1. **Research Title:** Experimental Aeroservoelasticity for Rapid Vehicle Design

2. **Individual Sponsor:**
Dr. Kevin A. McHugh, AFRL/RAVE
2210 Eighth Street, Bldg 146
WPAFB, OH 45433
Kevin.mchugh.3@us.af.mil

3. **Academic Area/Field and Education Level:** Aerospace, Civil, Materials, or Mechanical Engineering; Solid or Structural Mechanics (MS or PhD level)

4. **Objectives:** Push forward the experimental aeroservoelasticity state of the art with an eye towards influencing the upstream design cycle. Develop experimental methods to characterize test articles and assimilate data into a digital design environment at speeds concurrent with numerical design optimization. Provide experimental data for validation of existing designs as well as for designs which may be difficult or impossible to evaluate numerically (eg novel/complex materials, architectures, and geometries; morphing structures; innovative control hardware and software).

5. **Description:** Experimental aeroservoelasticity data is required to supplement or to validate numerical analysis, and experimental data needs to be coupled with current multidisciplinary design optimization (MDO) processes. The maturation of technologies such as rapid prototyping, machine learning, full-field sensing and instrumentation, and industrial automation provide opportunities to quickly test novel ideas experimentally and integrate experimental datasets into the design cycle. Topics of exploration include but are not limited to:
    a. Scaling laws
    b. Materials and architectures
    c. Manufacturing technology and technique
    d. Sensing and Control hardware
    e. Control laws
    f. Ground tests
    g. Tunnel tests
    h. Flight tests
    i. Data assimilation into MDO

6. **Research Classification/Restrictions:** Unclassified

7. **Eligible Research Institutions:** All DAGSI Universities

Distribution Statement A: Approved for Public Release; Distribution is Unlimited. PA# AFRL-2024-5101