TITLE: *An experimental summary of plasma arc exposures of space shuttle high-temperature reusable surface insulation tile array with a single missing tile (conducted at the Ames Research Center)*

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Abstract:
A space shuttle high temperature reusable surface insulation (HRSI) tile array with a single missing or lost tile was exposed to a hot gas simulated reentry environment to investigate the heating conditions in and around the vicinity of the missing HRSI tile. Heat flux and pressure data for the lost tile condition were obtained by the use of a water cooled lost tile calibration model. The maximum aluminum substrate temperature obtained during the simulated reentry was 128 C (263 F). The lost tile calibration data indicated a maximum heat flux in the lost tile cavity region of 63 percent of the upstream reference value. This test was conducted at the Ames Research Center in the 20 MW semielliptical thermal protection system (TPS) pilot plasma arc test facility.

Major Subject Terms:
PLASMA JETS • REENTRY EFFECTS • REUSABLE HEAT SHIELDING • SPACE SHUTTLES

Minor Subject Terms:
PERFORMANCE PREDICTION • SPACE ENVIRONMENT SIMULATION • THERMAL INSULATION

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