

D1.7 Data Management Plan Final



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List of Acronyms

Abbreviation / acronym	Description
AEED	Aircraft Engine Emissions Databank (ICAO/EASA)
AEM	Advanced Emissions Model (EUROCONTROL)
AI	Artificial Intelligence
API	Application Programming Interface
ATM	Air Traffic Management
CFD	Computational Fluid Dynamics
CSV	Comma-Separated Values file format
DMP	Data Management Plan
DPO	Data Protection Officer
EC	European Commission
ECAC	European Civil Aviation Conference
ECMWF	European Centre for Medium-Range Weather Forecasts
FAIR	Findable, Accessible, Interoperable, Reusable
FDR	Flight Data Recorder
GDPR	General Data Protection Regulation
Git	Version control system (GitHub/GitLab)
GRIB	Gridded Binary (meteorological data format)
HCP / HPC	High-Performance Computing
HE	Horizon Europe
HPC	High-Performance Computing
JSON	JavaScript Object Notation
LES	Large Eddy Simulation
MEEM	Modified Estimated Emissions Method

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MVP	Minimum Viable Product (RefMap platform prototype)
NetCDF	Network Common Data Form (scientific data format)
PDF/A	Archival PDF format
RANS	Reynolds-Averaged Navier–Stokes simulations
SAF	Sustainable Aviation Fuels
SPSS	Statistical Package for the Social Sciences
TGV	Taylor-Green Vortex (benchmark CFD case)
UAS	Unmanned Aircraft System
UAV	Unmanned Aerial Vehicle
WP	Work Package
Zenodo	Trusted open-access repository supported by CERN

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Executive Summary

This deliverable, D1.7 Final Data Management Plan (DMP), presents the final and consolidated data-management framework of the RefMap project, funded under the Horizon Europe Research and Innovation Programme (Grant Agreement No. 101096698). It completes and formalises the data-management approaches introduced in the Initial DMP (D1.3) and refined in the Midterm DMP (D1.6), reflecting their full implementation over the project lifecycle. The document provides an overview of the datasets, software tools, models, and documentation generated by the consortium, together with the procedures applied for their collection, processing, storage, sharing, preservation, and reuse. It confirms compliance with the FAIR principles, Horizon Europe Open Science requirements, and applicable legal and ethical frameworks, including the General Data Protection Regulation (GDPR). The DMP identifies the repositories used for long-term preservation, the applicable access conditions and licences, and the technical and organisational measures adopted to ensure data quality, security, and integrity. The deliverable also integrates the outcomes of the project's ethics and data-management monitoring activities, confirming that no sensitive personal data were processed and that any personal data collected during stakeholder engagement were handled in accordance with GDPR and approved ethical procedures. Overall, D1.7 provides assurance that all RefMap research outputs have been responsibly managed, curated, and preserved, supporting transparency, reproducibility, and long-term accessibility of project results beyond the project's duration.

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1. Introduction

1.1. Purpose of the document

This document constitutes the final Data Management Plan of the RefMap project. Its purpose is to consolidate and validate the data-management practices applied across the project by integrating and finalising the information previously reported in the Initial DMP (D1.3) and the Midterm DMP (D1.6). Unlike earlier versions, which functioned as evolving documents, this deliverable provides a definitive reference framework describing how RefMap research data and outputs were governed, documented, preserved, and prepared for reuse. It serves as a consolidated record of the measures adopted to ensure data quality, security, interoperability, and long-term accessibility, in alignment with the FAIR principles and Horizon Europe Open Science requirements.

Furthermore, this deliverable incorporates all aspects related to ethical and legal compliance, ensuring coherence with the project's research ethics framework. It is fully aligned with:

1. D1.8 Research Ethics Monitoring Report, which documents ethical procedures, informed consent processes, and compliance checks;
2. D7.1 Ethics Deliverable, which outlines the overarching ethics provisions and personal-data safeguards established early in the project.

Consistent with these documents, this DMP confirms that all personal data processing within RefMap complied with the General Data Protection Regulation (GDPR) and the national legislation applicable to participating organisations. No sensitive personal data were processed, and any personal information collected in stakeholder engagement activities was handled using appropriate consent procedures, pseudonymisation, and strict data minimisation. In summary, the purpose of this deliverable is to provide the final, validated framework for data management and responsible research within RefMap, ensuring that all research outputs are curated, documented, preserved, and made reusable according to the highest standards of transparency, ethics, and scientific integrity.

The main objectives of this deliverable can be summarised as follows:

- **Final description of Data Handling:** Presents the complete overview of all data categories collected, generated, or processed, including their long-term preservation and access provisions.

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- **Final Implementation of FAIR Principles:** Demonstrates how all RefMap datasets and outputs have been made findable, accessible, interoperable, and reusable, using persistent identifiers, standardised metadata, and trusted repositories.
- **Validation of the project's Data Management Policy:** Confirms the consistent application of the RefMap data governance procedures established and refined across D1.3 and D1.6.
- **Ethics and Data Protection Compliance:** Documents the final measures ensuring GDPR-compliant, safe, and responsible processing of any personal data, in alignment with D1.8 and D7.1.

To enhance the clarity of this document, the following key terms are reiterated for reference:

- **Open Research Data:** Data made openly available for access, use, and reuse without restriction, promoting transparency, collaboration, and innovation.
- **Research Data:** Information collected, observed, or created during the project, including raw data, processed datasets, models, simulation results, survey responses, or analytical outputs.
- **Secondary Data:** Data sourced from existing studies, public databases, or institutional repositories, reused within RefMap in accordance with applicable licences.
- **Open Access:** The practice of making publications and research results freely accessible to the public without barriers, supporting wide dissemination and collaboration.
- **Metadata:** Descriptive information about datasets, including their origin, format, and structure, enabling their discovery, understanding, and proper citation.
- **Research Data Repositories:** Trusted repositories that support long-term preservation, curation, and access in accordance with FAIR principles.

The content and approach of this deliverable are based on the Guidelines on Data Management in Horizon Europe [1], Horizon Europe (HORIZON) Programme Guide (Version 2.0) [2], relevant European Commission guidance on FAIR data management [3], FAIR Guiding Principles for Scientific Data Management and Stewardship [4] and General Data Protection Regulation (GDPR) [5]

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1.2. Relation to other project work

This deliverable, D1.7 Final Data Management Plan, is closely related to and builds upon several key documents and activities within the RefMap project. It is part of Work Package 1 (Project management & Dissemination and Communication activities), which provides the overarching framework for governance, quality assurance, and ethical compliance.

The Final DMP represents the culmination of the iterative data management process initiated at the beginning of the project. Each preceding version contributed progressively to defining and refining the data governance and ethical framework that underpins all project activities:

- **D1.3 Initial Data Management Plan (July 2023):** Established the foundation of the RefMap data management strategy. It outlined the initial methodology for data collection, storage, and sharing, introduced the FAIR principles, and defined the preliminary legal and ethical framework under the GDPR.
- **D1.6 Midterm Data Management Plan (July 2024):** Updated the structure and content of D1.3 to reflect mid-project developments, including new datasets, simulation results, and data-sharing mechanisms across partners. It also presented refinements in metadata standards, repository choices, and ethical oversight procedures.
- **D1.7 Final Data Management Plan (January 2026):** Consolidates and finalises all information, confirming that data management, ethics, and open-science practices have been fully implemented across the consortium. It serves as the definitive record of RefMap's data lifecycle, ensuring that all data, software, and research outputs are curated and preserved for long-term accessibility and re-use.

