

## Sonic Nozzle Calibration System

### Abstract:

A portable system for calibrating gas mass flow in the CRF's engine laboratories has been constructed based on sonic flow. The system comprises externally calibrated sonic nozzles traceable to NIST, pressure transducers, thermocouples, and a data-acquisition board controlled using an Excel interface. Placing the system in series with other engine laboratory flow-measurement instruments allows the latter to be calibrated. Currently the system handles air, nitrogen, carbon dioxide, and propane flows, but can be expanded to other gases if additional information is input.