

Cougar helicopter – thermal simulations

For RUAG Aerospace the institute of electronics (IfE) simulated thermal flow in a Cougar helicopter to predict and verify temperature behaviours of critical electronic parts in a cockpit.

Motivation

The new Cougar helicopters of the Swiss Army will be equipped with an integrated self defence system (ISSYS). The control computer for this system will be installed in the electronic cabinet of the aircraft, dissipating a considerable amount of power, which heats up the surrounding devices. There is almost no information available about the acceptable temperature rise of the other devices in the cabinet. We built a virtual model of the cabinet and simulated the thermal flow to predict the temperatures even before the flight tests.

Description

The ISSYS control computer introduces an additional 160W of power into the electronics cabinet of the Cougar helicopter. RUAG wanted to know the thermal effect on the neighbouring devices as early as possible to predict whether the temperature rise was critical, and to plan constructional modifications if necessary.

The hardest task of the project was to build a thermal model of the cabinet. It was just too complex to model every detail, so we had to implement many simplifications. Since the system didn't exist yet, we didn't have the chance to verify our model by measurements.

The thermal simulation enabled us to have an insight into the heat flow before the system was operational. In this particular case they showed that the additional dissipated power was not critical. But if they were, the simulation shows much more information than just a few measured temperatures, simplifying the task of optimizing the thermal behaviour.

An additional advantage of the simulation versus measurements is the descriptive pictures. They allow explaining the thermal processes very easily, which was an advantage to get the flight approbation from the public authorities.

Results

We simulated the temperature rise in the electronic cabinet of the Cougar helicopter caused by the control computer of the ISSYS system. We identified the critical constructional parts to spread the heat and minimize the thermal effect to neighbouring devices. Meanwhile the ISSYS is built into the helicopters and the simulation was verified by measurements. They correlated in a tight tolerance of just a few degrees Celsius.



Project

Thermal Simulation Cougar

Project Partners

RUAG Aerospace, CH-Emmen
www.ruag.com

Project Duration

10 months

Project Budget

CHF 25'000

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