

Data Management Plan 2018 Mobility21 UTC

Platooning for Improved Safety and Efficiency of Semi-trucks [PISES]

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1. Description of the data and data producing program:

1.1. Collected data will include 'drive-cycle' data which describe the driving characteristics of Class 8 trucks, weather/temperature data which describe the driving conditions, and other transportation data like road-conditions etc., will be in non-proprietary formats of '.csv'.

1.2. A part of the generated data from modeling and simulation involving computational fluid dynamics will be in '.plt' (Tecplot), '.ccm' (CD-adapco) or other similar formats during the research and analysis phase but the results from the analysis will be in non-proprietary formats.

2. Purpose of the research: This research aims to leverage computational approaches to understand the aerodynamics and energy efficiency of Class 8 semi-trucks, specifically by utilizing powertrain models supplemented by computational fluid dynamics models and obtaining results which can be integrated into vehicle control platforms to enable effective, efficient, and safe truck platooning strategies.

3. Description of the nature of the data: The data gathered and generated as part of the proposed work will include road terrain images and databases (numerical-and-text hybrid datatypes) pertaining to driving characteristics and road conditions, modeling and simulation data from vehicle dynamics models.

4. Methods for creating the data: Programming platforms for modeling will include MATLAB® and Python which will also function as data collection and refining platforms for the gathered data. The data formats used will include '.mat', '.txt', '.xlsx', and '.csv'. The second section of modeling will be performed on computational fluid dynamics modules and platforms where the requisite formats compatible with the commercial package will be utilized.

5. Period of data collected and frequency of update: Datasets and results will be generated on a weekly basis and collection will occur every quarter.

Potential users of the data: The datasets are expected to be useful to researchers on diesel and electric semi-trucks.

Long-term value: The datasets are expected to be useful broadly to inform design decisions related to semi-trucks.

6. **Managing the data:** The PI will make all efforts to ensure the data is managed for long-term retrieval. The PI adopts a practice where all of the relevant datasets used are stored in Supporting Information files along with published papers. This provides a secondary approach to ensuring that the data is available for long-term use.
7. **Plans for adhering to this data management plan:** The PI will work with the Mobility21 UTC to ensure that the data management plan is adequately implemented.

8. Data format and metadata standards:

- 8.1. As stated above, due to the nature of research proposed to be undertaken, the research phase will utilize proprietary data formats in certain sections, albeit, the the final results will be presented and documented in non-proprietary and platform independent formats to maximize the usability and utility of the research undertaken.

The PI will adhere to the DwC (Darwin core) metadata schema format whenever required. All final datasets will be in non-proprietary in the standard data format of the field such as '.csv' or '.txt'.

- 8.2. The PI will describe the data process log to clarify the final version of data shared.
- 8.3. The PI will list documentation to ensure data is understandable by other researchers.
- 8.4. The PI will provide analysis tools and workflow with standard software to read, view and use the data.
- 8.5. The PI will describe the quality control measures used related to convergence settings, number of repeated runs, etc. for the provided dataset and results.

9. Policies for access and sharing:

No human subject research will be carried out in this project.

No private or confidential information will be used for this project.

10. **Policies for re-use, redistribution, derivatives:** Carnegie Mellon University holds the IP for data created by the project. The PI will cite the data source and license under which they used the data in the project.

11. Plans for archiving and preservation:

- 11.1. The PI will utilize the Mobility21 UTC's plans for archiving all data on CERN, <https://cds.cern.ch/>, which is an approved site of the USDOT.
- 11.2. The PI will submit within 60 days of the final project, all data to be archived on CERN.
- 11.3. The PI will maintain the data until it is archived on CERN. CERN is a approved data repository by USDOT, we assume the following is pre-approved by DOT

- 11.4.** The PI's group adopts redundancy in storage to ensure data security by actively maintaining several copies of the data on local computers, off-site storage at a computing cluster in Monroeville, PA and on online services like Box™.
- 11.5.** Post-processing is carried out with the help of online storage services such as Dropbox and Box, which have automatic retrieval capabilities.

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