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Space Vehicles – Mechanical/Thermal/Fluidic Systems (7)

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AUTOMATED THERMAL MODEL CORRELATION TOOL FOR SPACE APPLICATIONS

Abstract

It is a common approach in the space industry to perform thermal calculations for temperature predictions during the operation phase for all spacecraft and satellites. Due to various model uncertainties the accuracy of the results has to be improved through a manual correlation process by adapting the model to test data. For this purpose, measurements from thermal tests or flight data are used as a reference for the modification or correlation of the thermal model. As the manual correlation process is often very time consuming, TAUMEL (Tool for AUtomated Model correlation using Equation Linearization) is a software development by ArianeGroup with the intention to support the engineer by means of automated correlation. Within the development and validation of the tool, models from ESATAN-TMS of real flight hardware such as the Ariane 5 ESC-A and several test models are used. Since the beginning of the project in 2013, significant improvements in functionality, performance, user-friendliness and the possibility of using TAUMEL for different thermal analysis platforms have been achieved. TAUMEL is a promising tool, enabling a faster correlation process for complex, large and cryogenic applications. The goal is to perform an automated thermal model correlation for the Ariane 6 launcher based on experience from projects such as Ariane 5 and the ATV (Automated Transfer Vehicle). The latest status of TAUMEL, highlights and results which were achieved during the past development phase will be presented.