ABSTRACT

TITLE:	Flow Visualization and Data Acquisition of Transparent Rocket Exhaust
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ABSTRACT: Our group developed a system that is capable of visualizing transparent rocket exhaust during a static rocket test. The system allows for the measurement of geometries in rocket exhaust plumes while recording pressure and temperature. The complete system consists of a flow visualization sub-system and the data acquisition and control (DACS) sub-system. For the flow visualization system we evaluated several options with the final choice being a double-pass single mirror schlieren apparatus. For the DACS we developed hardware and software that is capable of controlling the test while logging the desired data. The group constructed and tested a full scale prototype in order to validate the design choices. To assess the performance of the systems, tests were conducted to evaluate the viewing area, resolution of the images, ease of alignment, and external interferences. The DACS team developed software to control the mechanical and electrical components of the system while logging pressure and temperature data. The exhaust plumes and corresponding effects of multiple nozzle types can be evaluated using our schlerien double-pass system. Our system is capable of capturing images of sufficient resolution and size while logging pressure and temperature data.