

THE THERMAL MANAGEMENT OF THE SPACECRAFT SYSTEMS USING THE HIGH DENSITY HEATERS

Goal of the project

The main issue is to find the optimal solution of the high density heater assembly used for thermal management of the satellite system, both from geometrical and heater type point of view.

Short description of the project

The topic of the project is thermal management of the spacecraft systems with emphasize on heat dispersion of the specific heat transfer rate inside the closed loop of the thermal system. Although the majority of the existing systems involves heat pipes as a circulating devices, in this case classical heat exchange loop with refrigerant is applied with heat pipes used only for rejection of the heat to the outer space. So related strictly to the thermal management of the high density heaters, the main issue is related to conjugate heat transfer phenomena.

Project implemented by

Politehnica University of Timisoara/ Faculty of Mechanical Engineering

Implementation period

27.05.2015 – 31.01.2016

Main activities

- Establish the mathematical model for conjugate heat transfer and fluid flow phenomena.
- The conjugate heat transfer and fluid flow numerical simulations.
- The analyzing of the numerical results.
- The optimization of the proposed solution.

Results

The following results are emphasized throughout the project:

- Based on the numerical simulations, the temperature field for high density heater assembly for various heater types and dispersed power is obtained.
- The hot spots for different elements of the high density heater assembly are identified.

Applicability and transferability of the results

- The results are primarily dedicated to specific part of the thermal satellite system but they might be used in any other system that involves the same phenomena of conjugate heat transfer.

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Research Centre

Research Center for Thermal Machines and Equipment, Transportation and Pollution Control

Research team

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