This document is directly connected with the broader ethical and governance framework of the project:

- **D1.1 Project Management, Quality Plan and Risk Management:** Provides the organisational, quality-control, and risk-management procedures that also govern the production, review, and approval of this DMP. The quality and risk principles defined in D1.1 ensure the traceability and reliability of all data-management activities.
- **D1.8 Research Ethics Monitoring Report:** Ensures that the ethical aspects of data processing, participant involvement, and responsible research conduct

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are monitored throughout the project. Ethics monitoring in D1.8 focused on data-protection compliance and GDPR requirements, and its findings directly inform the ethical considerations presented in this DMP.

- **D7.1 Ethics Deliverable:** Outlines the ethical framework of the project, including considerations relevant to artificial-intelligence-based tools and data-driven models. D7.1 complements this DMP by detailing compliance with relevant EU ethical guidelines and obligations related to research integrity and GDPR.

1.3. Structure of the document

This document is structured in a clear and systematic manner, following the same format as the previous Data Management Plans (D1.3 and D1.6) to ensure continuity, consistency, and traceability across all stages of the RefMap project. It presents the final overview of the data-management framework adopted by the consortium and the measures implemented to ensure compliance with ethical, legal, and technical requirements.

Chapter 1 introduces the purpose of the deliverable, its relation to other project work, and the overall structure of the document. It explains how this final DMP builds on the initial (D1.3) and midterm (D1.6) versions and how it aligns with the ethical and data-protection framework established in D1.8 and D7.1.

Chapter 2 presents the final RefMap Data Management Plan. It describes the procedures applied for data collection, generation, storage, sharing, preservation, and reuse. It also includes the final implementation of the FAIR principles and the management of other research outputs, together with updated summaries of the datasets and software produced by the consortium.

Chapter 3 outlines the General Data Protection Regulation (GDPR) framework applied throughout the project. It summarises the relevant data-protection principles, governance arrangements, and the organisational and technical measures used to ensure the lawful, secure, and responsible handling of any personal data processed within RefMap.

Chapter 4 provides the final assessment of the project's data-management activities and confirms that all research outputs have been curated, validated, and preserved in trusted repositories to ensure long-term accessibility and reusability.

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2. RefMap Data Management Plan

2.1. Data Summary

This section provides an overview of the main categories of research outputs generated and used within RefMap. It builds on the preliminary descriptions in D1.3 and D1.6 and incorporates the final information collected from all partners at the end of the project.

For the purposes of this Final Data Management Plan, RefMap outputs are grouped into three categories:

- **Research Items:** project deliverables, reports, models, policies, questionnaires, and scientific publications documenting the work carried out in all work packages. These items are typically available in .docx and .pdf formats and are classified as public, sensitive, or internal according to the Dissemination Plan.
- **Software and Tools:** code, libraries, frameworks, simulation tools, and services that were developed within RefMap or used as core components in project workflows (e.g. CFD codes, optimisation and AI tools, noise and emission modelling tools). These are stored in institutional repositories, version-control platforms (e.g. GitHub/GitLab), or, where applicable, linked to Zenodo entries.
- **Datasets:** numerical, experimental, and questionnaire-based data generated within the project, as well as external datasets reused under appropriate licences (e.g. meteorological, traffic, and emissions databases). These datasets are stored in open or restricted repositories, high-performance computing facilities, or secure institutional servers, depending on their access level and licensing constraints.

The detailed inventories of these categories, including partner, title, description, related work package and task, format, access conditions, and preservation plans, are presented in the following tables:

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	Partner Name	Artefact Discription	Dissemination level	Format	Status
1	FN	D1.2 Dissemination and Communication Plan	Public	.docx, .pdf	Done
2	KTH	D1.1 Project Management, Quality Plan and Risk Management	Sensitive	.docx, .pdf	Done
3	ISCTE	D6.2 Presentation of new European business models and products enabled by RefMap services	Public	.docx, .pdf	Done
4	UC3M	D2.6 Aviation climate change models	Public	.docx, .pdf	Done
5	UC3M	D5.3 Resilient and environmentally optimal aerial traffic	Public	.docx, .pdf	Done
6	TUD	D2.2 Description of RANS-based simulations and results	Public	.tex, .pdf	Done
7	TUD	D2.3 Description of multi-fidelity approach to combine both types of simulations	Public	.tex, .pdf	Done
8	AFT	D5.1 Flight dynamics models with environmental impact assessment support	Public	.docx, .pdf	Done
9	AFT	D5.2 Multi-scale aviation simulation	Public	.docx, .pdf	Done
10	USAL	D4.3 report	Public	.pdf	Done
11	USAL	D4.3 systematic map	Public	.accdb	Done
12	USAL	Antonio J. Torija Martinez, Carlos A. Ramos-Romero and Nathan Green. "Acoustic and Psychoacoustic Characterisation of Unmanned Aircraft Systems as a Function of Vehicle Mass and Flight Procedure," AIAA 2024-3235. 30th AIAA/CEAS Aeroacoustics Conference (2024). June 2024.	Public	.docx, .pdf	Done
13	USAL	Carlos A. Ramos-Romero, Marc Green and Antonio J. Torija Martinez. "Synthesis and Auralisations of Quadcopter Flyovers for Psychoacoustic Assessment.," AIAA 2024-3272. 30th AIAA/CEAS Aeroacoustics Conference (2024). June 2024.	Public	.docx, .pdf	Done
14	USAL	Lotinga, M., Green, M., & Torija, A. (2025, October). Effects of exposure to unmanned aircraft systems sound: Applying machine learning and parametric clustered-data models to human response prediction. In INTER-NOISE and NOISE-CON Congress and Conference Proceedings (Vol. 272, No. 4, pp. 491-502). Institute of Noise Control Engineering.	Public	.docx, .pdf	Done

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15	USAL	Torija, A., Ramos-Romero, C., & Podwinska, Z. (2025, October). Auralisation and assessment of time-varying characteristics of Unmanned Aircraft System noise. In INTER-NOISE and NOISE-CON Congress and Conference Proceedings (Vol. 272, No. 4, pp. 631-640). Institute of Noise Control Engineering.	Public	.docx, .pdf	Done
16	USAL	D4.4: Model for Drone Noise Perception	Public	.docx, .pdf	Done
17	USAL	D4.5: Report on targets for public acceptance of drone noise in cities	Public	.docx, .pdf	Upcoming
18	USAL	D4.6: Report on impact of drone noise on wildlife	Public	.docx, .pdf	Upcoming
19	TUD	Camilo I. Andino Cappagli, Alireza Amiri-Simkooei, Mirjam Snellen, "Empirical models to describe UAV tonal dynamics during real operations". Quiet Drones Conference 2024, Manchester, UK.	Public	.docx, .pdf	Done
20	TUD	C. I. Andino Cappagli, A. Amiri-Simkooei, S. Luesutthiviboon, T. Meiser, A. Morin, Zajačik M., M. Rollo, M. Snellen. "Machine Learning-based Modelling of UAV Noise Metrics in Real Conditions". Forum Acusticum Euronoise 2025. Málaga, Spain	Public	.docx, .pdf	Done
21	TUD	Journal paper with preliminary model development	Public	.docx, .pdf	Upcoming
22	TUD	D4.2: Model of drone noise emissions	Public	.docx, .pdf	Upcoming
23	KTH	D4.1: Noise modelling for commercial aviation	Public	.docx, .pdf	Upcoming
24	ICCS	D3.4: First report on deep learning inference optimisation	Public	.docx, .pdf	
25	ICCS	D3.5: Final deep learning inference optimisation framework	Public	.docx, .pdf	Upcoming
26	ICCS	D2.4: Multi-fidelity simulations auto-tuning framework	Public	.docx, .pdf	Upcoming
27	ICCS	D5.6: The RefMap cloud service	Public	.docx, .pdf	Upcoming
28	ICCS	K. Koliogeorgi, G. Anagnostopoulos, G. Zampino, M. Sanchis, R. Vinuesa and S. Xydis, "Auto-tuning Multi-GPU High-Fidelity Numerical Simulations for Urban Air Mobility," 2024 Design, Automation & Test in Europe Conference & Exhibition (DATE), Valencia, Spain, 2024, pp. 1-6, doi: 10.23919/DATE58400.2024.10546549.	Public	.pdf	Done

