

1. **Research Title:** *Advancement of Automated Aerospace Structural Design*

2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**

Mechanical Engineering or Aerospace Engineering (MS or Ph.D. level)

4. **Objectives:** The objective of the proposed research is to develop and integrate automated structural layouts tools, optimizers and higher fidelity analyses into pre-conceptual, aerospace structural design.

5. **Description:** Completion of higher fidelity aircraft structural design early in the design process is important for new vehicle programs. Typically, aircraft structural layout is not completed until the end or near the end of the design process due to its complexity. This can detrimentally affect aircraft vehicle design, resulting in negative impact to cost, schedule, and performance of a program. This topic is focused on research that enables development, advancement, and incorporation of vehicle structural design earlier in the overall design process. Emphasis is placed on methods that would completely automate structural layouts, optimization at lower design fidelity levels, higher fidelity analyses earlier in the design, high-speed structural designs methods and tools, and aspects of machine learning.

Project Areas of Interest:

- . Research on processes and methods for utilizing parametric geometry coupled with finite element methods (FEM) to complete automated structural design early in design processes
- a. Enhancement of existing tools and practices to allow higher fidelity and optimization to take place earlier in the design process
- b. Application of advancements in machine learning as it applies to automated structural design
- c. High-speed structural design methods and tool advancements

6. **Research Classification/Restrictions:** U.S. Citizens only. Most aspects of this research fall under the 6.1 basic research classification. Some aspects, in particular those dealing with specific vehicle configurations and performance parameters, are FOUO with ITAR restrictions.

7. **Eligible Research Institutions:**

DAGSI (Wright State University, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)

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