

RQ15-8

1. **Research Title:** *Structural Dynamics & Mechanics of Turbomachinery Components*

2. **Individual Sponsor:**

Jeff Brown

AFRL/RQTI

1950 Fifth Street, Bldg. 18

WPAFB, OH 45433

[jeffrey.brown@wpafb.af.mil](mailto:jeffrey.brown@wpafb.af.mil)

3. **Academic Area/Field and Education Level:** Mechanical or Aerospace Engineering. MS or Ph.D. Level

4. **Objectives:** Develop advanced experimental or analytical approaches for the accurate assessment of turbine engine component life. The research can be directed towards improved bench experimentation, innovative component fatigue and creep models, or improved dynamic response prediction for rotors.

5. **Description:** Turbomachinery components are a significant driver of both unscheduled and scheduled maintenance actions that drive fleet sustainment costs. The goal of this research is to advance the life assessment capability of turbine engine components. Activities will be performed in the Turbine Engine Fatigue Facility (TEFF) or with the Structural Analysis Group (SAG). The TEFF and SAG maintain unique research capabilities to perform structural, vibration, and mechanical evaluations of turbine engine components. They provide direct support of Versatile Affordable Advanced Turbine Engine (VAATE) program through basic and applied research. Experimental capabilities include scanning vibrometry, real time digital laser holography, Stress Pattern Analysis by Thermal Emissions (SPATE), ping dynamic frequency analysis, derotation, large scale dynamic shakers, high temperature ovens and single and multiaxial fatigue test. Computational capabilities include static and dynamic stress prediction, mistuning, computational fluid dynamics, fatigue and fracture modeling, and probabilistics assessment capabilities.

6. **Research Classification/Restrictions:** U.S. Citizens only.

7. **Interest in Summer USAFA Cadet:**

None

8. **Eligible Research Institutions:** Place an X in all that apply.

Universities (DAGSI)

AFIT (only)

USAFA