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29	ICCS, KTH	Panagiotis-Eleftherios Eleftherakis, George Anagnostopoulos, Anastassis Kapetanakis, Mohammad Umair, Jean-Yves Vet, Konstantinos Iliakis, Jonathan Vincent, Jing Gong, Ricardo Vinuesa, and Sotirios Xydis. 2025. POSTER: Performance Portability in GPU-Accelerated Spectral Finite Element Fluid Simulations: A Cross-layer Exploration Approach. In Proceedings of the 22nd ACM International Conference on Computing Frontiers (CF '25). Association for Computing Machinery, New York, NY, USA, 228–229. https://doi.org/10.1145/3719276.3729458	Public	.pdf	Done
30	ICCS, KTH	Georgios Anagnostopoulos, Panagiotis-Eleftherios Eleftherakis, Angelos Christos Maroudis, Anastassis Kapetanakis, Konstantinos Iliakis, Luca Guastoni, Mohammad Umair, Jean-Yves Vet, Jonathan Vincen, Jing Gong, Ricardo Vinuesa, and Sotirios Xydis. RefMap: From HPC Computational Fluid Dynamic Simulations to Optimized Flow Prediction Models	Public	.pdf	Done
31	ICCS	Anagnostopoulos Georgios, Nikolaos Zompakis, and Sotirios Xydis. "Dynamic Frequency Boosting of RISC-V FPSoCs Through Monitoring Runtime Path Activations." 2024 27th Euromicro Conference on Digital System Design (DSD). IEEE, 2024.	Public	.pdf	Done
32	ICCS	Anastassis Kapetanakis, Aggelos Ferikoglou, George Anagnostopoulos, Sotirios Xydis, Dataflow Optimized Reconfigurable Acceleration for FEM-based CFD Simulations. https://ieeexplore.ieee.org/abstract/document/10992836/	Public	.pdf	Done
33	AFT	D5.4 Report on assessment of impact of optimised trajectories on the performance of UAS operation in urban environment	Public	.docx, .pdf	Upcoming
34	KTH/UoB	H Aksoy, S Blakey, E T Turgut, E Otero, Analysis of an Integrated Approach for Aircraft Emissions Calculations: Combining BFFM2 and MEEM Methods, Journal of Engineering for Gas Turbines and Power	Public	.pdf	Upcoming
35	TUD/KTH/UoB	D2.5: Local air quality model	public	.docx, .pdf	Done

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36	USAL	Glen Hancocks, Sam Barrett, Marc Green, Mike Wood, Amy Leedale and Antonio J. Torija Martinez. "How Does the Noise of Uncrewed Aircraft Systems Impact the Behaviour of Birds? A Pilot Study on the Isles of Scilly". European Ornithologists' Union (EOU) Conference 2025, Bangor, UK.	Public	.pdf	Done
37	USAL	Glen Hancocks, Sam Barrett, Marc Green, Mike Wood, Amy Leedale and Antonio J. Torija Martinez. "How Does the Noise of Uncrewed Aircraft Systems Impact the Behaviour of Birds? A Pilot Study on the Isles of Scilly". Salford Postgraduate Annual Research Conference (SPARC) 2025, Salford, UK.		.ppt, .pdf	Done
38	USAL	Sam Barrett, Glen Hancocks, Marc Green, Reece Woodcock, Ali Alameer, Antonio J. Torija Martinez, Amy Leedale and Mike Wood. "Assessing the Effects of UAV Noise on Birds: A Playback Experiment Approach". European Ornithologists' Union (EOU) Conference 2025, Bangor, UK.	Public	.pdf	Done
39	USAL	Michael Lotinga, Marc Green, Sam Barrett, Glen Hancocks, Riul Jung, Deepak Akiwate, Carlos A. Ramos-Romero and Antonio J. Torija Martinez. "Sound from unmanned aircraft systems: Progress in acoustics and psychoacoustics". Acoustics Bulletin, 51(1):38–43.	Public	.pdf	Done
40	TUD	Maes, J., Bezantakos, S., Kavabata, L.K. et al. Aircraft emissions of ultrafine particles characterized by real-world near runway measurements. npj Clim Atmos Sci 8, 232 (2025). https://doi.org/10.1038/s41612-025-01095-9	Public	.pdf	Done
41	TUD	Kavabata, L.K., Quadros, F. Q., Meijer, V., Snellen, M., Dedoussi, I.C., Horizontal grid and meteorology resolution impacts on air quality (manuscript)	Public	.pdf	Upcoming
42	FN/ISCTE	Palaiologk Anna, Krousouloudi Nikoleta, Georganti Eleftheria, Kalakou Sofia. Towards an Integrated Environmental Modeling Platform for Sustainable Aviation and Urban Air Mobility. Transportation Research Procedia Volume 91, 2025, Pages 83-90, DOI: https://doi.org/10.1016/j.trpro.2025.10.012	Public	.docx, .pdf	Done

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43	FN	Palaiologk Anna, Iosifidou Sofia, Krousouloudi Nikoleta, Daskaloudi Kyriaki. Integrating Environmental Impact Tools for Aviation and UAM: Development of a Minimum Viable Product.	Public	.docx, .pdf	Upcoming
44	TUD	Patil, Akshay, and Clara García-Sánchez. "Quantifying the impact of urban geometric detail for urban air mobility risk forecasting." Sustainable Cities and Society (2025): 106750.	Public	.pdf	Done
45	TUD	Patil, Akshay, and Clara García-Sánchez. "Fake it till you make it: Synthetic turbulence to achieve swift converged turbulence statistics in a pressure-driven channel flow." Computers and Fluids 301.10673 (2025): 3.	Public	.pdf	Done
46	TUD	Patil, Akshay, Udhaya Chandiran Krishnan Paranjothi, and Clara García-Sánchez. "GenSDF: An MPI-Fortran based signed-distance-field generator for computational fluid dynamics applications." SoftwareX 30 (2025): 102117.	Public	.pdf	Done

