lyft, Kapten, ViaVan, etc.) - Supply data							
Fleet size: Fleet composition/Vehicle Types/Number for each type: Fuel Consumption: Vehicle Capacities: Others ...							
Station-based or free-floating Carsharing (DriveNow, car2go, etc.) - Supply data							
Fleet size: Fleet composition/Vehicle Types/Number for each type: Vehicle Capacities: Station capacity/dock-parking numbers: Fuel Consumption: Others ...							
Station-based or free-floating Bikesharing (Santander bikes, Lime, Ofo, OBiKe, etc.) -Supply data							
Fleet size: Fleet composition/Vehicle Types/Number for each type: Vehicle Capacities: Station capacity/dock-parking numbers: Fuel Consumption: Others ...							
Station-based or free-floating Scooters (Lime, Voi, etc.) - Supply data							
Fleet size: Fleet composition/Vehicle Types/Number for each type: Vehicle Capacities: Station capacity/dock-parking numbers: Fuel Consumption: Others ...							
Ride-sourcing/Ride-hailing/E-hailing/Ridesharing apps (Uber, Gett, Kapten, ViaVan, etc.) - Demand data							
Trips /ODs Driving Profiles Others							
Station-based or free-floating Carsharing (DriveNow, car2go, etc.)							
Static or dynamic daily station/zone stock level data Trips /ODs Rentals/Bookings Others							

	Station-based or free-floating Scooters (Lime, VOI, etc.) - Supply data
Fleet sizes	
Fleet composition/Vehicle Types/Number for each type	
Vehicle Capacities	
Station capacity/dock-parking numbers	
Fuel Consumption	
Others ...	
	Ride-sourcing/Ride-hailing/E-hailing/Ridesharing apps (Uber, Gett, Kapten, ViaVan, etc.) - Demand data
Trips /ODs	
Driving Profiles	
Others	
	Station-based or free-floating Carsharing (DriveNow, car2go, etc.)
Static or dynamic daily station/zone stock	
level data	
Trips /ODs	
Rentals/Bookings	
Others	
	Station-based or free-floating Bikesharing (Santander bikes, Lime, Ofo, OBIke, etc.)
Static or dynamic daily station/zone stock	
level data	
Trips /ODs	
Rentals/Bookings	
Others	
	Station-based or free-floating Scooters (Lime, VOI, etc.)
Static or dynamic daily station/zone stock	
level data	
Trips /ODs	
Rentals/Bookings	
Others	
	Traditional freight operators (Trucks)
Fleet sizes	
Fleet composition/Vehicle Types/Number for each type	
Vehicle Capacities	
Speed	
Fuel consumption	
Zone to zone travel times and loading/unloading times	
Others	
	Crowdshipping
Fleet sizes	
Fleet composition/Vehicle Types/Number for each type	
Vehicle Capacities	
Speed	
Fuel consumption	
Zone to zone travel times and loading/unloading times	
Others	
	Cargo Bikes
Fleet sizes	
Fleet composition/Vehicle Types/Number for each type	
Vehicle Capacities	
Speed	
Charging facilities	
Zone to zone travel times and loading/unloading times	
Others	

9 APPENDIX II: Model Outputs data definition template

Data set category (Data provided from the HARMONY models)	
Data set description	
What is the purpose of data collection/generation? "Data utility": to whom this dataset will be useful?	
Data set reference and name	
Who (partner name) / When (which task and when the data will be available)	
Format (including related standards and metadata). For example, you can check whether any standards listed in the Metadata Standards Directory of Research Data Alliance makes sense for your data (http://rd-alliance.github.io/metadata-directory/)	
In case metadata standards do not exist in your discipline, please outline what type of metadata will be created and how	
Data sharing plan (license) If open, please describe how it will be made available (e.g. submission to a repository?)	
Relation to project Objective(s) - for which objective is this dataset relevant and why?	
Pre-existing dataset or new? (if pre-existing please provide a reference)	
Size / expected size (use a measurement unit that makes sense for the dataset)	

