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## Rocket Motor Exhaust Thermal Environment Characterization

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### Abstract

This study experimentally examines the heat flux to objects outside of a firing solid propellant rocket motor plume by measuring the heat flux to gages located at various locations with respect to the rocket nozzle. Because the application of interest may involve multiple motors firing simultaneously, the heat flux from multiple motors is projected based on data collected for a single motor test, and compared to the data for two configurations of three motor tests. Data showing the enhancement from three motors firing can be substantially higher than a single motor firing when the three motors are arranged in a triangular bundle, but this was not found to be the case when the three motors were arranged in a linear bundle (linear to the instrumentation). Based on results of this study, it was concluded that a material of concern which is exposed to as many as 14 motors firing simultaneously, should survive.

**Keywords:** Rocket plume, propellant, heat flux, motor tests, radiation

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