Table 1 Research Data

	Partner Name / owner	Artefact Name	Artefact Description	Related WP(s)/ Task(s)	Dataset description	Format/ Type	End User	Existence of similar data	Possibility of integration and reuse	Standards and metadata	Data sharing	Archiving and preservation
1	Argonne (used by KTH)	Nek5000	CFD code for urban-flow simulations	WP2	Code written in Fortran	Researchers	N/A	Open source	N/A	N/A	N/A	N/A
2	Google (used by KTH)	Tensorflow	libraries for deep learning	WP3	Code in C++ and Python	Researchers	N/A	Open source	N/A	N/A	N/A	N/A
3	HEAD acoustics (used by USAL)	ArtemiS	Sound Quality Assessment	WP4	Code property of HEAD acoustics	Researchers	N/A	Potential integration with MATLAB and Python	N/A	N/A	N/A	N/A

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4	Python deployed by ISCTE	-	text analysis	WP6	code in python	Researchers	N/A			N/A	N/A	N/A
5	UC3M	ROOST	Aircraft trajectory optimizer	WP3/WP5	Library in python	WP3/WP5	Flight dispatcher s		Yes	N/A	N/A	N/A
6	UC3M/DLR	CLIMaCCF	Climate change models	WP2	Library in python	WP2/WP3/WP5	Research ers		Yes	N/A	N/A	N/A
7	TUD	OpenFOAM	CFD code for RANS urban-flow simulations	WP2	Code written in C++	Researchers	Research ers	Open source	Yes	N/A	N/A	N/A
8	TUD	Dakota, OpenFOAM, uDALES	Multi-fidelity Uncertainty-Quantification toolbox	WP2	Code written in C++/Fortran	Researchers	Research ers	Open source	Yes	N/A	N/A	N/A
9	AFT	AgentFly	Fast-Time large scale simulation framework	WP5	Code written in Java	WP5	N/A		N/A	N/A	N/A	N/A
10	IBM (used by USAL)	SPSS	Statistical processing software suite	WP4	Proprietary	WP4	N/A	N/A	N/A	N/A	N/A	N/A
11	JSBSim (used by AFT)	JSBSim	Open Source Flight Dynamics Model	WP5	Open source in C++	WP4/WP5	N/A	N/A	N/A	N/A	N/A	N/A
12	EUROCONTROL (used by AFT)	AEM	Advanced Emissions Model - commercial flight emission modeling software	WP5	Proprietary	WP5	N/A	N/A	N/A	N/A	N/A	N/A

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13	TUD	Several codes	Several acoustic and flight dynamics data analysis scripts. Drone noise modelling scripts.	WP4	Codes written in MATLAB	Researchers	N/A	N/A	N/A	N/A	N/A	N/A
14	KTH	ANTAO	Prediction of noise maps and population exposure from conventional aircraft	WP4	Codes written in MATLAB	Researchers		CIDER project (KTH/CSA)	Yes	Comparison with ECAC Doc.29 standard	Yes	Repository
15	ICCS	SOD2D Auto-Tuning Framework	wrapper framework that automates mesh generation and profiling for the Taylor-Green Vortex (TGV) and Channel Flow (CF) cases, a set of memory access optimizations for SOD2D	WP2	Fortran with openacc directives	Researchers	Researchers	N/A	Yes	N/A	N/A	Repository
16	ICCS	SOD2D Multi-GPU Performance Portability Framework	A framework for the analysis of efficient performance portability across cross-vendor (AMD vs NVIDIA), multi-GPU configurations	WP2	Fortran with openACC directives	Researchers	Researchers	N/A	Yes	N/A	N/A	Repository

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17	ICCS	OpenFOAM-AMGX Auto-Tuning Framework	A set of containers for the GPU-accelerated OpenFOAM, integrated with the appropriate libraries, amgx autotuning code	WP2	C++ code	N/A	Research ers	N/A	Yes	N/A	N/A	Repository
18	ICCS	Auto-compr ession for DNN CFD models	Framework for efficient multi-objective ML model compression through pruning and quantization	WP3	Python	N/A	Research ers	N/A	Yes	N/A	N/A	Repository
19	ICCS	The Refmap Cloud Service	RefMap analytics integration into a unified web platform capable of deployment on servers/cloud infrastructures.	WP5	Python, Bash, Vue	WP5	Research ers, Policy Makers, UAS Operators	N/A	Yes (as is)	N/A	N/A	Repository
20	TUD	GEOS-Che m	Atmospheric chemistry modelling code to simulate the dispersion and evolution of chemical species	WP2	Fortran	Researchers	Research ers, policy makers	Open Source	N/A	N/A	N/A	Repository

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21	USAL	uas-sound-propagation	Code to simulate the atmospheric propagation effects of a moving aircraft source	WP4	Python	Researchers	N/A	Open Source	N/A	N/A	N/A	Repository
22	Open Robotics (used by AFT)	Gazebo	Gazebo provides realistic physics simulation for drones using high-fidelity, interchangeable physics engines and specialized plugins that model complex aerodynamic and mechanical effects.	WP5	Open source in C++	WP5	N/A	N/A	N/A	N/A	N/A	N/A
23	USAL	refmap-psychoacoustics	Code repository with tools for evaluating psychoacoustics	WP4 / T4.3	Code repository with tools for evaluating psychoacoustics	Python, MATLAB and R code	N/A	N/A	Open access licensed		Open access licensed	GitHub
24	TUD	GenSDF	MPI + Fortran based software to compute the signed-distance-field for OBJ file format geometry over cartesian grid.	WP2	https://github.com/AkshayPatil1994/GenSDF	Researchers	Researchers	open-source (AGPL-3.0 license)	N/A	N/A	N/A	N/A

Table 2 Software Inventory

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	Partner Name / owner	Name	Dataset description	Related WP(s)/ Task(s)	Format/Type	End User	Existence of similar data	Possibility of integration and reuse	Standards and metadata	Data sharing	Archiving and preservation
1	FN / ISCTE	WP6 feedback	At least 100 participants will provide feedback to obtain user insights through individual replies. The objective will be to designate the tools with the highest value, identify the priorities of each user and also to identify and discuss future aviation scenarios and additional applications of the RefMap product.	WP6 / T6.1	Answers to questionnaires or interviews	Data set will be used for conducting the work of WP6 with the possibility of used in scientific publications.	Data set will be used to evaluate potential project product.	Data set will be used for conducting the work of WP6 with the possibility of used in scientific publications.	Not Applicable	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.
2	USAL	WP4	At least 120 responses from participants of psychoacoustics experiments on UAS sound perception. This will allow us to work on metrics for noise assessment, and define acceptable	WP4/T4.3	Questionnaires	Data set will be used for conducting the work of WP4 with the possibility of being used for scientific publications	This data will complement existing data gathered by USAL as part of other research projects (e.g., EPSRC DroneNoise)	Data set will be used for conducting the work of WP4 with the possibility of being used for scientific publications	Metadata will be publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.