10 APPENDIX III: Data Sharing Agreement Template

LONDON'S GLOBAL UNIVERSITY



Data Sharing Agreement

between

University College London

and

[INSERT NAME OF OTHER DATA CONTROLLER]

Date this Agreement comes into force: **[DATE]**

1. Parties to this Agreement

- (a) **UNIVERSITY COLLEGE LONDON** a body corporate established by Royal Charter with company number RC000631 of Gower Street, London, WC1E 6BT (**UCL**); and
- (b) **[NAME OF OTHER DATA CONTROLLER] [DESCRIPTION, COMPANY NUMBER AND REGISTERED ADDRESS] ([X])**.

2. Purpose

- (a) This Agreement establishes the terms and conditions under which the parties will share personal data in connection with the [project]. **[Note: describe project and the personal data that will be shared as part of the project.]**

- (b) The parties shall share the personal data described in 2(a) above only in accordance with the terms of this Agreement.

3. Term and termination

- (a) This Agreement shall commence on the date set out at the beginning of it and shall continue until [DATE] unless terminated earlier in accordance with its terms.
- (b) Either party may terminate this Agreement with immediate effect by giving written notice to the other party if that other party commits a material breach of any term of this Agreement which breach is irremediable or (if such breach is remediable) fails to remedy that breach within a period of 30 days after being notified in writing to do so;
- (c) Clause 3 (Term and termination) and Clause 4 (Data protection) shall survive the termination or expiry of this Agreement, as shall any other Clause which, by its nature, is intended to survive termination or expiry.
- (d) Termination or expiry of this Agreement shall not affect any rights, remedies, obligations or liabilities of the parties that have accrued up to the date of termination or expiry, including the right to claim damages in respect of any breach of the Agreement which existed at or before the date of termination or expiry.

4. Data protection

- (a) In this Clause, the following terms have the following meanings:
- (i) **Controller** means a person which, alone or jointly with others, determines the purposes and means of the Processing of Personal Data;
 - (ii) **Data Protection Laws** means all applicable statutes and regulations in any jurisdiction pertaining to the processing of Personal Data, including but not limited to the privacy and security of Personal Data;
 - (iii) **Data Subject** means the individual to whom the Personal Data relates;
 - (iv) **Personal Data** means any information relating to an identified or identifiable living individual;
 - (v) **Processing** means any operation or set of operations which is performed on Personal Data or on sets of Personal Data, whether or not by automated means, and Process, Processes and Processed shall be construed accordingly; and
 - (vi) **Personal Data Breach** means a breach of security leading to the accidental or unlawful destruction, loss, alteration, unauthorised disclosure of, or access to, Personal Data transmitted, stored or otherwise processed.
- (b) The parties acknowledge and agree that where a party Processes Personal Data under or in connection with this Agreement it alone determines the purposes and means of such processing as a Controller.
- (c) In respect of the Personal Data a party Processes under or in connection with this Agreement, the party shall:
- (i) comply at all times with its obligations under the Data Protection Laws;
 - (ii) notify the other party without undue delay after becoming aware of a Personal Data Breach; and
 - (iii) assist and co-operate fully with the other party to enable the other party to comply with their obligations under Data Protection Law, including but not limited to in respect of keeping Personal Data secure, dealing with Personal Data Breaches, complying with the rights of Data Subjects and carrying out data protection impact assessments.
- (d) The parties shall work together to ensure that each of them is able to Process the Personal Data it Processes under or in connection with this Agreement for the purposes contemplated by this Agreement lawfully, fairly and in a transparent manner and in compliance with the Data Protection Laws. This shall include but not be limited to entering into such other written agreements as may be required from time to time to enable each party to comply with the Data Protection Laws.

