

## **MULTI-SOURCES REFRIGERATOR FOR SATELLITE ACTIVE COOLING**

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### **Abstract**

In this experimental study, a specific multi-sources refrigerator designed for Telecommunication onboard electronic cooling is presented. The overall loop is composed of three parallel evaporators, four parallel condensers, three expansion valves and one single compressor. The specifications give an overall heat power to be extracted into space of 11 kW, including the working power consumption of the compressor. Here, the refrigerating loop, filled with R245fa as working fluid, has been designed at scale 1, with three evaporator panels simulating the real Telecommunication satellites panels composed of several electronic devices. The condenser radiative panels have been replaced by a convective cooling loop with secondary fluid controlled at fixed temperature. In this paper, a presentation of the experimental loop is done, and is followed by some previous tests results, involving the optimal mass of fluid found empirically, results with single evaporator operating loop and with two evaporators in parallel. These tests show that, in a first step, this kind of cooling system can be available for the thermal management of an entire Telecommunication Satellite.