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			characteristics for UAS sound								
3	EUROCONTROL (used by UC3M)	Traffic Scenario (DDR2)	The traffic scenario is used to analyze the aviation-induced climate effects within trajectory optimization	WP3/T3.3 WP5	ALL_FT+	Data set will be used for WP3 in order to generate optimized trajectories for the analysis performed in WP5	N/A	N/A	Data set is not publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be available within project consortium only. Data analysis results can be published.
4	ECMWF (used by UC3M)	Meteorological data	Meteorological data is used to determine areas sensitive to aircraft emissions in terms of environmental impact	WP2/T2.6	netCDF (.nc)	Data set will be used in WP2 for identifying environmental-sensitive areas, which is then used in WP3 and WP5 for achieving environmentally optimal aerial traffic	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be available within project consortium only. Data analysis results can be published.
5	ECMWF (used by TUD)	Meteorological data	Meteorological data is used to learn the large scale forcing for urban areas. This data will be used to enforce the boundary conditions for a given urban canopy to run	WP2/T2.2	netCDF (.nc)	Data will be used to generate prototype conditions to sample the boundary conditions for	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data analysis results can	Data will be available within project consortium only. Data analysis results can be published.

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			the RANS simulations.			micrometeorological RANS simulations				be published.	
6	Airlines (used by KTH)	Flight Data Recorder (FDR) data	FDR data contains flight data of a given trajectory.	WP2/T2.5 and WP4/T4.1	CSV file	The data will be used in WP2 and 4 for testing the emissions and noise computation along these FDR trajectories.	N/A	N/A	Data set is not publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.
7	OpenSky Network Association (used by KTH)	OpenSky Network	The OpenSky Network provides open access of flight tracking control data.	WP2/T2.5 and WP4/T4.1	CSV, Avro and JSON files	The data will be used in WP2 and 4 for testing the emissions and noise computation along these trajectories.	N/A	N/A	Data set is publically available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.
8	ICAO&EASA (used by KTH)	ICAO Aircraft Engine Emissions Databank	The ICAO Aircraft Engine Emissions Databank contains the emission indices of different engine types at different fuel flow levels.	WP2/T2.5	excel (xlsx)	The data will be used to compute aircraft emissions from fossil fuels at a given point of the trajectory.	N/A	The data will be reused for the computation of aircraft emissions from sustainable	Data set is publically available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.

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								aviation fuels (SAF).			
9	EUROCONTROL (used by KTH)	Aircraft Noise and Performance (ANP) database	ANP data contains aircraft noise and performance (ANP) information for noise modelling purposes around airports.	WP4/T4.1	Online data resource	The data will be used to compute aircraft noise around airports for a given trajectory.	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.
10	EUROCONTROL (used by AFT)	Traffic Scenario (DDR2) Route network (DDR2) Sectorization (DDR2)	Creation of ATM testing scenario over ECAC wide airspace	WP5	ALL_FT+, SO6, AIRAC	Data set will be used for WP5 to simulate ECAC wide airspace and all the ATCOs involved	N/A	N/A	Data set is not publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be available within project consortium only. Data analysis results can be published.
11	ECMWF (used by AFT)	Meteorological data	Meteorological data used for fast-time ATM simulation. Wind.	WP5	GRIB, netCDF	Data set will be used for WP5 to simulate ECAC wide airspace and all the ATCOs involved	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be available within project consortium only. Data analysis results can be published.
12	ICAO&ESA (used by AFT)	ICAO Aircraft Engine Emissions	ICAO AEED is used as input for EUROCONTROL'S AEM software for commercial flight	WP5	XLSX	Data set will be used for WP5 to compute aircraft	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data	Data will be available within project consortium only. Data

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		Databank	emission calculation in fast-time ATM simulation.			emissions of simulated traffic in ECAC wide airspace.				analysis results can be published.	analysis results can be published.
13	ICAO&EASA (used by AFT)	Aircraft Noise and Performance (ANP) database	ANP data base is used for noise propagation modelling of commercial flights in fast-time ATM simulation.	WP5	CSV	Data set will be used for WP5 to calculate noise propagation of simulated traffic in vicinity of airports.	N/A	N/A	Data set is publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be available within project consortium only. Data analysis results can be published.
14	KTH (used by KTH)	High-resolution LES database	The LES database contains all the simulations of a single and two building in a row, modelled as square cylinders, immersed in urban-like turbulent boundary layer conducted within the WP2/T2.1. These simulations investigate the smallest turbulent scales in an urban-like configuration to provide the most accurate data of the	WP2/T2.1	.CSV, .mat, .h5	Dataset will be used by the WP3/T3.3 to train and test the optimization trajectory of the drones moving around the buildings.	Yes, there are similar data published in literature. However, some of them are not as accurate as the data provided by RefMap (LES are largely used). In addition, the data only investigate the effect of the aspect ratio of the buildings while the	N/A	Dataset will be available in the future	Data will be available within project consortium and outside the consortium if requested. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.

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			flow around buildings at a relatively high Reynolds number.				present analysis aims to describe also the effect of the building heights on the flow structures.				
15	TUD	Drone noise database of real operations	The database was obtained from two measurements campaigns conducted in the Netherlands and in Czechia (in collaboration with AFT). Operations consisting of a broad range of manoeuvres were performed, using different drone types and configurations, and the acoustic output was recorded with microphone arrays. Operational data was also obtained, including GPS, drone attitude, and thrust telemetry.	WP4/T4.2	.CSV, .mat, acoustic data	The data will be used to develop the models to predict acoustic metrics from real drone operations. It will also be used to generate the RefMap database of UAV noise.	N/A	Data set will be used for conducting the work of WP4 with the possibility of being used for scientific publications	Data set is not publicly available	Data will be available within project consortium only. Data analysis results can be published.	Data will be stored for at least 5 years after project's end.
16	TUD	Concentration maps due to aircraft	Annual-averaged concentrations of species associated with aircraft activity such as PM2.5, NOx	WP2/T2.5	netCDF (.nc)	The data will be used for publication and for the visualization	Yes	N/A	Data set will be partly available	Data will be available within project consortium and outside	Data will be stored for at least 5 years after project's end.

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		emission s during the landing and take-off phase	and O3 using irregular stretched grids			tool on the website				the consortium if requested. Data analysis results can be published.	
17	USAL	Morphom etric, vocal and auditory ranges and ecologica l traits database	A synthesis of available data on morphometrics, vocal and hearing capabilities and ecological traits of birds. Still being compiled for use with developing models to predict avian species-specific sensitivity to drone noise.	WP4.T4.4	excel (xlsx)	Dataset will be used for WP4 T4.4 and for publication in chapters of my PhD thesis.	N/A	Data set will be used for conducting the work of WP4 with the possibility of being used for scientific publications	Dataset will likely be made available in the future once the results of the research are published.	Data will be available within project consortium and potentially to the public if published as open access.	Data will be stored for at least 5 years after project's end.
18	TUD	Number of deaths per emitted mass of pollutant	The dataset includes estimates of how many people die due to emissions of black carbom organic carbon, nitrogen oxydes and sulfur from aircraft LTO phase	WP2/T2.5	.csv	Data will be used by UC3M	N/A	Data may be used with flight path calculations to estimate air quality impacts	Dataset is not publically available	Data will be available within project consortium and potentially to the public if published as open access	Data will be available within project consortium only. Data analysis results can be published.
19	TUD	RANS/L ES urban flow	The dataset incorporates RANS and LES results for	WP2/T2.2 ,T2.3	python	Data will be used by WP5	No	N/A	N/A	N/A	N/A

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		databases	urban flows in TUDelft campus								
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Table 3 Dataset Inventory

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2.2. Data Storage, Access, and Security

This section describes the systems and procedures used by the RefMap consortium to store, access, secure, and preserve all data and research outputs produced throughout the project. The approach follows the methodology established in D1.3 and updated in D1.6, and reflects the final practices implemented by partners during the project's lifetime. RefMap data, including research items, software, and datasets, were stored within secure institutional infrastructures or trusted external repositories, depending on their type, size, format, and access conditions.

