Master's Thesis Defense Announcement
Mechanical and Aerospace Engineering Department
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DEVELOPMENT OF THE VEHICLE CONFIGURATION COMPENDIUM: A COMPREHENSIVE DATA-INFORMATION-KNOWLEDGE SYSTEM TO AID IN HIGH-SPEED VEHICLE DESIGN

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Abstract

The loss of knowledge between generations of engineers and vehicle designers has been a long-standing issue that must be resolved, especially in the field of high-speed aerospace vehicle design. Future generations of engineers end up having to expend valuable time and resources relearning information that had already been generated through experimentation in the past, and this slows down progress overall in the field. This issue has been addressed by this research effort through the development of a one-of-a-kind parametric library that houses data, information, and knowledge from past-to-present vehicle projects and is designed to aid in the conceptual design process of high-speed aerospace vehicles. The Vehicle Configuration Compendium (VCC) is designed for integration into a multidisciplinary, multi-fidelity synthesis and sizing system developed within the AVD Laboratory (AVDS synthesis system). The integrated system aims to revolutionize how conceptual design is conducted by effortlessly providing the designer past-to-present projects for reference, verification, and forecasting purposes. The VCC accomplishes this by allowing the designer to easily access conceptual design-relevant data, information, and knowledge. The standalone compendium is designed to allow for the education of the practicing engineer and student alike by delivering the contents in a user-friendly software interface, thus encouraging design enthusiasts of all experience levels to consider various vehicle configurations to forecast the feasibility of new designs. The data, information and knowledge showcased has been selected from hundreds of credible resources, sorted, digitized, and stored in the database library. Additional knowledge trends have been generated for the easy comparison of various configurations. The current software development iteration that has been completed is the alpha version or the initial prototype, with seven relevant high-speed vehicles compiled, and serves as the steppingstone for future researchers to expand the compendium. The vision for the future of this prototype compendium is for continual updating and expansion towards a truly all-encompassing aerospace design compendium.