Data Management Plan

Expected Data: This project is a computational effort with primary objective being the numerical simulations and post-processing of the generated data to understand the three-dimensional forebody and afterbody geometry effects on the flow-induced vibrations (FIVs). Three different forebodies with various afterbody shapes and sizes will be considered to isolate the role of various geometry attributes and to identify the underlying physical mechanisms that drive the FIVs in various velocity regimes. For each simulation, the expected data includes the simulation solution files (raw data) and the post-processing scripts and results (derived data) for force decomposition that will help isolate the contributions to induced forces/moments from various flow structures.

Each simulation will generate three-dimensional datasets (raw data) containing the conserved variables (mass, momentum, and total energy) in the computational domain and post-processed results, e.g. forces/moments, mean flow quantities, turbulence statistics, etc. (derived data). As noted in the broader impacts section of the proposal, the raw data will also be processed to create virtual reality visualizations of the three-dimensional unsteady flow field.

Data Formats and Dissemination: The data derived from this work are completely digital in nature and stored, in raw form, as binary or ASCII format files, with one file saved per simulation output timestep, roughly one file per twenty timesteps. All data necessary to reproduce observations and conclusions will be published in top journals and/or technical reports. Upon completion of the project and publication of results, raw data and software will be made available to outside users upon request for (a) further investigation and (b) for external verification purposes. The PI will also share on his GitHub page the codes to help others implement the developed method and to reproduce the published results.

Period of Data Retention: The generated data will be archived quarterly. The duration of the data retention period will be for a minimum of three years after the termination of the grant.

Data Storage and Preservation of Access: All the data produced in this project will be archived in digital format on the university fileservers, or in fileservers specific to the PI's laboratory that operate in accordance with guidelines from the Auburn University IT department. This data storage will be executed in a secure and efficient manner, with appropriate provisions for backup and recovery in case of equipment failure. Large data sets will be stored on removable disks, typically of 5+ TB capacity. Important data sets necessary for characterization of FIVs and force decomposition to reproduce the published results will be stored in duplicate on both networked drives and removable disks with the physical media stored in different locations.