

# **Mass-Based Optimization of Thermal Management and Power Systems for Space-Based Applications**

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## **Abstract**

Integration of new and existing technologies for space-based thermal management will be required to meet the challenges associated with the increased need for an efficient, lightweight, heat-rejection system. Subsystem design requirements, such as thermal and mass management, must be brought into the design cycle to establish an optimal configuration. This presentation provides a parametric analysis that determines the specific conditions under which a proposed system becomes advantageous from a weight-management standpoint. The analysis can be applied to essentially any space-operated thermally actuated heat pump providing power and/or refrigeration. By applying the techniques demonstrated in this presentation, designers will be able to identify and optimize conceptual configurations during the initial prototype development stages to reduce payload weight and increase financial savings. Examples of systems to which this analysis can be applied are presented and quantified.