Plan Overview

A Data Management Plan created using DMPonline.be

Title: FailProof: Autonomous failure prognosis for complex structural systems by unmanned vehicle-acquired measurements and multi-sensor data fusion

Creator: Tian Xun Lin

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Project abstract:

Aerostructures amongst several other industrial structures are subject to extreme operational conditions with their continuous and automated monitoring, health prognosis and maintenance being a major modern engineering challenge. Autonomous monitoring technologies through unmanned vehicles are promising for increasing the wealth of measured data, reducing the complexity and cost of the monitoring system and eliminating hardware to be attached on the structure itself. FailProof will enable failure prognosis and predictive maintenance through focusing on three research directions: i) Investigate if the additional measurement variability induced by an unmanned vehicle may destroy the value of the acquired monitoring data. ii) Investigate if fusion of high-frequency (ultrasound) and low-frequency (digital image correlation) data can provide more trustworthy damage assessment than each sensing source individually. iii) Develop a bespoke damage modelling technique for assembled aircraft components to capture initiation and propagation of damage and estimate the remaining useful life of the component.

ID: 213832

Start date: 01-10-2024

End date: 30-09-2028

Last modified: 24-03-2025

FailProof: Autonomous failure prognosis for complex structural systems by unmanned vehicle-acquired measurements and multi-sensor data fusion

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.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: ***N****(ew data) or* ***E****(xisting data)*	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Documentation	Supporting documents or literature	N	D	I, T	.docx .pdf	<1GB	
Experimental	Ultrasound measurement dataset	N	D	N, T	.csv	<100GB	
	Crawler design and measurement	N	D	A, I, N, T	.mp4 .docx .pdf .jpeg .csv	<100GB	
	Software: data analysis	N	D	N, M, SO	Source code (Matlab, Python, LabView)	<1GB	
	Evaluation results and performance	N	D	A, N, M, SO	.mp4 .csv Graph by software results(Matlab, Python, LabView)	<100GB	

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:

At this moment, we are not relying on existing data.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- 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

In the long term, when the accuracy from experiment results reach to a certain level. The models and datasets included with our inspection system can be used as prototypes.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or 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.

- No

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).

All collected data, including designs, images, videos, algorithms, and code, will be systematically documented by the researcher conducting the experiment (e.g., PhD researchers) to ensure long-term accessibility, reproducibility, and usability.
During the project, all experimental results, datasets, data analysis outputs, graphs, videos, and documents will be securely stored as electronic files and backed up in OneDrive cloud storage.
All processes related to the experiment—including design, measurement, and analysis—will be clearly documented in a README.txt file, providing detailed descriptions to ensure transparency and consistency.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- No

A specific metadata standard will not be used. Instead, metadata will be documented in README.txt files, which will describe the folder structure, file naming conventions, dataset contents, and collection methods. This documentation ensures that the data remains findable, understandable, and reusable for future reference.

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Sharepoint online
- Other (specify below)
- Shared network drive (J-drive)

OneDrive(KU Leuven)

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

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

All project-related shared data will be accessible only to promoters, co-promoters, and the research team. Additionally, KU Leuven's authentication system ensures secure storage and protects against unauthorized access.

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

The costs are covered by project funding.

Data Preservation after the end of the Research Project

Which data will be retained for 10 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 preserved for 10 years according to KU Leuven RDM policy

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

- Other (specify below)
- Shared network drive (J-drive)

OneDrive (KU Leuven)

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

The costs are covered by project funding.

Data Sharing and Reuse

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

- Yes, as restricted data (upon approval, or institutional access only)
- Yes, as open data

Some data will become available when published.
Other data can be obtained by researchers after request and approval.

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

Researchers can access the data after request.

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 per dataset or data type where appropriate.

- Yes, intellectual property rights

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- Other data repository (specify below)

OneDrive (KU Leuven)

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.

- Other (specify below)

Data usage licenses will be provided according to the requirements for reuse defined by the original publisher.

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

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

Not applicable.

Responsibilities

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

Tian-Xun Lin and all researcher within the group that work on the project

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

Tian-Xun Lin and all researcher within the group that work on the project

Who will manage data preservation and sharing?

Tian-Xun Lin and all researcher within the group that work on the project

Who will update and implement this DMP?

Tian-Xun Lin