
Plan Overview

A Data Management Plan created using DMPonline

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

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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, observational, 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