5. Miscellaneous

- (a) No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives).
- (b) A failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall not constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict any further exercise of that or any other right or remedy. No single or partial exercise of any right or remedy provided under this agreement or by law shall prevent or restrict the further exercise of that or any other right or remedy.
- (c) If any provision or part-provision of this Agreement is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this Clause shall not affect the validity and enforceability of the rest of this Agreement.
- (d) This Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter.
- (e) Each party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that is not set out in this Agreement.
- (f) Nothing in this Agreement is intended to, or shall be deemed to, establish any partnership or joint venture between any of the parties, constitute any party the agent of another party, or authorise any party to make or enter into any commitments for or on behalf of any other party.
- (g) This Agreement does not give rise to any rights under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Agreement.
- (h) This Agreement may be executed in any number of counterparts, each of which when executed shall constitute a duplicate original, but all the counterparts shall together constitute the one Agreement.
- (i) This Agreement and any dispute or claim (including non-contractual disputes or claims) arising out of or in connection with it or its subject matter or formation shall be governed by and construed in accordance with English law.
- (j) Each party irrevocably agrees that the courts of England and Wales shall have exclusive jurisdiction to settle any dispute or claim (including non-contractual disputes or claims) arising out of or in connection with this Agreement or its subject matter or formation.

Signed for and on behalf of **University College London**

Signed for and on behalf of **[INSERT NAME OF OTHER DATA CONTROLLER]**

Name (print):

Name (print):

Job title:

Job title:

Date:

Date:

11 APPENDIX IV: Data Processing Agreement Template

LONDON'S GLOBAL UNIVERSITY



Data Processing Agreement

between

University College London

and

[INSERT NAME OF DATA PROCESSOR]

Date this Agreement comes into force: 25/01/2022

Agreement owner:

1. Parties to this Agreement

- (a) **UNIVERSITY COLLEGE LONDON** a body corporate established by Royal Charter with company number RC000631 of Gower Street, London, WC1E 6BT (**UCL**); and
- (b) **[NAME OF SERVICE PROVIDER] [DESCRIPTION, COMPANY NUMBER AND REGISTERED ADDRESS]** (Service Provider).

2. Purpose

- (a) [UCL has appointed the Service Provider to provide services as set out in [INSERT DETAILS OF MAIN AGREEMENT] (Main Agreement).] **[Note: include this Clause only if applicable.]**



- (b) This Agreement establishes the terms and conditions under which: (a) UCL will provide Personal Data to the Service Provider; and (b) the Service Provider shall Process that Personal Data on behalf of UCL, **[in connection with the Main Agreement].**

3. Terms of the Agreement

- (a) This Agreement comprises these terms and conditions and the Schedules attached hereto.
 (b) For clarity, the Schedules form part of this Agreement and shall have effect as if set out in full in the body of this Agreement. Any reference to this Agreement includes the Schedules.
 (c) UCL shall share the Personal Data with the Service Provider, and the Service Provider shall process that Personal Data, only in accordance with the terms of this Agreement.

4. Term and termination

- (a) This Agreement shall commence on the date set out at the beginning of it and shall continue: **[(a) until terminated in accordance with its terms; or (b) until the date upon which the Main Agreement terminates or expires, whichever is the later.] [Note: applicable termination date to be considered.]**
 (b) Without prejudice to any other right or remedy available to it, UCL may terminate this Agreement at any time for any reason with immediate effect by giving 28 days' written notice.
 (c) Clause 4 (Term and termination), Clause 5 (Data protection arrangements) and Clause 6 (indemnity) shall survive the termination or expiry of this Agreement, as shall any other Clause which, by its nature, is intended to survive termination or expiry.
 (d) Termination or expiry of this Agreement shall not affect any rights, remedies, obligations or liabilities of the parties that have accrued up to the date of termination or expiry, including the right to claim damages in respect of any breach of the agreement which existed at or before the date of termination or expiry.

