Standardizing Metadata for Experimental Aerodynamic Databases: Enhancing Accessibility, Usability, and Research Impact

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Enhancing Accessibility, Usability, and Research Impact

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EPSRC data policy:

- **Publicly funded research data** should be widely and freely accessible in a timely and responsible manner.
- **Sufficient metadata** must be openly available to enable further research and data reuse, with published results providing access information.
- **Research integrity** should be maintained, avoiding damage from inappropriate data release.

What is happening, actually….
Very few publish in the university repository

- difficult to contact for questions/correction
- Files may not be organised
- minimal data description (Read me file)

Experimental Datasets are expensive to repeat- should be preserved – for both economical and sustainable reason

Our initiative

- Aim to be the first-place for aerodynamic datasets- catering to researchers in both UK and International

- Establish guidelines, best practice and standards that can be adopted by others

Loughborough University

Benefits of Database

Boost Visibility and Citations :

Improves the scientific reputation of the
- individual researchers
- their lab/team
- institution

Generating more citations.

Facilitate Data Reuse :

Enhances efficiency by reusing data for new purposes.

Helps future researchers

Support Education : Aids in training new researchers and educating the public.

Demo..

NWTF

NWTF Experimental database

Metadata

What we do..

- **Data Acquisition**

  - We collect and gather the relevant experimental data from NWTF tunnels.

- **Metadata Creation**

  - Comprehensive metadata documentation in markdown & html

- **Internal & external Review**

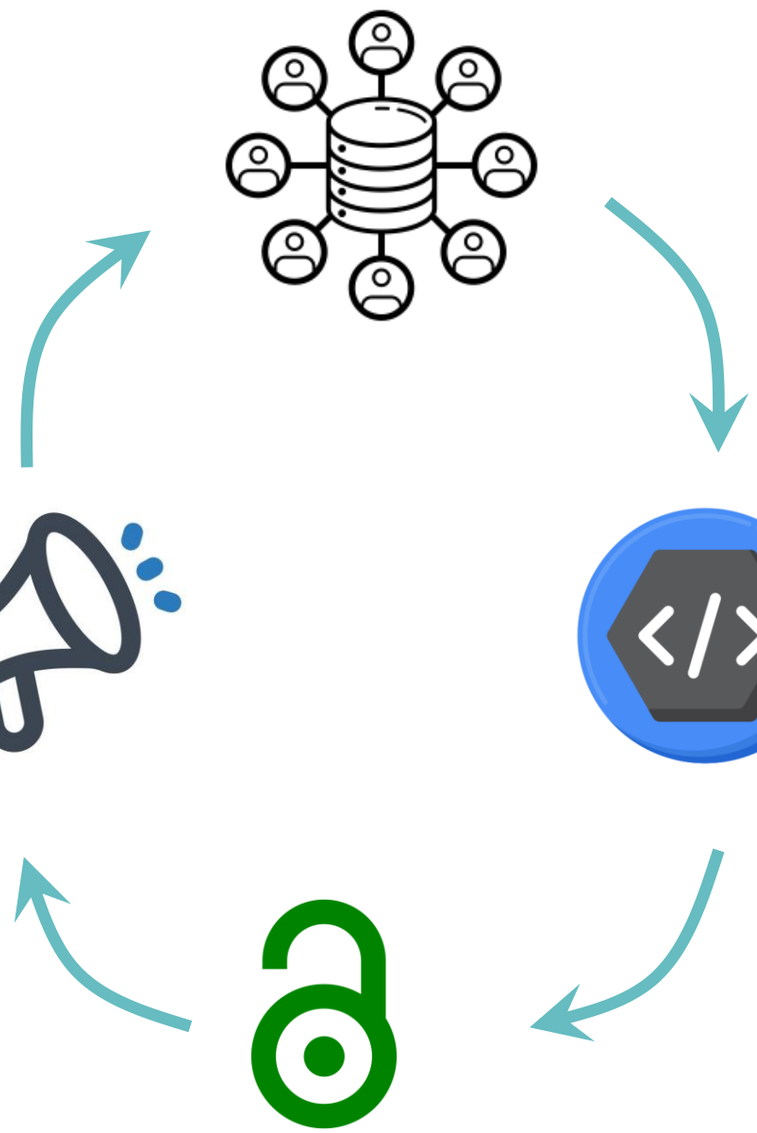
  - Conduct an internal review process to ensure the quality, and adherence to the standards.

  - Corresponding author of the dataset will review the metafile for any corrections.

  - Author Acceptance, & publication

- **Open access & promotion**

  - Loughborough university host the datasets



Challenges

- **Standardization Across Institutions**

NWTF comprises multiple institutions, each with different data collection methods, formats, and standards.

Establishing a unified metadata schema that accommodates diverse datasets while ensuring consistency is complex.

Loughborough - .dat
Glasgow- .mat
Cranfield- .dat and .lay
Airbus - .xml

- **Data Variability and Complexity**

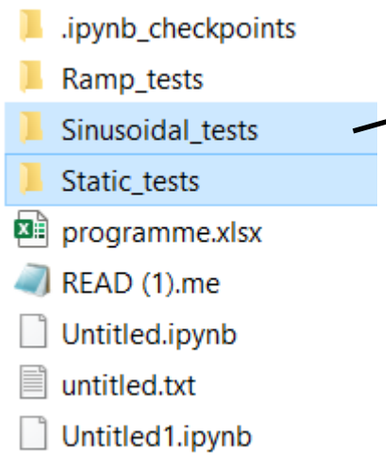
Metadata must account for variations in test conditions, instrumentation, and processing techniques.

- **Integration with Existing Databases**

Some institutions may already have their own metadata structures or data management systems.

Challenging dataset

If we unzip a file



230 files

- The variables mentioned in the file name differ from those in the reference paper.

	File name	paper
Pressure	psi	kPa
Frequency	Hz	rad/s

(i) Effect of steady blowing

(ii) Effect of mean aerofoil angle of attack during sinusoidal pitching motion.

(iii) Effect of varying duty cycle

(iv) Effect of varying pressure

(v) Effect of varying blowing frequency

(vi) Effect of pitching frequency

Progress

So far, we have published datasets from:

- Loughborough University: 4
- University of Glasgow: 2
- Cranfield University: 1

Currently in progress:

- Airbus: 1

Next in line:

- University of Southampton: 2

Contact

Thank you
&

Please fill the NWTF database survey, helps to improve the data dissemination and user accessibility.

To publish your data, please contact
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