DMP title

Project Name The impact of atmospheric winds on complex seaport areas and ships

Project Identifier 00123937

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Principal Investigator / Researcher Alessio Ricci

Project Data Contact alessio.ricci@kuleuven.be

Description Seaport areas are the entry and exit of countries and since decades they keep expanding in order to host larger cruise ships and container ships. Although essential for the global trade, port areas are considered among the most vulnerable and risky in the world. Here accidents frequently happen, human lives are lost and ships and goods are damaged. Among the meteorological and climatological events, the wind is the most destructive natural phenomenon and most frequently the prime cause of accidents in coastal areas. Despite the important milestones achieved in the past decades by the Wind Engineering research community to characterize the atmospheric winds over flat terrain for structural designing, it is still unclear how the wind behaves in more complex and hybrid areas (as seaport areas) composed of open areas surrounded by built-up environments. This is the main topic of the present project. The project aims at providing the scientific community and the port stakeholders with a novel multidisciplinary approach able to predict atmospheric wind flows over seaport areas in order to better estimate wind loads acting on ships and cranes. The research project will also provide a comprehensive overview about the strengths and weaknesses of numerical and experimental techniques when dealing with this kind of applications.

Institution KU Leuven

1. Data Description

What data will you collect or create? Fill out the table below and/or describe.

Type of data	Format	Volume	How created?
Dataset points and drawings of seaport areas, ships, cranes, buildings.	.dwg, .step, .stl, .iges	~300 MB	AutoCAD, Rhinoceros, MapTool, Pdok, STRM data,
Aero and 3D views of the study areas	.jpeg, .tif	~50 MB	Google Earth Pro and Google Maps
Computational grids of the study areas and ships	.msh.gz	~70 GB	Pointwise, ANSYS Meshing, Gambit
Computational cases to be simulated	.cas.h5, .dat.h5, ascii	~ 3 TB	ANSYS Fluent, OpenFOAM
Computational results	ascii, .csv.gz	~10 GB	ANSYS Fluent, OpenFOAM
Contour maps (of wind speed, turbulence intensity, pressure coefficients), vertical and horizontal wind profiles (of wind speed, turbulence intensity, integral length scale, etc.), power spectral density of turbulence, wind pressure coefficients, aerodynamic forces.	.mat , .csv, .jpeg, .tif, .png	~500 MB	Matlab
Wind-tunnel results: time histories of pressure coefficients, aerodynamic forces, wind velocity.	.csv.gz	~100 MB	Homemade wind-tunnel software

Do you intend to reuse existing data?

The PI will not reuse any existing data.

Do you use personal data (i.e. all data possibly identifying an individual)?

- No

2. Documentation and Metadata

Describe the documentation that will be created for the data. This section deals with the way in which you will document how the dataset was created and subsequently

processed.

For the CFD simulations and wind-tunnel tests, one main folder will be generated for each work package (WP), three in total. For each WP, a folder will be generated per sub-work package (S-WP). Within each S-WP, every CFD case study will be organized into: (1) geometry, (2) grid, (3) raw data, (4) postprocessing. Within the folder (4), three types of folders will be created: (1) Matlab script, (2) input and (3) output of the analysis.

A similar structure will be organized for the conference papers, journal papers and articles for magazines that will be produced throughout the whole project.

Describe the metadata for the data. This section deals with metadata: information contained in your dataset about the research data.

With reference to the folders' structure indicated above, a “readme” file will be created within every main folder to explain: (1) the structure of sub-folders, (3) how the numerical and experimental raw data are organized, (3) how the raw data are post-processed, (3) note down specific comments/notes related to the Matlab scripts/codes used for the postprocessing.

Each Matlab script (both for wind-tunnel tests and CFD simulations) will include metadata showing: (1) author of the file (i.e. PI), (2) date (dd/mm/yyyy), (3) WP and S-WP, (4) type of postprocessing executed. Specific comments will be made close to particular functions (if necessary).