2.2.1. Data storage and Backup

Data generated within the RefMap project were stored using a combination of institutional repositories, high-performance computing infrastructures, and secure collaboration platforms, selected according to the nature, size, and access requirements of the data. All partners stored working data on their institutional servers or high-performance computing (HPC) environments. These infrastructures provide controlled access restricted to authorised users, institutional authentication mechanisms, routine backup procedures, and version control, ensuring secure storage in compliance with national and European regulations. This approach applied both to large technical datasets, such as LES and RANS simulation outputs, drone noise measurements, and multi-GPU computation results, and to smaller-scale files, including deliverables, reports, questionnaires, and software code. Internal project documentation and collaborative material, such as deliverables, internal drafts, management files, and questionnaires, were exchanged through secure project collaboration platforms. These included the RefMap SharePoint environment and equivalent institutional cloud services (e.g. internal SharePoint or Nextcloud instances). Where necessary, secure email exchanges were used to support specific coordination activities. Large datasets produced under WP2, WP3, WP4, and WP5, including simulation outputs, noise recordings, and environmental modelling data, were stored on dedicated scientific infrastructures. These comprised university HPC clusters operated by partners such as KTH, TUD, ICCS, UC3M, and AFT, GPU clusters managed by ICCS, and dedicated data servers hosted at partner institutions. Regular backup procedures were implemented across all infrastructures to ensure data integrity and availability throughout the project.

2.2.2. Data Access and Sharing

Access to data generated within the RefMap project was defined according to data type, ownership, legal constraints, and dissemination level. Throughout the project, a

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clear distinction was maintained between internal project data, publicly available research outputs, and externally sourced datasets subject to licensing conditions. Most datasets, software, and intermediate results were accessible only within the consortium during the project lifetime. Access was restricted to authorised project partners involved in the relevant work packages and was managed through institutional authentication mechanisms and controlled-access platforms. This approach applied in particular to large simulation outputs, proprietary tools, licensed datasets (e.g. EUROCONTROL DDR2, Flight Data Recorder data), and datasets containing personal or sensitive information. Public access was granted to selected research outputs, including deliverables, scientific publications, and software components, in line with the Horizon Europe Open Science requirements. These outputs were made available through trusted repositories such as Zenodo or institutional repositories, subject to appropriate licensing conditions and embargo periods where applicable.

2.2.3. Security Measures

To ensure the confidentiality, integrity, and availability of data, all partners applied appropriate organisational and technical security measures in line with institutional policies and EU regulations. These measures included:

- controlled access limited to authorised users;
- secure institutional servers and HPC environments;
- encrypted data transfer channels where applicable;
- regular backup procedures and system monitoring;
- role-based access management for collaborative platforms.

Personal data and other restricted datasets were stored exclusively on secure institutional infrastructures and were not transferred outside the consortium. Where required, anonymisation or pseudonymisation techniques were applied prior to analysis or internal sharing. These measures ensured that project data were protected against unauthorised access, accidental loss, or unlawful processing throughout the project duration.

2.2.4. Long-Term Preservation

Long-term preservation of research outputs generated within the RefMap project was addressed in accordance with institutional policies, Horizon Europe requirements,

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and Open Science best practices. Partners committed to ensuring that data, software, and documentation remain accessible and usable beyond the project's lifetime, taking into account the nature of the data and any legal or contractual constraints. Public datasets, software, and project deliverables have been deposited in trusted repositories such as Zenodo or relevant institutional repositories, where they will be preserved for at least ten years.

These repositories provide persistent identifiers, stable access mechanisms, and long-term curation in line with FAIR principles. Restricted or licensed external datasets, including data obtained under specific usage agreements (such as EUROCONTROL DDR2 traffic data), are preserved in accordance with the original licence conditions. These datasets remain accessible only to authorised partners and are not redistributed beyond the scope permitted by the data providers. Internal project data and GDPR-relevant datasets, including stakeholder questionnaires and communication records, are stored securely on institutional infrastructures and retained for a period of five years after project completion, as indicated by partners in the data-collection template. After this period, such data will be deleted or anonymised in accordance with institutional data-protection policies. Overall, long-term preservation strategies implemented in RefMap follow the FAIR and Open Science principles established in D1.3 and D1.6, as well as Horizon Europe data-management recommendations, ensuring sustainability, traceability, and appropriate reuse of project outputs.

2.3. Making Data Fair

The RefMap consortium applied the FAIR guiding principles to all research data, software, and other outputs generated during the project, taking into account the nature of the data, legal constraints, and dissemination level. The implementation of FAIR principles was proportionate and pragmatic, ensuring transparency and reusability while respecting confidentiality, licensing, and ethical requirements.

2.3.1. Findable

Publicly shared datasets, software components, and deliverables were made findable through deposition in trusted repositories, primarily Zenodo and institutional repositories. These outputs were assigned persistent identifiers (DOIs) and accompanied by descriptive metadata to facilitate discovery by both humans and machines. Metadata records include essential information such as title, authorship, description, versioning, keywords, and funding reference, ensuring traceability to the RefMap project. Internally used or restricted datasets were documented through the

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project's data inventories and internal repositories, allowing partners to locate and reference data efficiently during the project lifetime.

2.3.2. Accessible

Accessibility of RefMap data was defined according to dissemination level and legal constraints. Public research outputs, including datasets, publications, and software components, were made openly accessible via repositories that support standard access protocols (e.g. HTTP/HTTPS, Git-based access), without the need for specialised software beyond commonly available tools. Where applicable, embargo periods were applied in accordance with publication policies. Restricted datasets, including licensed external data (such as EUROCONTROL DDR2 traffic data and airline Flight Data Recorder data) and GDPR-related datasets (e.g. psychoacoustic experiment responses and MVP user feedback), were accessible only to authorised consortium members. Access conditions for such data are clearly described in the dataset inventories and comply with licensing agreements and data-protection requirements. Aggregated and anonymised results were used for scientific dissemination.

2.3.3. Interoperable

To support interoperability, RefMap data were generated and stored using widely adopted, open, and community-recognised formats where possible. These include formats commonly used in environmental modelling, aviation research, and data analysis, such as NetCDF, HDF5, CSV, JSON, GRIB, and PDF/A. Noise and acoustic data were stored in formats appropriate to the measurement systems used, including MATLAB-based formats where required. Where relevant, standard vocabularies and domain conventions were applied, particularly for meteorological data, aviation trajectories, emissions modelling, noise assessment, and machine-learning workflows. Software outputs were documented with sufficient technical information to support integration with external tools and workflows, and RefMap-developed software adhered to widely used programming frameworks to facilitate reuse.

2.3.4. Reusable

Reusability of RefMap outputs was ensured through clear licensing, comprehensive documentation, and adherence to quality standards. Public datasets and software were released under appropriate open licences (e.g. CC-BY for data and widely used open-source licences for software) where permitted by partner policies. Documentation accompanying these outputs describes their scope, structure, assumptions, limitations, and intended use. For restricted or licensed datasets, reuse

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conditions are defined by the original data providers and are clearly indicated in the dataset descriptions. In all cases, sufficient contextual information is provided to allow future users to understand the origin and appropriate use of the data, supporting reproducibility and long-term scientific value.