5. Data protection

- (a) The parties agree that:
 (i) this Agreement will require the Processing of Personal Data by the Service Provider on behalf of UCL;
 (ii) UCL alone shall determine the purposes for which and the manner in which Personal Data will be Processed by the Service Provider on behalf of UCL under this Agreement; and
 (iii) UCL shall be the Data Controller and the Service Provider shall be the Data Processor in respect of all such Personal Data.
 (b) Particulars of the Processing to be carried out by the Service Provider on behalf of UCL under or in connection with this Agreement are set out in Schedule 2 (Data Processing Particulars).

Obligations applicable to the Service Provider

- (c) The Service Provider shall, when Processing Personal Data in connection with this Agreement on behalf of UCL as UCL's Processor:
 (i) comply with all applicable provisions of the Data Protection Legislation, including the obligations imposed upon a Data Processor;
 (ii) Process the Personal Data only:

- (A) on the written instructions of UCL and to the extent reasonably necessary for the performance by the Supplier of its obligations under this Agreement. The Supplier shall immediately inform UCL if, in its opinion, Processing the Personal Data in accordance with a written instruction received from the Customer or in the performance of its obligations under this Agreement infringes Data Protection Laws to which either the Customer or the Supplier (in its capacity as a Processor) is subject; or
- (B) as otherwise required by European Union law or individual European Union member state law to which the Supplier is subject, in which case the Supplier shall inform the Customer of that legal requirement before Processing the Personal Data (unless that law, on important grounds of public interest, prohibits the Supplier from informing the Customer);
- (iii) Process the Personal Data for and on behalf of UCL only for the Permitted Purpose in accordance with this Agreement, including the terms of Schedule 2 (Data Protection Particulars);
- (iv) not disclose the Personal Data to any person except as required or permitted by this Agreement or with the Customer's prior written consent;
- (v) ensure that all persons authorised by the Supplier to Process the Personal Data:
 - (A) Process the Personal Data in accordance with provisions of this Clause 5; and
 - (B) are under an appropriate contractual or other legal obligation to keep the Personal Data confidential;
- (vi) notwithstanding any other provision of this Agreement, implement appropriate technical and organisational measures to ensure the security of the Personal Data and prevent Personal Data Breaches which: (A) are sufficient to comply with at least the obligations imposed on UCL by the Security Requirements; and (B) include the encryption of personal data in transit and at rest, and where requested, provide to UCL evidence of its compliance with this Clause 5(c)(vi);
- (vii) not engage another Processor to Process the Personal Data on behalf of the Customer (**Sub-processor**) except with the Customer's prior written consent. The Supplier shall, prior to engaging a Sub-processor, enter into a written contract with the Sub-processor that imposes on the Sub-processor obligations that are the same as, or more onerous than, the obligations imposed on the Supplier under this Clause 5. Notwithstanding any other provision of this Agreement, the Supplier shall remain fully liable and responsible for all acts and omissions of its Sub-processors and the acts and omissions of those employed or engaged by its Sub-processors as if they were its own. An obligation on the Supplier to do, or to refrain from doing, any act or thing shall include an obligation upon the Supplier to procure that its employees, staff, agents and its Sub-processors' employees, staff and agents also do, or refrain from doing, such act or thing;
- (viii) not transfer or Process the Personal Data outside the European Economic Area, nor disclose the Personal Data to any party located outside the European Economic Area, except with the Customer's prior written consent. Where such consent is given by the Customer, the Supplier shall take such actions and enter into such written agreements as the Customer may require in order to help ensure that such transfer, disclosure or Processing complies with the Data Protection Laws to which the Customer is subject;
- (ix) within thirty (30) calendar days of a request from UCL, allow its data processing facilities, procedures and documentation to be submitted for scrutiny, inspection or audit by the Data Controller (and/ or its representatives, including its appointed auditors) in order to ascertain compliance with the terms of

this Agreement and with the Data Protection Legislation, including the requirements of Article 28 GDPR and provide reasonable information, assistance and co-operation to UCL, including access to relevant Personnel and/ or, on the request of UCL, provide UCL with written evidence of its compliance with the requirements of this Agreement and with Data Protection Legislation;

