1. **Research Title:** Control Techniques for Aircraft Energy Management
2. **Individual Sponsor:**

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

Mechanical, Aerospace, Electrical, Computer Engineering; Applied Mathematics or Statistics. MS or Ph.D. Level

4. **Objectives:**

Expand the capability of aircraft energy systems via more effective and robust energy resource allocation over the mission and across the aircraft. The research will use advanced control and estimation concepts to proactively coordinate decisions/actions among subsystems and provide the requisite aircraft state and condition awareness. The research can be directed towards optimal control, predictive control, distributed control, Bayesian estimation, formal synthesis, machine learning, distributed sensing, uncertainty propagation, resource projection, on-line model validation, or strategic perturbation of aircraft systems.

5. **Description:**

Current and next generation of aircraft are faced with increasingly critical power and thermal requirements despite decreasing footprint (i.e. weight, volume, and external sinks). These challenges involve large transient loads and strenuous mission environments. The siloed and steady-state design paradigms have reached a point of diminishing returns for expanding system capabilities. Instead, techniques are needed that dynamically allocate energy resources over the mission and across the aircraft to vastly expand capability. This necessitates coordinating energy conversion, distribution, storage, and dissipation among subsystems. Specifically, there are tremendous opportunities for employing cyber-physical systems concepts applied to power and thermal systems. Potential techniques include optimal control, predictive control, distributed control, Bayesian estimation, formal synthesis, and machine learning.

6. **Research Classification/Restrictions:** U.S. Citizens Only
7. **Eligible Research Institutions:** All DAGSI

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