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**EDL Heatshield Experiments with Dual-Layer Ablators,
Advanced Materials and Variable Honeycombs**

Jennifer N. Congdon
ARA Ablatives Laboratory (ABL)
Centennial, Colorado 80112

Today's challenge is to make ablative heatshield systems lighter and more efficient for thermal protection of the large EDL vehicles baselined for manned exploration of Mars. This paper discusses interim results from a three-year ABL program to improve upon heatshield systems already available. The project is focused on three elements: 1) fabricate and test dual-layer ablator systems with a higher-density, more robust top layer over a lower-density, more insulative sublayer of the same chemistry; 2) develop and investigate new ablator constituents such as silicon-carbide microballoons and fibers to replace less-durable fillers currently in use; and 3) produce, test and evaluate honeycombs with a wide range of cell size to better understand the dependence of ablator performance on reinforcement configurations. Primary ablator performance testing has consisted of: 1) arc-jet iso-q stagnation testing using the NASA/ARC IHF tunnel; 2) arc-jet aeroshear testing with a swept-cylinder design using the IHF tunnel, and 3) concentrated solar radiation testing using the Sandia Labs Solar Tower facility. The main focus of this presentation will be summarizing test results collected to date and interpretations of sample performance from the wide array of experimental ablator samples.