- (x) not make (nor instruct or permit a third party to make) a Data Transfer unless it: (A) has first obtained UCL's prior written consent; (B) provides, in advance of any such Data Transfer, a Data Transfer Risk Assessment to UCL; and (C) has put in place measures to ensure UCL's compliance with the Data Protection Legislation, including entering into, or procuring that such applicable sub-contractors enter into, the relevant Standard Contractual Clauses with UCL;
- (xi) not disclose Personal Data to a third party (including a sub-contractor) in any circumstances without UCL's prior written consent, save in relation to Third Party Requests where the Service Provider is prohibited by Applicable EU Law from notifying UCL, in which case it shall use reasonable endeavours to advise UCL where permitted in advance of such disclosure and in any event as soon as practicable thereafter;
- (xii) not sub-contract the performance of any of its obligations under this Agreement without the prior written consent of UCL;
- (xiii) where in connection with this Agreement, it sub-contracts the processing of any Personal Data to a third party, (A) ensure that the arrangement with the sub-contractor is: (1) governed by a written contract imposing the same terms in relation to the processing of the Personal Data as those set out in this Agreement; and (2) where applicable, meets the requirements of Article 28(3) of the General Data Protection Regulation; and (B) be fully liable to UCL for any breach by that party in respect of its obligations to process Personal Data in accordance with this Agreement and the compliance of that subcontractor with the Data Protection Legislation;
- (xiv) notify UCL promptly (and in any event within forty-eight (48) hours) following its receipt of any Data Subject Request or Regulator Correspondence and shall: (A) not disclose any Personal Data in response to any Data Subject Request or Regulator Correspondence without UCL's prior written consent; and (B) provide UCL with all reasonable co-operation and assistance required by UCL in relation to any such Data Subject Request or Regulator Correspondence;
- (xv) notify UCL promptly (and in any event within twenty-four (24) hours) upon becoming aware of any actual or suspected, threatened or 'near miss' Personal Data Breach, with sufficient information to allow UCL to meet any obligations under Data Protection Legislation to report or inform Data Subjects of the data breach, and: (A) implement any measures necessary to restore the security of compromised Personal Data; and (B) assist the Data Controller to make any notifications to the Regulator and affected Data Subjects;
- (xvi) except to the extent permitted by Applicable EU Law, upon UCL's request and/or on the earlier of: (A) termination or expiry of this Agreement (as applicable); and/ or (B) the date on which the Personal Data Processed in connection with this Agreement is no longer relevant to, or necessary for, the Permitted Purpose, the Service Provider shall cease Processing all such Personal Data and return and/ or permanently and securely destroy, so that it is no longer retrievable (as directed in writing by UCL), all such Personal Data and all copies in its possession or control (including back up copies); and
- (xvii) use all reasonable endeavours, in accordance with Good Industry Practice, to assist UCL to comply with the obligations imposed on UCL by the Data Protection Legislation, including: (A) compliance with the Security Requirements; (B) obligations relating to notifications required by the Data

Protection Legislation to the Regulator and/ or any relevant Data Subjects; and (C) undertaking any Data Protection Impact Assessments (and, where required by the Data Protection Legislation, consulting with the Regulator in respect of any such Data Protection Impact Assessments).

Obligations applicable to both UCL and the Service Provider

- (d) Without prejudice to the obligations applicable to the Service Provider set out at Clause 5(c) above) each party shall:
- (i) make due notification (where required by applicable Data Protection Legislation) to the Regulator, including in relation to its use and Processing of the Personal Data;
 - (ii) comply at all times with the Data Protection Legislation;
 - (iii) hold the information contained in the Personal Data confidentially; and
 - (iv) not do anything which shall damage the reputation of the other party or that party's relationship with the Data Subjects.
- (e) Notwithstanding anything in this Agreement to the contrary, this Clause 5 (Data Protection Arrangements) shall continue in full force and effect for so long as the Service Provider Processes any Personal Data in connection with this Agreement.

