



#8090

SCIROCCO PWT Test and CFD Rebuilding for RASTAS SPEAR Project

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TA at $t_{\phi} = 1s$

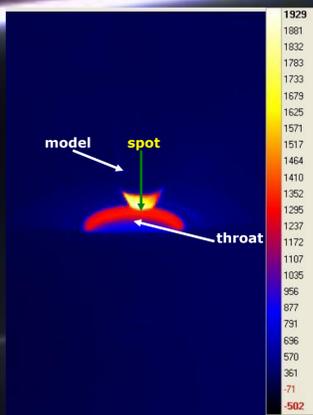
The aim of the test was to assess the behavior under representative super-orbital re-entry conditions of adhesives for joining and bonding ASTERM, the carbon-phenolic ablative material developed by Airbus DS. The Test Article was obtained by four radial sections of ASTERM joined together with different combinations of adhesives.



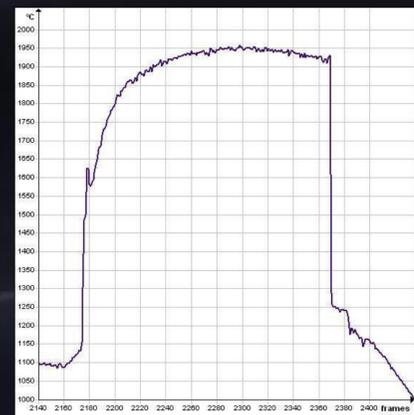
TA ready for the test



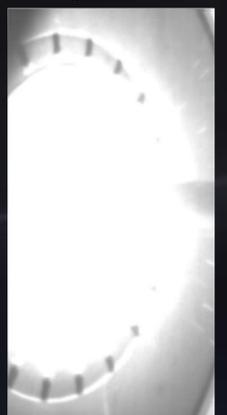
TA at $t_{\phi} = 12s$



IR frame at $t_{\phi} = 12s$



temperature spot vs. time



Ablation process (HSC 500Hz footage)



TA at holder break-point ($t_{\phi} = 12s$)



The Test Article was cross sectioned by Demokritos NCSR after the test, revealing a char layer of about 12mm in the stagnation region and of about 6mm on the conical surface.



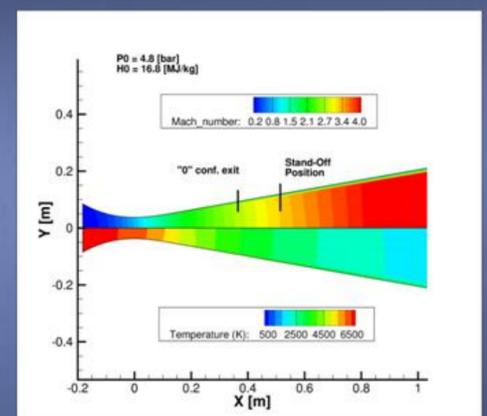
TA + holder fly away ($t_{\phi} = 12s$)

Measured values

$$H_o = 16.8 \text{ MJ/kg}$$
$$P_o = 4.8 \text{ bar}_a$$
$$P_{Arc} = 31 \text{ MW}_{el}$$

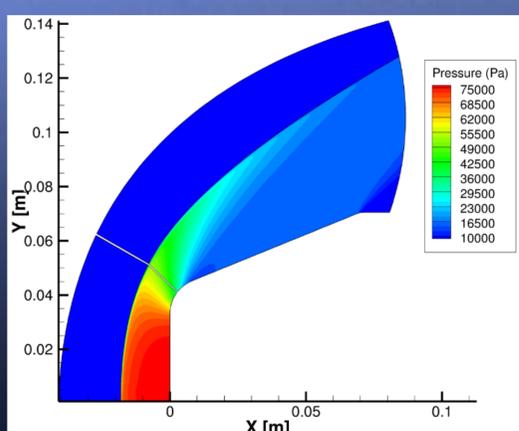
Input values for CFD Rebuilding

CIRA code CAST, Axisym NS, Thermochemical Non-Eq. air model

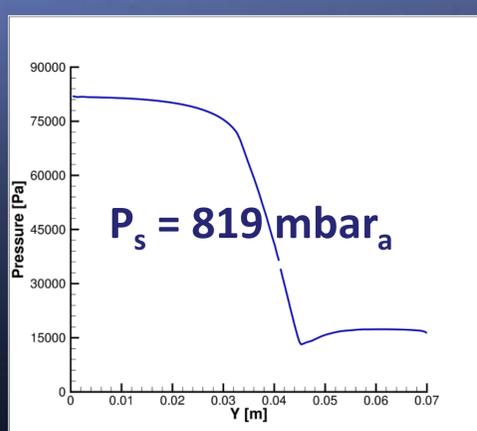


Nozzle Mach and Temperature maps

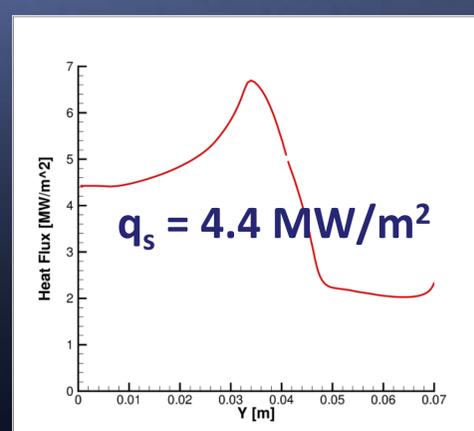
The Nozzle flow conditions were used as free stream conditions for TA rebuilding



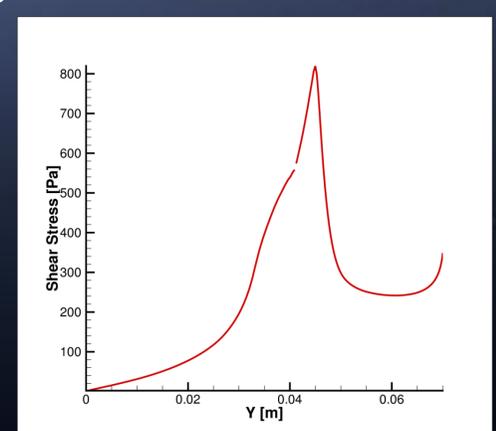
TA Static Pressure map



TA Wall Pressure



TA Wall Heat Flux (FC, 300K)



TA Wall Shear Stress