Plan Overview

A Data Management Plan created using DMPonline

Title: Numerical Analysis of Merging Supersonic Streamwise Vortices for Enhanced Mixing in Scramjet Engines

Creator: Dónal McCaughey

Principal Investigator: Marco Geron

Data Manager: Dónal McCaughey

Project Administrator: Declan Nolan

Affiliation: Queen's University Belfast

Template: DCC Template

ID: 124069

Last modified: 15-05-2023

Copyright information:

Numerical Analysis of Merging Supersonic Streamwise Vortices for Enhanced Mixing in Scramjet Engines

Data Collection

What data will you collect or create?

Flow visualisation files (tecplot .szplt format) produced by a Large Eddy Simulation in SU2. Each flow file is around 10gb and we require around 1000 to perform analysis of the turbulence. Restart files, required to start the simulation again from a specific point will also be stored. These are around 6gb each and 4 are stored for every 1000 flow files.

The tecplot .szplt format is required as the data is being post processed in tecplot. This also makes it easier to manipulate the data and extract regions for analysis.

The output of theses simulations is one of the major products of my PhD. No similar simulations have been conducted for this flow and so no existing data can be resused

How will the data be collected or created?

The data is generated using SU2 on the Kelvin Cluster. around 1.5Tb of data at a time will be generated and transferred using ssh and tar, to my PC and then to the Queen's Active Data Storage Unit, or to the Queen's active data storage unit directly.

The data is time dependent so files are named according to the settings used and the time they are taken from. For a simulation using the SLAU2 convective scheme for example, the 30000th time step file would be named "SLAU2_30000.szplt"

The time steps will be save in a folder that is named according to the settings used and the data the files were downloaded on. A config file containing the full settings input to SU2 will also be included in each folder

Documentation and Metadata

What documentation and metadata will accompany the data?

The folders will contain a config file which will have the full settings used for the simulation as well as a brief description of the project and the name of the publication the data will be included in.

Ethics and Legal Compliance

How will you manage any ethical issues?

There are no ethical issues with the data we are generating. In terms of data sharing, the config files and restart files will be hosted online so that users can recreate the data themselves. I (Dónal McCaughey) will also keep some of the flow files on a hard disk for future analysis

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

The data is owned by me (Dónal McCaughey) and I intend to make the data freely available to anyone who wishes to continue this work as soon as I have completed my thesis

Storage and Backup

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

Currently the data is being stored on an external hard drive (8Tb). I need more space to store more files for the analysis I want to perform which is why I am requesting the use of the Queen's Active Data storage Unit. This will also serve as a back up

Restart files are also stored on an external disk and my PC. The data can be recreated from these if necessary

How will you manage access and security?

Data is not confidential and will be made freely available

Selection and Preservation

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

An average of the 1000s of flow files will be created and stored. A small number of the flow files will also be kept, as well as restart files which will allow the data to be recreated for future analysis

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

After completion of the project the results that are to be saved will be kept on an external hard drive. Restart and config files will be made available online so that the data can be recreated.

Data Sharing

How will you share the data?

The data will be shared in my PhD thesis and in two publications. I intend to host some of the data online and make it freely available

Are any restrictions on data sharing required?

No

Responsibilities and Resources

Who will be responsible for data management?

Me (Dónal McCaughey)

What resources will you require to deliver your plan?

I require minimum 100gb of RAM which has been provided by ESPRC on Archer2. I also require access to tecplot and a local machine with at least 32gb of RAM which has been provided.

Aside from the remaining storage space I require, all other resources are in place