6. Freedom of Information

- (a) The Service Provider acknowledges that UCL is subject to the requirements of the FOIA and the EIRs. The Service Provider shall:
- (i) provide all necessary assistance and cooperation as reasonably requested by UCL to enable UCL to comply with its obligations under the FOIA and EIRs;
 - (ii) transfer to UCL all Requests for Information relating to this Agreement [or to the Main Agreement] that it receives as soon as practicable and in any event within 2 working days of receipt;
 - (iii) provide UCL with a copy of all Information belonging to UCL requested in the Request For Information which is in its possession or control in the form that UCL requires within 5 working days (or such other period as UCL may reasonably specify) of UCL's request for such Information; and
 - (iv) not respond directly to a Request For Information unless authorised in writing to do so by UCL.
- (b) The Service Provider acknowledges that UCL may be required under the FOIA and EIRs to disclose Information (including Commercially Sensitive Information) without consulting or obtaining consent from the Service Provider. UCL shall take reasonable steps to notify the Service Provider of a Request For Information (in accordance with the Secretary of State's section 45 Code of Practice on the Discharge of the Functions of Public Authorities under Part 1 of the FOIA) to the extent that it is permissible and reasonably practical for it to do so but (notwithstanding any other provision in this Agreement) UCL shall be responsible for determining in its absolute discretion whether any Commercially Sensitive Information and/or any other information is exempt from disclosure in accordance with the FOIA and/or the EIRs.

7. Indemnity

- (a) The Service Provider hereby indemnifies UCL against all costs, claims, liabilities and expenses (including reasonable legal expenses) incurred by UCL in connection with or as a result of any breach of this Agreement by the Service Provider, its staff or agents.

- (b) [For clarity, the parties agree that any limitations on liability set out in the Main Agreement shall not apply to the indemnity set out in this Clause.] **[Note: include only if applicable.]**

8. Miscellaneous

- (a) No variation of this Agreement shall be effective unless it is in writing and signed by the parties (or their authorised representatives).
- (b) A failure or delay by a party to exercise any right or remedy provided under this Agreement or by law shall not constitute a waiver of that or any other right or remedy, nor shall it prevent or restrict any further exercise of that or any other right or remedy. No single or partial exercise of any right or remedy provided under this agreement or by law shall prevent or restrict the further exercise of that or any other right or remedy.
- (c) If any provision or part-provision of this Agreement is or becomes invalid, illegal or unenforceable, it shall be deemed modified to the minimum extent necessary to make it valid, legal and enforceable. If such modification is not possible, the relevant provision or part-provision shall be deemed deleted. Any modification to or deletion of a provision or part-provision under this Clause shall not affect the validity and enforceability of the rest of this Agreement.
- (d) This Agreement constitutes the entire agreement between the parties and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between them, whether written or oral, relating to its subject matter.
- (e) Each party agrees that it shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that is not set out in this Agreement.
- (f) Nothing in this Agreement is intended to, or shall be deemed to, establish any partnership or joint venture between any of the parties, constitute any party the agent of another party, or authorise any party to make or enter into any commitments for or on behalf of any other party.
- (g) This Agreement does not give rise to any rights under the Contracts (Rights of Third Parties) Act 1999 to enforce any term of this Agreement.
- (h) This Agreement may be executed in any number of counterparts, each of which when executed shall constitute a duplicate original, but all the counterparts shall together constitute the one agreement.
- (i) This agreement and any dispute or claim (including non-contractual disputes or claims) arising out of or in connection with it or its subject matter or formation shall be governed by and construed in accordance with English law.
- (j) Each party irrevocably agrees that the courts of England and Wales shall have exclusive jurisdiction to settle any dispute or claim (including non-contractual disputes or claims) arising out of or in connection with this agreement or its subject matter or formation.

