(HBC.2023.0488)NudgeFlow: The next generation of residential ventilation - tweaking the natural air flow with distributed components

VLAIO DMP (Flemish Standard DMP)

1. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
template		Please choose from the following options: • Generate new data • Reuse existing data	Please choose from the following options: • Digital • Physical	Please choose from the following options: • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	Please choose from the following options: • .por, .xml, .tab, .cvs,.pdf, .txt, .rtf, .dwg, .gml, ... • NA	Please choose from the following options: • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
WP1: CFD models	Description of simulated case and cases themselves (selection used in publications	both new and reused data	digital	simulation data	.h5 (ANSYS compressed files), .txt	< 5 TB	
WP1: CFD simulation results	Simulation results (velocity, pressures,, temperatures, concentrations)	new data	digital	compiled/aggregated data	.csv, .txt	< 1GB	
WP1: wind tunnel test setup	Scale models in the wind tunnel to measure pressures	both new and reused data	physical				0.5 m³
WP1: wind tunnel test setup documentation	Description of setup, including boundary conditions, measurement info	both new and reused data	digital	experimental	.txt, .dwg	< 1 GB	
WP1: pressure and flow measurement data	Data of wind pressure and velocities (spatial information and temporal information)	new data	digital	compiled/aggregated data	.csv, .txt	< 1GB	

WP1: state-space models	numerical description of the models	new data	digital	simulation data	.py, .mo, .txt	< 1GB	
WP2: reference dwellings	Descriptions of dwellings, in terms of geometry and properties	both new and reused data	digital	Compiled/aggregated data	.pdf, .txt, .dwg	<100MB	
WP2: boundary conditions	Time series of boundary conditions	both new and reused data	digital	Compiled/aggregated data	.xml, .csv, .pdf, .txt	<1GB	
WP2: reference dwelling model	Numerical descriptions of dwellings, in terms of geometry and properties	both new and reused data	digital	Compiled/aggregated data	Modelica models (.mo)	<100MB	
WP3: component test setup	Identification of the relevant relations in component characteristics and design specifications of an adequate test set-up	Generate new data	Digital	Compiled/aggregated data	.pdf, .dwg	<100MB	
WP3: component data	Table summarizing all relevant component data. The data exists out of a newly classified set of information containing the results of a review on literature, technical data sheets, interviews with stakeholders and lab tests	Generate new data / Reuse existing data	Digital	Compiled/aggregated data simulation data	.csv Modelica model (.mo) and Python code (.py) .	<1GB	
WP4: Controller model	Hierarchical NudgeFlow controller model will be defined as a state-space model.	Generate new data	Digital	simulation data	Modelica model (.mo) and Python code (.py)	<1GB	
WP4: assessment of controller	Output of the controller model (see previous datasource)	Generate new data	Digital	Simulation data	.csv	<1GB	
WP5: test setup	test setup of wall with NudgeFlow components	new and reused	Physical				2 m³

WP5: test setup documentation	Comprehensive list of test methods (aerolic and acoustic) and design criteria for NudgeFlow component characterisation	new and reused data	Digital	compiled/aggregated data	.csv	< 100 MB	
WP5: experimental dataset	Set of combined aerolic and acoustic performances of air transfer components	new data	digital	experimental	.csv	< 100 MB	
WP6: Virtual testbed	A virtual testbed of a NudgeFlow system will be modelled in Dymola Modelica environment. This includes the design of the system (WP3) and distributed model-based controller (WP4) in the reference building (WP2) with stochastistic boundary conditions from WP2 and WP5 and assessment framework of WP2.	generate new data	Digital	simulation data	Modelica models (.mo) and Python code (.py)	<100GB	
WP6: virtual testbed simulation results	simulation results (temperatures, concentrations, airflows)	new data	digital	simulation data	.csv, .txt	<1GB	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

WP1: ABL wind tunnel test setup at TU Eindhoven (described in previous publications of the partner at TU Eindhoven)
WP2: dwelling geometry (based on previous research project from Ghent University: EL²EP project)
WP2: stochastic occupant activity generator (based on previous research done by Verbruggen et al., 2020)
WP5: test set up in lab at Buildwise

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- Yes

That is the aim of the cluster SBO to prepare valorization projects as follow-up together with the companies in the industrial advisory board.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements/ research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- Yes

IP agreement between the partners is described in the "samenwerkingsovereenkomst" as required by VLAIO.

2. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g., in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

For the models (Modellica, Python and CFD), a codebook will be included to describe each model (mesh (only for CFD), boundary conditions, user defined functions). Each model will be given an ID number and stored in its own folder accordingly. The output data (i.e., numerical, visual) will be in the same folder and match the same ID number.
For the experimental setups, word documents will be created describing the different equipment
used and how it was built, the experimental conditions and how the experiments were executed step by step. A logbook will be also created to document important details of the experimental procedures (e.g., dates and time stamps, potential anomalies). This will ensure that the process is reproduceable.
Upon execution, each experiment will be given an ID number, and a folder will be created per experiment. The folder will contain the experimental conditions and output measurement data from sensors will match the same ID of experiments.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- No

Yes, for models in CFD.
For the CFD models generated, MCFD (metadata standard to describe metadata specific to CFD simulations) will be used. It covers aspects such as the simulation domain, grid resolution, boundary conditions, turbulence models, solver settings, convergence criteria, and simulation results.
No, for experimental data and Modelica models.
For the experiments, an experimental setup Metadata (in the form of a Word document) describing the setup, configuration of the experimental apparatus used to perform the measurements will be used. It will include details such as the equipment used, calibration, environmental conditions and parameters and the steps and sequences of steps performed as well as quality assurance procedures. A data processing and analysis metadata document will be also generated documents the steps involved in processing, analyzing and interpreting the experimental data.
For the Modelica models, a codebook will be created to make the data easier to find and reuse.

3. Data storage & back-up during the research project

Where will the data be stored?

Data will be stored on the Teams-site of the NudgeFlow project.
The virtual testbed will in the test phase be hosted on github.ugent.be from Ghent University and later in the project on protected server room on the HPC of the Building Physics research group at Ghent University (gvo00152).
For CFD models from WP1, the data will be stored on Research Drive by SURF (TU Eindhoven).

How will the data be backed up?

Standard back-up provided by the universities.

SURF offers disaster recovery, meaning a maximum loss of 24 hours of data

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely.
If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.

- Yes

Maximum storage capacity on Teams-site is 5 TB.
SURF has no limitations.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

The data stored on the Teams-site can only be accessed by the partners in this VLAIO project.
Github.ugent.be will be made accessible for partners in this VLAIO project.
SURF allows access only to persons provided with access.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

Costs for the shared Teams-site (up to 5 TB) are free for KU Leuven staff. Admission to HPC is free for universities. Eventually extra costs can be covered by the operational budget foreseen in the project.
SURF charges about 360 euro per TB per year. Costs will come from the operational budget foreseen in the project.

4. Data preservation after the end of the research project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

All data will be retained for 10 years according to KU Leuven RDM policy.

Where will these data be archived (stored and curated for the long-term)?

KU Leuven RDR

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

Eventually costs will be covered by all the universities via reserve funds.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in a restricted access repository (after approval, institutional access only, …)

If access is restricted, please specify who will be able to access the data and under what conditions.

The partners in this project will have access to the data. Conditions are specified in the "samenwerkingsovereenkomst" between the partners.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain in the comment section per dataset or data type where appropriate.

- Yes, Intellectual Property Rights

IP rights are specified in the "samenwerkingsovereenkomst" between the partners.

Where will the data be made available? If already known, please provide a repository per dataset or data type.

KU Leuven RDR

When will the data be made available?

Upon publication of research results.

Which data usage licenses are you going to provide? If none, please explain why.

The Modelica and CFD models and test set ups will not be made availabe for reuse.

For the simulation results: selected data that will be used in publications, will be made available under the conditions that are described in the following license: Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

A PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

No costs are expected for data sharing.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

All partners are responsible to manage data documentation and metadata of their WP. WP responsibility is specified in the research proposal.

Who will manage data storage and backup during the research project?

Every partner manage data storage and backup of their WP during the project. WP responsibility is specified in the research proposal.

Who will manage data preservation and sharing?

Every partner manage data preservation and sharing of the data in their own WP. WP responsibility is specified in the research proposal.

Who will update and implement this DMP?

The project coordinator will coordinate the process. Every partner is responsible for the update and implementation of this DMP for their own WP. WP responsibility is specified in the research proposal.

(HBC.2023.0488)NudgeFlow: The next generation of residential ventilation - tweaking the natural air flow with distributed components

GDPR

GDPR

Have you registered personal data processing activities for this project?

- No

(HBC.2023.0488)NudgeFlow: The next generation of residential ventilation - tweaking the natural air flow with distributed components

DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- Not applicable