2.4. Management of Other Research Outputs

In addition to datasets, RefMap generated a variety of other research outputs that contribute to the project's scientific, technical, and societal impact. These outputs include formal project deliverables, scientific publications, models, simulation results embedded in reports, technical documentation, stakeholder materials, and software-related artefacts that do not constitute standalone datasets. This section summarises how these outputs are governed, documented, shared, and preserved in accordance with Horizon Europe Open Science requirements.

2.4.1. Types of Research Outputs

The main categories of non-dataset research outputs produced in RefMap include:

- **Formal project deliverables** (public or restricted), covering methodologies, simulation frameworks, technical analyses, and results across all WPs;
- **Scientific publications**, including journal articles, conference papers, and proceedings generated mainly in WP2 - WP6;
- **Technical reports, models, and policy inputs**, such as modelling descriptions, noise-perception reports, environmental impact studies, and conceptual frameworks;
- **Stakeholder and user engagement materials**, including questionnaires, interview guides, and summary reports (anonymised and compliant with GDPR);
- **Software documentation**, manuals, user guides, and model descriptions accompanying the software outputs listed in Annex II.

These research items complement the datasets and software produced and contribute to the open-science profile of the project.

2.4.2. Storage and Preservation

All research outputs are stored and preserved using secure and trusted infrastructures, consistent with the practices established in D1.3 and D1.6:

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- **Project deliverables** are stored in the project's internal SharePoint and deposited in the EC Funding & Tenders Portal. Public deliverables are additionally shared on the project website and Zenodo.
- **Scientific publications** are preserved in institutional repositories and, where applicable, in OpenAIRE-compliant platforms.
- **Technical documentation and models** are preserved alongside related software or datasets on institutional servers or in Zenodo (when openly available).
- **Stakeholder materials** (e.g., questionnaire templates or engagement guides) are stored internally, with only anonymised or summarised versions shared externally.

Public research outputs will be preserved for the long term in trusted repositories and institutional infrastructures, in accordance with institutional policies and repository practices. Internal or restricted materials, including GDPR-relevant data, will be stored for at least 5 years, as required by institutional policies and ethical guidelines.

2.4.3. Access and Licensing

The access conditions for research outputs follow the dissemination policies defined in WP1:

- **Public research outputs** (most scientific publications, technical reports, public deliverables) are openly accessible via Zenodo, institutional repositories, or the project website under **open licences** such as CC-BY 4.0.
- **Restricted deliverables** (e.g., management documents) are accessible only within the consortium and consortium reviewers.
- **Stakeholder-related materials** (e.g., questionnaires, summaries of user insights) are restricted to internal use unless anonymised.
- **Software documentation** is shared under the same licence and access level as the associated software (e.g., MIT, GPL, or institutional licences).

Clear licensing information and citation instructions are provided for each publicly released item.

2.4.4. Interoperability and Reusability

RefMap ensured interoperability and reusability of research outputs through:

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- **Use of open and widely recognised formats** (.pdf, .txt, .md, .docx);
- **Metadata descriptions** aligned with OpenAIRE and Zenodo schemas;
- **Permanent identifiers** (DOIs) assigned to public deliverables and publications;
- **Version control** for software documentation and technical reports stored in Git repositories;
- **Clear methodological descriptions**, enabling replication of analyses, simulations, or models described in the deliverables and publications.

Research outputs are reusable by external researchers under the terms of the selected licence. In cases where reuse is limited (e.g., proprietary or confidential material), the constraints are clearly specified.

2.4.5. Linkage with Datasets and Software

To support transparency and reproducibility, all research outputs are cross-referenced with the corresponding datasets and software:

- Scientific publications reference the datasets, noise databases, simulations, or models used.
- Software documentation explains how the tools relate to the datasets described in Annex III.
- Deliverables include methodological pipelines linking input data, processing steps, and resulting analyses.

This linkage ensures that research outputs can be interpreted and reused in full compliance with the FAIR principles and the ethical requirements documented in D1.8.

2.5. Allocation of Resources

This section outlines the human, technical, and financial resources allocated for data management activities within the RefMap project, as well as the responsibilities for long-term data preservation and access after project completion. The allocation of resources was coordinated under Task 1.4 and aligned with the project's overall governance, as defined in D1.1.

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2.5.1. Human Resources

The management of data across the RefMap consortium was a shared responsibility involving the Data Management Lead, Work Package leaders, technical partners responsible for data generation and processing, and the Project Coordinator. This distributed model ensured both central oversight and local responsibility for data governance.

Role / Responsibility	Partner(s)	Main Tasks
Data Management Lead	Future Needs (FN)	Coordination of DMP implementation, support on metadata standards and FAIR practices, and verification of repository use.
Work Package Data Owners / Technical Contributors	KTH, UC3M, USAL, TUD, AFT, ICCS, ISCTE	Generation, processing, storage, and documentation of datasets, simulations, models, and software, validation of data quality, formats and metadata.
Ethics and GDPR Compliance	FN, KTH, Institutional DPOs of each partner	Ensuring GDPR-compliant procedures, supporting anonymisation/pseudonymisation of personal data (WP4, WP6), contributing to ethics monitoring activities reported in D1.8.
FAIR and Open Science Oversight	All partners	Ensuring adherence to Horizon Europe Open Science requirements, selecting appropriate repositories, applying FAIR principles to all public research outputs.
Quality and Risk Management	KTH	Integrating data-management risks into the overall Quality and Risk Management framework defined in D1.1, ensuring procedural alignment across WPs.

Table 4 Key roles and responsibilities

Throughout the project, each partner designated at least one Data Management Representative, responsible for internal compliance with the procedures established in D1.3, D1.6, and this Final DMP. These representatives ensured that data were stored securely, documented consistently, and prepared appropriately for long-term preservation and dissemination.

2.5.2. Technical and Infrastructure Resources

The RefMap consortium utilised a combination of institutional, HPC, cloud-based, and public infrastructures to support secure data storage, collaboration, processing, and long-term preservation. These infrastructures were maintained by the partners in accordance with institutional policies and provided the technical backbone for FAIR and secure data management.

Key infrastructures included:

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- **Institutional data repositories and servers** at KTH, UC3M, TUD, ICCS, USAL, AFT, ISCTE, and FN, used for controlled-access storage and long-term preservation.
- **High-performance computing (HPC) resources** at KTH, ICCS, UC3M, and AFT for simulation, modelling, and machine-learning workflows.
- **Project collaboration platforms**, including SharePoint and other institutional cloud platforms, for internal data exchange and documentation workflows.
- **Public repositories**, such as Zenodo, GitHub, and GitLab, used for open-access dissemination of datasets, publications, and software with DOI assignment and version control.

All infrastructures provide secure access, regular backups, and long-term preservation capacity in line with institutional and Horizon Europe requirements.

2.5.3. Resources for FAIR Compliance

The consortium allocated the necessary organisational and technical resources to ensure compliance with the FAIR principles throughout the project. This included:

- adoption of **standardised, open data formats** (NetCDF, HDF5, CSV, JSON, PDF/A);
- support for **metadata creation** using recognised schemas such as DataCite and Dublin Core;
- **DOI assignment** for datasets, software releases, and public deliverables via Zenodo;
- maintenance of **version-controlled repositories** for software and documentation;
- continuous updates to the **dataset inventories** compiled in D1.3, D1.6, and finalised in D1.7;
- support from existing institutional research support structures when needed.

