Plan Overview

A Data Management Plan created using DMPonline

Title: Development of a commercially viable magneto-hydrodynamics thruster for spacecraft propulsion

Creator: Alexandru Uifalean

Affiliation: Cranfield University

Template: DCC Template

ID: 117844

Last modified: 27-02-2023

Copyright information:

The above plan creator(s) have agreed that others may use as much of the text of this plan as they would like in their own plans, and customise it as necessary. You do not need to credit the creator(s) as the source of the language used, but using any of the plan's text does not imply that the creator(s) endorse, or have any relationship to, your project or proposal

Development of a commercially viable magneto-hydrodynamics thruster for spacecraft propulsion

Data Collection

What data will you collect or create?

Type of data	Description	Formats	Reasoning	Volume of data
CAD model or assembly files	for thruster design CAD modelling and analysis	.sldprt, .sldasm or .step	the thruster will be designed in SolidWorks using .sldprt and .sldasm. At the end of the project, the final assembly will be saved as a non-proprietary .step file	20GB
MATLAB scripts	for thruster initial sizing and specification	.m files	this is the file format in MATLAB	15GB
COMSOL Multiphysics simulation files	for thruster performance simulation (i.e. CFD and electrodynamics) analysis	.mph, .mphbin, .mphtxt, .mphphb	standard file formats for COMSOL Multiphysics simulation	500GB
Mesh geometry files	for thruster multiphysics, thermal and structural analysis	.msh or .stl	universal file types for mesh files	500GB
NASTRAN structural simulation files	for structural analysis of the thruster	.nas	standard file type for NASTRAN	500GB
Ansys thermal simulation files	for thermal analysis of the thruster	.rth, .wbdp, .anf, .wbpj, .wbpz, .wbex, .wbdb, .esav, .mntr, .rst, .mechdb, .emat, .axdt, .lgw, .osav, .engd, .mdef, .fedb, .meshdat, .ans, .dbb, .rfl, .rmg, .	standard file types for Ansys Workbench	500GB
Diagrams and image files	for presenting pictures, graphs and other types of processed data in academic paper and writings	.png or .jpg	standard file type for images	15GB
Video files	for recording and analysing thruster experimental performance	.mp4	standard file type for videos	15GB
Text and document files	for documentation and write-ups	.txt, .pdf, .docx	standard file types for documents	500MB
Spreadsheet files	for organising and presenting tabular data	.csv, .xlsx	standard file types for spreadsheets	500MB

How will the data be collected or created?

Type of data	Naming convention
CAD model or assembly files	YYYY_MM_DD_NameOfFile_ver stored in CAD folder
MATLAB scripts	YYYY_MM_DD_NameOfFile_ver stored in MATLAB scripts folder
COMSOL Multiphysics simulation files	YYYY_MM_DD_NameOfFile_ver stored in Multiphysics simulations folder
Mesh geometry files	YYYY_MM_DD_NameOfFile_ver stored in Mesh geometry folder
NASTRAN structural simulation files	YYYY_MM_DD_NameOfFile_ver stored in Structural simulations folder
Ansys thermal simulation files	YYYY_MM_DD_NameOfFile_ver stored in Thermal simulations folder
Diagrams and image files	YYYY_MM_DD_NameOfFile_ver stored in Images folder
Video files	YYYY_MM_DD_NameOfFile_ver stored in Video folder
Text and document files	YYYY_MM_DD_NameOfFile_ver stored in Documentation or Papers or Thesis folder
Spreadsheet files	YYYY_MM_DD_NameOfFile_ver stored in data folder

Documentation and Metadata

What documentation and metadata will accompany the data?

===== README FILE INFORMATION =====
This file must be saved as a text file, ie extension .txt. You may need one for the whole dataset or one per subset/data file.
Readme.txt written by: [name]
Written on [YYYY-MM-DD]

===== DATASET INFORMATION =====
1. Directory/file naming conventions: explain any abbreviations in filenames or describe each file
eg YYYY-MM-DD-INSTRUMENT-NAME, YYYY-MM-DD-ALGORITHM-NAME
... [repeat as needed]

2. Definitions of acronyms, abbreviations, or other project-specific terms used in file/folder names or documentation
Acronym/abbreviation:
Description:
... [repeat as needed]

3. Variables: units of measurement (also note any special formats used)
Name:
Description:
Units of measurement:
... [repeat as needed]

4. Variables: codes for missing data
Code:
Definition:
... [repeat as needed]

5. Column headings for tabular data
Full name (spell out abbreviated words):
Definition:
... [repeat as needed]

6. Date/date range of data collection
Eg YYYY-MM-DD to YYYY-MM-DD, or YYYY-MM to YYYY-MM

7. Geographic location of data collection
Eg city, country, coordinates

8. Additional format information
Eg specialised software (including version) used or needed to view the files

===== METHODOLOGY INFORMATION =====
9. General methodology (experimental, obervational, simulation, etc.):

10. Method for processing data, if the dataset is not raw data:

11. Instruments used for collecting data:

12. Uncertainty, precision, and accuracy of measurements, if known:

13. Standards or calibrations that were used:

14. Quality assurance and quality control that have been applied, if applicable:

15. Any further relevant information eg known issues with the data, related datasets:

Ethics and Legal Compliance

How will you manage any ethical issues?

N/A: No personal or GDPR-sensitive data will be generated, collected or processed.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

N/A: All data used will be located in the public domain or open source.

Storage and Backup

How will the data be stored and backed up during the research?

All data used will be stored on a restricted access computer and automatically backed up onto Cranfield's OneDrive system.

How will you manage access and security?

All data used or generated will be non-confidential and freely available to anyone if requested.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

Thruster simulation set-up and results alongside thermal and structural analysis data. Also, manufacturing and assembly drawings together with experimental set-up and results documents.

What is the long-term preservation plan for the dataset?

If the project is successful and has commercial viability then the data will be stored in a private location.

Data Sharing

How will you share the data?

If the project is successful and has commercial viability then the data will not be shared with everyone.

Are any restrictions on data sharing required?

If the project is successful and has commercial viability then the data will not be shared with everyone.

Responsibilities and Resources

Who will be responsible for data management?

Alexandru Uifalean, the PhD student.

What resources will you require to deliver your plan?

Software: MATLAB, NASTRAN, COMSOL, Ansys
Hardware: Thruster manufacturing and testing facilities (i.e. vibration table and TVAC)
Technical expertise: Thruster mechanical design, electromagnetism design, propulsion performance assessment