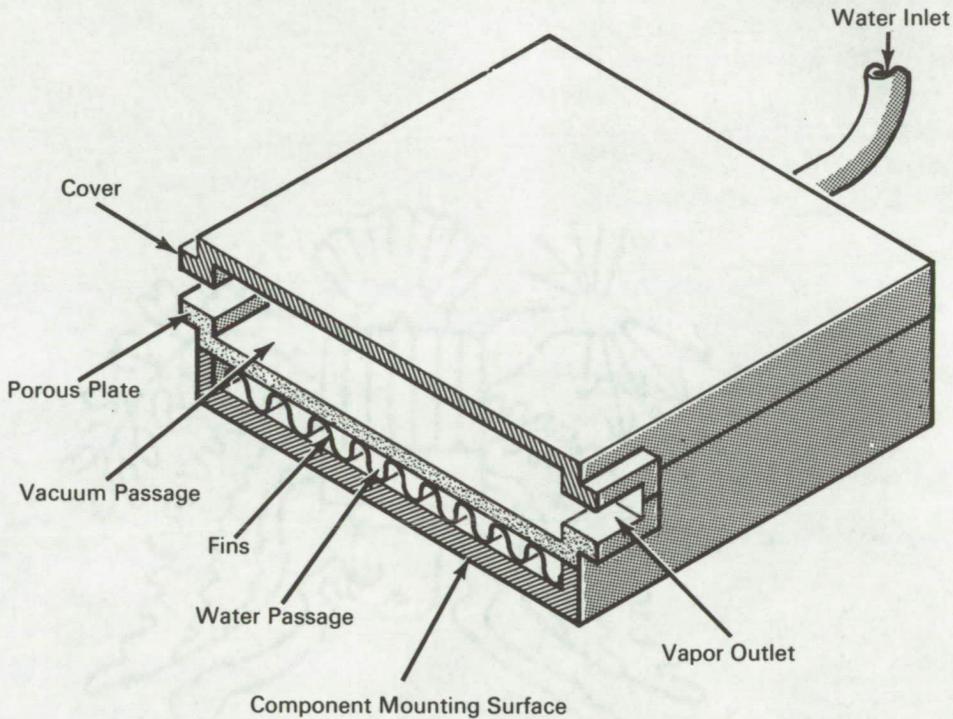


NASA TECH BRIEF



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Modular Porous Plate Sublimator (MPPS) Requires Only Water Supply for Coolant



The problem:

To conserve the battery power of a space vehicle by eliminating a coolant pump. A conventional sublimator system requires a constant power source for a coolant pump to provide circulation of the coolant through coldplates to remove excess heat of electronic components.

The solution:

Provide modified modular sublimators for each location where heat must be dissipated, eliminating the need for an extensive coolant circulation system.

How it's done:

The modular porous plate sublimator (MPPS) requires only a water supply for coolant. The design permits heat to conduct directly from the component being cooled to the sublimator. The heat flows from the component to the MPPS water jacket, through the corrugated fins, and finally to the frozen surface in the porous plate. The water sublimates from pores of the porous plate exposed to the space vacuum, dissipating the heat into space. The MPPS is mounted in a housing that has a cover allowing the vapor to vent at a collection point.

(continued overleaf)

Notes:

1. A principal advantage of the MPPS system is the conservation of power because of the absence of a coolant pump. Overall weight and costs should not increase and the reliability factor should not be impaired. Although this concept does not provide for ground cooling (as a sublimator will not operate except in a vacuum), the system design and operation is simplified by the deletion of the pump, secondary coolant, associated plumbing, and cold plates. This simplified sublimator supplies local cooling as required by each heat source.

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10409

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: R. J. Rathbun
of International Business Machines
under contract to
Marshall Space Flight Center
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