Signed for and on behalf of **University College
London**

Signed for and on behalf of **[INSERT NAME OF
SERVICE PROVIDER]**

Name (print):

Name (print):

Job title:

Job title:

Date:

Date:

Schedule 1: Definitions and interpretation

1. Definitions

Applicable EU Law	means any law of the European Union (or the law of one of the Member States of the European Union) to which the Service Provider is subject;
Commercially Sensitive Information	means information of a commercially sensitive nature relating to the Service Provider, its intellectual property rights or its business or which the Service Provider has indicated to UCL that, if disclosed by UCL, would cause the Service Provider significant commercial disadvantage or material financial loss;
Confidential Information	any information, however it is conveyed, that relates to the business, affairs, developments, trade secrets, know-how, personnel and suppliers of the Service Provider, including intellectual property rights, together with all information derived from the above, and any other information clearly designated as being confidential (whether or not it is marked as "confidential") or which ought reasonably to be considered to be confidential, including Commercially Sensitive Information;
Current Standard	means the current standards for encryption recommended by the Information Commissioner's Office, such as FIPS 140-2 (cryptographic modules, software and hardware) and FIPS 197;
Data Controller	has the meaning set out in the Data Protection Legislation;
Data Processor	has the meaning set out in the Data Protection Legislation;
Data Protection Impact Assessment	means an assessment of the impact of the envisaged Processing operations on the protection of Personal Data, as required by Article 35 of the GDPR;
Data Protection Legislation	means any law, statute, declaration, decree, directive, legislative enactment, order, ordinance, regulation, rule or other binding restriction (as amended, consolidated or re-enacted from time to time) which relates to the protection of individuals with regards to the Processing of Personal Data to which a party to this Agreement is subject, including: (a) the Data Protection Act 1998 and EC Directive 95/46/EC (up to and including 24 May 2018); and (b) the GDPR (from and including 25 May 2018); and/or (c) in the event that the UK leaves the European Union, all legislation enacted in the UK in respect of the protection of Personal Data as well as the Privacy and Electronic Communications (EC Directive) Regulations 2003;
Data Protection Particulars	means, in relation to the Processing under this Agreement: (a) the subject matter and duration of the Processing; (b) the nature and purpose of the Processing; (c) the type of Personal Data being Processed; and (d) the categories of Data Subjects, as set out in Schedule 2;
Data Subject Request	means an actual or purported request or notice or complaint from or on behalf of a Data Subject exercising its rights under the Data Protection Legislation in relation to Personal Data including without limitation: the right of access by the Data Subject, the right to rectification, the right to erasure,

