

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures 1 - Development and Verification (Space Vehicles and Components) (1)

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EXPERIMENTAL INVESTIGATION OF THE EMISSIVITY OF THE EXPERT FLAP IN SCIROCCO
PLASMA WIND TUNNEL TESTS

Abstract

In the frame of the ESA EXPERT project, a test campaign on the Open Flap PL 6/8 of the EXPERT space vehicle has been executed at CIRA in the facility SCIROCCO Plasma Wind Tunnel. The Flap was manufactured by MT Aerospace and is made by Keraman C/SiC material. In order to measure the temperature of the surface achieved during the tests, the application of non-intrusive instrumentation has been performed. There were applied optical instruments such as dual color pyrometer and thermocamera operating in the near-infrared spectral wavelength range (NIR, $\lambda > 0.65 \mu\text{m}$) and looking at the model from the same sight. The thermocamera needs to operate with a known emissivity of the material under test, but it is well known that the emissivity of a material could change increasing its temperature. In fact during the re-entry phase of a space vehicle, the temperature of the surface increases giving rise to the changes of the material physical properties. Now, after the development of the test campaign on the EXPERT Flap, the study of the material emissivity has been performed by properly analysing the temperature measurements detected through the thermocamera and the pyrometer. The results of such investigation will be shown giving evidence of the big importance of the proper knowledge of the material emissivity behaviour