3. Ethical, Legal and Privacy Issues

Are there any ethical issues concerning the creation and/or use of the data?

No

Did you consider all issues about copyrights and IPR?

Yes, the PI considered all issues about the copyrights and intellectual property. The future data produced by this project will not contain any trade secret. The main result will be shared in journal papers and published according to Open Access standards, under CC BY license.

Are the collected data considered to be â€œdata containing personal informationâ€ and are all the requirements about the collection of these data met?

No personal data are shared in this research project.

4. Data storage and Backup during Research

How and where will the data be stored during research?

- Other, please specify:

CFD simulations: the data (e.g. drawings, grids, raw data, scripts, plots, etc.) will be stored in the external hard drive (capacity 20 TB) and in the personal account of the cluster machine used for the simulations. A backup of such data will be created on a personal external hard drive of 20 TB. All the Matlab scripts used for the post-processing of data will be also stored on the personal laptop of the PI.

Wind-tunnel tests: the data (e.g. drawings, raw data, scripts, pictures the physical model, photos and videos of the tests) will be stored in the external hard drive (capacity 20 TB) and in a personal folder of the wind-tunnel desktop. At the end of the test campaign, the data will be transferred to the external hard drive of 20 TB. All the Matlab scripts used for the post-processing of data will be also stored on the personal laptop.

Which back-up procedures are in place?

A backup of all data will be executed every week on the external hard drive.

Describe the data security procedures and who has access to the data.

The personal account of the KU Leuven (Department of the Building Physics and Sustainable Design) cluster machine used for simulations as well as any external national supercomputer is protected by a secured password.

The transfer of data between supercomputer and KU Leuven cluster machine (and vice versa) will be executed by the PI through the Linux platform that requires the credentials (passwords) of the

PI. The transfer of data from the cluster platforms to the external hard drive will be executed by the PI through his personal laptop.

Only the PI will have access to the data.

5. Data selection and Preservation after Research

What is the long-term preservation plan for these dataset(s)?

1. The wind-tunnel data will be stored on the wind-tunnel workstation for a non-limited time.

2. The CFD simulation data will be stored on the machine cluster of the KU Leuven - Department of the Building Physics and Sustainable Design - for the whole duration of the project and six months after the end.

3. All data used for publications (conference papers, journal papers, magazine articles, etc.) will be retained for a non-limited time.

4. All data and files related to this research project will be retained also in the personal external hard drive for a non-limited time.

Data Selection: Which data will have long time value for the research and will be preserved?

All datasets described in Section 1 will be retained for a non-limited time.

6. Data Sharing

Are there any restrictions for sharing the data?

The are no restriction for sharing the data. The PI will analyze and discuss with the collaborators (supervisor and co-supervisor) every single opportunity to share the data for research purposes only.

If there are no restrictions, which mechanisms will be in place to assure that the data are discoverable, accessible and intelligible?

The main results will be published according to Open Access standards, under CC BY license. Conference papers, journal papers as well as magazine articles will be also advertised through LinkedIn and Twitter. Practitioners as well as academicians are free to contact the PI and request published and (possibly) unpublished data. The PI will provide the applicant with sufficient information for the correct reading/interpretation of data, by means of “readme” files introduced in Section 2.

How will you share the data?

- Website
- Publication
- Other, specify

As mentioned above, the main results will be shared in Open Access publications and extra data will be available on request after signing a data sharing agreement. Practitioners and academicians interested in the data can contact the PI through his KU Leuven e-mail account or/and his personal website. The data format will be agreed each time with the applicant, but basically the same formats mentioned in Section 1 will be used.

With whom will the data be shared?

- On request

The created data will be available to anyone, provided that they give appropriate credit to the creators.

7. Responsabilities and Resources

Who is responsible for Data Management during the project? This will be the person who might receive questions on the data management aspects of the research project.

The project PI.

Which additional resources are needed for the execution of the Data Management Plan?

No additional resources are required for the execution of the DMP.

Did you read the KU Leuven Data Management Policy? (find the link to the policy in

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- Yes