

# Super Air Knife Exit Flow Characterization



## Team B

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*Team B (Left to Right): Rodney Lewis, Sarah Brearey, Victoria Farias & Andrew Whately (Team Lead)*

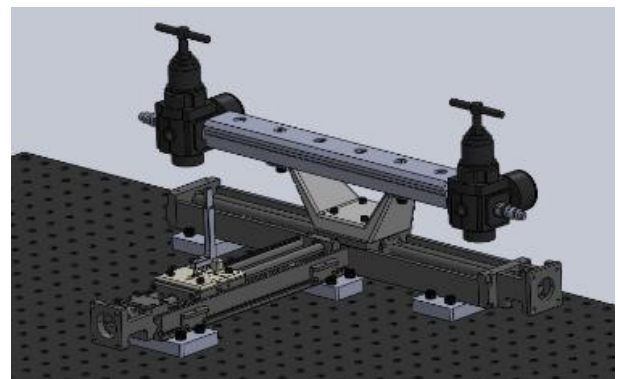
## Project Summary

The automated characterization system is intended to be used to evaluate the uniformity of the airflow up to six inches from the exit slot of the Super Air Knife. The characterization method provides the detection and placement of blockages within the knife and the transition from laminar to turbulent airflow. The system is comprised of a force sensor,

lever arm attachment, traversing position structure for data acquisition and a software program for data processing & visualization.

## Design Goal

To endure even flow for a given application, 3M requires the development of a test fixture to determine the performance of the Super Air Knife. The final test fixture serves a user-friendly method to evaluate the air flow and check for blockages within the air knife.



*Computer Aided Design assembly of final test fixture*

## Design Constraints

- Must test between 0.01 inch and 6 inches from air knife slot
- Must be capable of detecting blockages at slot heights of 0.002-0.008 inch and manifold pressures between 15 psi and the maximum achievable in-house pressure
- Test must be completed in under 5 minutes
- Program must run on LabVIEW
- Software must be usable by a technician
- Software must create a 2D plot of the air flow to qualitatively determine the uniformity of the airflow
- Team must quantitatively characterize the air flow and determine the location of the transition region (laminar to turbulent) for each slot height and manifold pressure