

1. **Research Title:** Control Techniques for Two Phase Thermal Management
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Aerospace or Mechanical Engineering/Computational Physics and Numerical Analysis (MS or Ph.D. level)
4. **Objectives:** To develop improved control techniques for two phase cooling of high power electronics and devices.
5. **Description:** High power electrical components are most efficiently cooled by using two phase cold plates. Some devices need to be held at a very uniform temperature with very small temporal variations which means overcooling degrades performance just as undercooling. The temperature can be controlled by modulating the refrigerant mass flow rate and cold plate saturation pressure but these are influenced by the thermal management system as a system not just particular components in the system. The goal of the study is to develop control techniques and algorithms that maintain device temperature in the presence of large swings in thermal load or heat sink conditions. Experiment and theoretical work is being pursued.
6. **Research Classification/Restrictions:** Unclassified
7. **Eligible Research Institutions:**

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

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