No external FAIR consultancy or additional specialised resources were required. FAIR compliance was ensured through established internal processes and partner expertise.

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2.5.4. Resources for Ethical and GDPR Compliance

Ethical and data-protection compliance within RefMap was ensured through existing institutional structures and procedures, without the need for additional specialised resources. Each partner processed personal data under the responsibility of its own institution and in accordance with national implementations of the General Data Protection Regulation. Institutional Data Protection Officers and ethics committees were consulted where required, particularly in relation to stakeholder engagement activities and data collection involving human participants (e.g. psychoacoustic experiments in WP4 and user feedback activities in WP6). These structures provided guidance on lawful processing, data minimisation, anonymisation, and secure storage practices. Technical and organisational safeguards were implemented using institutional infrastructures, including controlled access to data, secure servers, encrypted storage and transfer mechanisms, and regular backup procedures. Anonymisation or pseudonymisation techniques were applied where relevant prior to data analysis or internal sharing. Ethical and GDPR-related monitoring activities were carried out under Task 1.4 and are fully documented in Deliverable 1.8. No external ethics or GDPR consultancy services were required, as compliance was ensured through established institutional processes and partner expertise.

2.6. Ethics

Ethical considerations have been fully integrated into the RefMap data-management process.

All data collection, storage, and sharing activities were conducted in accordance with the ethical principles of Horizon Europe, the European Code of Conduct for Research Integrity, and the General Data Protection Regulation (GDPR) (EU) 2016/679.

The consortium ensured that:

- Any personal or stakeholder-related information collected during the project was processed lawfully, transparently, and solely for its intended purpose.
- Data requiring protection were anonymised or pseudonymised prior to storage or publication.
- No sensitive personal data were processed, and no ethical or data-protection incidents occurred.

Ethical aspects related to data processing and GDPR compliance were monitored through Task 1.4.

AI-related ethics considerations are addressed in Deliverable D7.1.

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3. GDPR

This section summarises the data-protection framework implemented in RefMap in accordance with the General Data Protection Regulation (GDPR) - Regulation (EU) 2016/679. A comprehensive ethical and legal analysis, including monitoring activities and verification of compliance, is presented in D1.8 Research Ethics Monitoring Report. RefMap processed very limited personal data, consisting mainly of contact information and stakeholder communication records obtained during project activities. No special categories of data (Article 9 GDPR) or sensitive data were processed at any stage of the project. All partners processed personal data under their own institutional responsibility, in accordance with GDPR and national legislation. Lawful bases for processing were limited to consent (Article 6(1)(a)) for stakeholder interactions and legitimate interest (Article 6(1)(f)) for internal communication and project management activities. Associated institutional Data Protection Officers (DPOs) were consulted where required. Personal data were stored on secure institutional systems with controlled access, encrypted storage, secure transfer channels, and strict data minimisation practices. Where relevant (e.g., in WP4 and WP6), data were anonymised or pseudonymised prior to analysis. A Data Protection Impact Assessment (DPIA) was not required. As confirmed in D1.8, the project did not involve large-scale processing, sensitive data, automated decision-making, profiling, or any other high-risk categories defined under Article 35 GDPR. All GDPR-related processes, records, and monitoring activities are fully documented in D1.8, which represents the authoritative reference for ethical and data-protection compliance across the project.

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4. Conclusions

This document, D1.7 Final Data Management Plan (DMP), presents the conclusive version of RefMap's data management framework, consolidating all actions, procedures, and outcomes implemented throughout the project's lifecycle. It builds upon the foundation established in D1.3 (Initial DMP) and the refinements made in D1.6 (Midterm DMP), providing the final, comprehensive record of how the consortium has managed, preserved, and shared research data and other outputs in full compliance with Horizon Europe Open Science and FAIR data management principles. The RefMap consortium has successfully ensured that all datasets, software, and publications produced under the project are findable, accessible, interoperable, and reusable. Data generated across the different work packages, ranging from high-fidelity simulations to AI models and the MVP platform, have been documented using standard metadata, validated for quality, and stored in secure and sustainable repositories. All public datasets and tools have been assigned Digital Object Identifiers (DOIs) and released under open-access or open-source licenses in accordance with project policies and European Commission guidelines. Throughout the project, strict adherence to ethical and legal requirements was maintained.

Data collection and processing were conducted in line with the General Data Protection Regulation (GDPR) and the European Code of Conduct for Research Integrity, ensuring that no sensitive or personal data were processed without appropriate safeguards. Ethics and data management monitoring activities were continuously supervised under Task 1.4, with detailed reporting provided in Deliverable D1.8 Research Ethics Monitoring Report.

The final DMP confirms that:

- All research data, software, and related documentation have been archived in trusted repositories (e.g., Zenodo, KTH, and Future Needs institutional repositories) for a minimum of ten years;
- Metadata and repository links ensure the traceability and reusability of project results;
- Open Science principles have been fully adopted to maximise the transparency and societal impact of RefMap's outputs; and
- The project has met all ethical, legal, and technical requirements for responsible data management under Horizon Europe.

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With the completion of this deliverable, the RefMap consortium demonstrates its full commitment to sustainable, ethical, and transparent research practices. The data, software, and knowledge generated by the project will remain available to the research community, industry stakeholders, and policymakers, contributing to continued innovation in sustainable aviation and urban air mobility beyond the project's lifetime.

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References

- [1] European Commission, *Guidelines on Data Management in Horizon Europe*, European Union, Brussels.
- [2] European Commission (2022), *Horizon Europe (HORIZON) Programme Guide*, Version 2.0, European Union, Brussels.
- [3] European Commission (2016), *Guidelines on FAIR Data Management in Horizon 2020*, European Union, Brussels.
(Referenced as background European Commission guidance on FAIR data management principles.)
- [4] Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J., et al. (2016), *The FAIR Guiding Principles for scientific data management and stewardship*, Scientific Data, 3, 160018.
- [5] 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 on the free movement of such data (General Data Protection Regulation).

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Annex

The following pictures constitute the Data Info Collection Excel file where partners enter information about the Data they are handling and operating on per the DMP's instructions.

#	Artefact type	Explanation (indicative)	Format (indicative)
1	Research Item	e.g. Models and Meta models, Policies, Questionnaires, Deliverables, Papers	.xls, .csv, .txt, .docx, .pdf
2	Software	e.g. Code, APIs, microservices, libraries, dashboard	.xls, .csv, .txt, .docx, .pdf
3	Dataset	e.g Synthetic, dummy	.xls, .csv, .txt, .docx, .pdf
4	Dataset	Dataset of the velocity field for the cases reported in the articles recently published by Zampino and colleagues.	.csv, .txt, .pdf, .mat
5	Please intecate any other		

Partner Name	Artefact Discription	Dissemination level	Format

Partner Name / owner	Artefact Name	Artefact Description	Related WP(s)/Task(s)	Dataset description	Format/Type	End User	Existence of similar data	Possibility of integration and reuse	Standards and metadata	Data sharing	Archiving and preservation

Partner Name / owner	Name	Dataset description	Related WP(s)/Task(s)	Format/Type	End User	Existence of similar data	Possibility of integration and reuse	Standards and metadata	Data sharing	Archiving and preservation

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