An Overview of Experiments in The Entry Systems Modeling Project

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The Entry Systems Modeling (ESM) project has invested in experiments designed to enhance understanding of salient interactions between thermal protection materials (TPS) and mission-relevant planetary entry environments. An arc-jet campaign has been carried out at the Aerodynamic Heating Facility (AHF) to investigate the spallation of fiber particles as a function of gas composition and to measure the effect of pyrolysis gas flow on the in-depth temperature response of phenolic impregnated carbon ablator (PICA). Moreover, fundamental insights into the pyrolysis and oxidation mechanisms of the phenolic binding agent of FiberForm will be discussed. Finally, two new apparatus developed at NASA will be presented that were designed to interrogate phenomena associated with the production of gases and particles generated under simulated flight conditions.

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