	the right to restriction of processing, the right to data portability and the right to object;
Data Subject	has the meaning given to it in the Data Protection Legislation;
Data Transfer Risk Assessment	means a risk assessment which set out details of the following: <ul style="list-style-type: none"> (a) the Personal Data that will be transferred; (b) the Restricted Country or Countries to which the Personal Data will be transferred; (c) the means by which the Data Processor will ensure an appropriate level of protection and appropriate safeguards in respect of the Personal Data that will be transferred to a Restricted Country so as to ensure the Data Processor's compliance with Data Protection Legislation; and (d) in providing and evaluating the risk assessment, the Data Processor shall ensure that it has regard to the Data Protection Legislation in connection with transfers of Personal Data to any Restricted Country;
Data Transfer	means transferring the Personal Data to, and/ or accessing the Personal Data from and/ or Processing the Personal Data within, a jurisdiction or territory that is a Restricted Country;
EIRs	means the Environmental Information Regulations 2004 together with any guidance and/or codes of practice issued by the Information Commissioner or relevant government department in relation to such regulations;
FOIA	means the Freedom of Information Act 2000, and any subordinate legislation made under the Act from time to time, together with any guidance and/or codes of practice issued by the Regulator or relevant government department in relation to such legislation;
GDPR	means Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and repealing Directive 95/46/EC (General Data Protection Regulation) OJ L 119/1, 4.5.2016;
Good Industry Practice	means, at any time, the exercise of that degree of care, skill, diligence, prudence, efficiency, foresight and timeliness which would be reasonably expected at such time from a leading and expert supplier of similar services to those being carried out under this Agreement, such supplier seeking to comply with its contractual obligations in full and complying with all applicable laws (including the Data Protection Legislation);
Information	has the meaning given under section 84 of FOIA;
Permitted Purpose	means the purpose of the Processing as set out in more detail in the Data Protection Particulars;
Personal Data Breach	has the meaning set out in the Data Protection Legislation;
Personal Data	means any Personal Data (as defined in the Data Protection Legislation) processed by either Party in connection with this Agreement;
Personnel	means all persons engaged or employed from time to time by the Data Processor in connection with this Agreement, including employees, consultants, contractors and permitted agents;
Process or Processing	has the meaning set out in the Data Protection Legislation;

Regulator	means the UK Information Commissioner (including any successor or replacement);
Restricted Country	means a country, territory or jurisdiction outside of the European Economic Area which the EU Commission has not deemed to provide adequate protection in accordance with EC Directive 95/46/EC and/or Article 45(1) of the GDPR (as applicable);
Request for Information	means a request for information or an apparent request under the Code of Practice on Access to Government Information, FOIA or the Environmental Information Regulations;
Security Requirements	means the requirements regarding the security of the Personal Data, as set out in the Data Protection Legislation (including, in particular, the seventh data protection principle of the Data Protection Act 1998 and/ or the measures set out in Article 32(1) of the GDPR (taking due account of the matters described in Article 32(2) of the GDPR)) as applicable;
Sensitive Personal Data	which in the GDPR is referred to as “special categories of personal data” has the meaning set out in the Data Protection Legislation;
Standard Contractual Clauses	means (i) the Standard Contractual Clauses approved by the Commission for transfers from data controllers in the EEA to data controllers outside the EEA; and/or (ii) the Standard Contractual Clauses approved by the Commission for transfers from data controllers in the EEA to data processors outside the EEA each as updated and/or amended from time to time;
Third Party Request	means a written request from any third party for disclosure of Personal Data where compliance with such request is required or purported to be required by law or regulation.

2. Interpretation

- (a) Clause and Schedule headings are inserted for convenience only and shall not affect the interpretation of this Agreement.
- (b) References to Clauses and Schedules are to the Clauses and Schedules of this Agreement.
- (c) A reference to a statute or statutory provision is a reference to it as amended, extended or re-enacted from time to time.
- (d) A reference to a statute or statutory provision shall include all subordinate legislation made under that statute or statutory provision.
- (e) Any words following the terms including, include, in particular or any similar expression shall be construed as illustrative and shall not limit the sense of the words, description, definition, phrase or term preceding those terms.
- (f) Words in the singular shall include the plural and in the plural include the singular.

Schedule 2: Data Protection Particulars

[Note: the following details should be completed before the contract is signed]

Subject matter and duration of the processing	[Describe the context of the processing and how long the personal data will be processed for. In particular, consider the extent to which processing will continue following termination of the agreement.]
Nature and purpose of the processing	[Describe what processing of the personal data will take place and for what purpose.]
Type of personal data being processed	[Describe the types of personal data being processed.]
Categories of data subjects	[Describe the categories of data subjects whose personal data will be processed.]



[@Harmony_H2020](https://twitter.com/Harmony_H2020)

#harmony-h2020



<https://www.linkedin.com/company/harmony-h2020/>

For further information please visit www.harmony-h2020.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 815269

