

AUTOMATED INSULATION MEASURING AND CUTTING MODULE

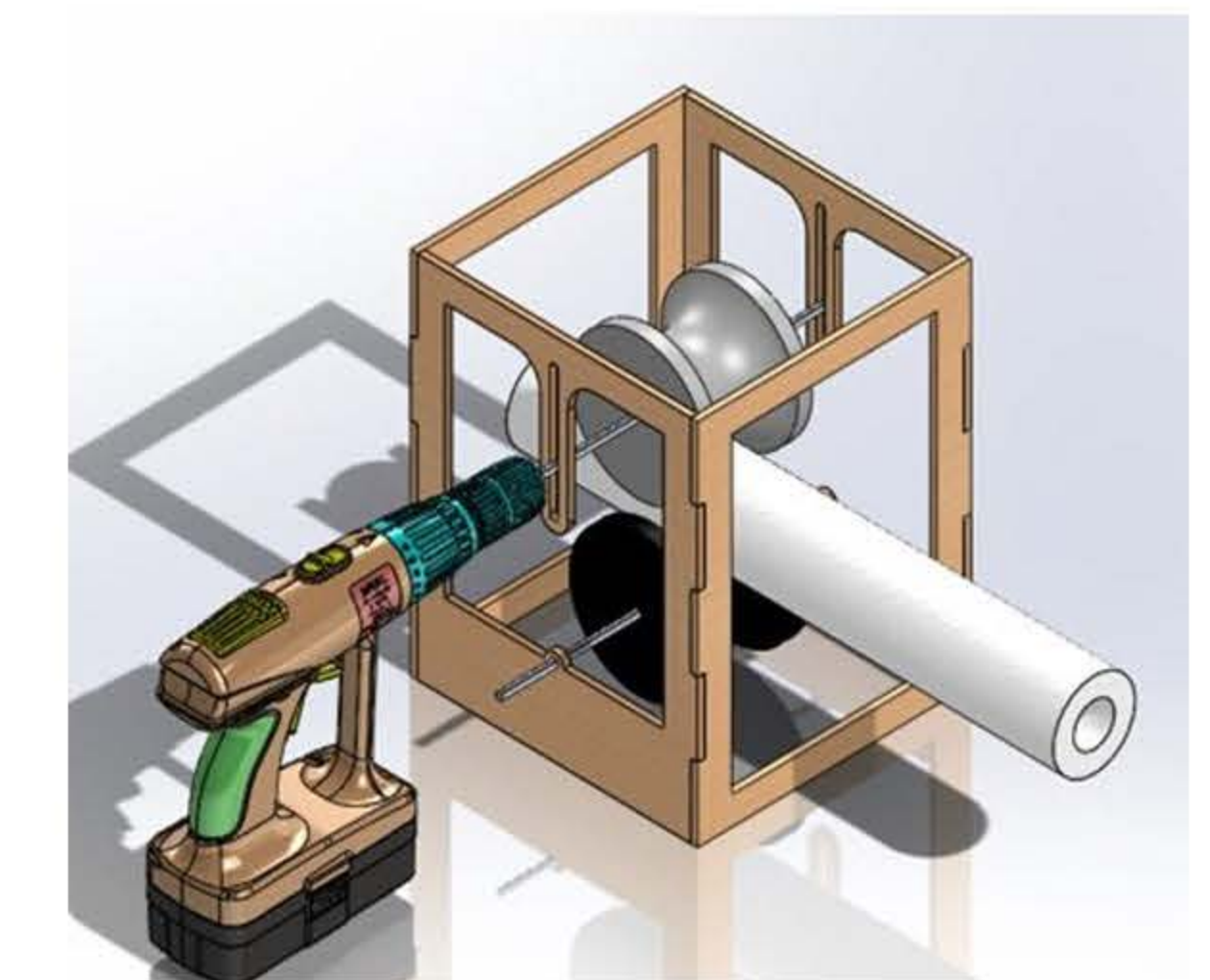
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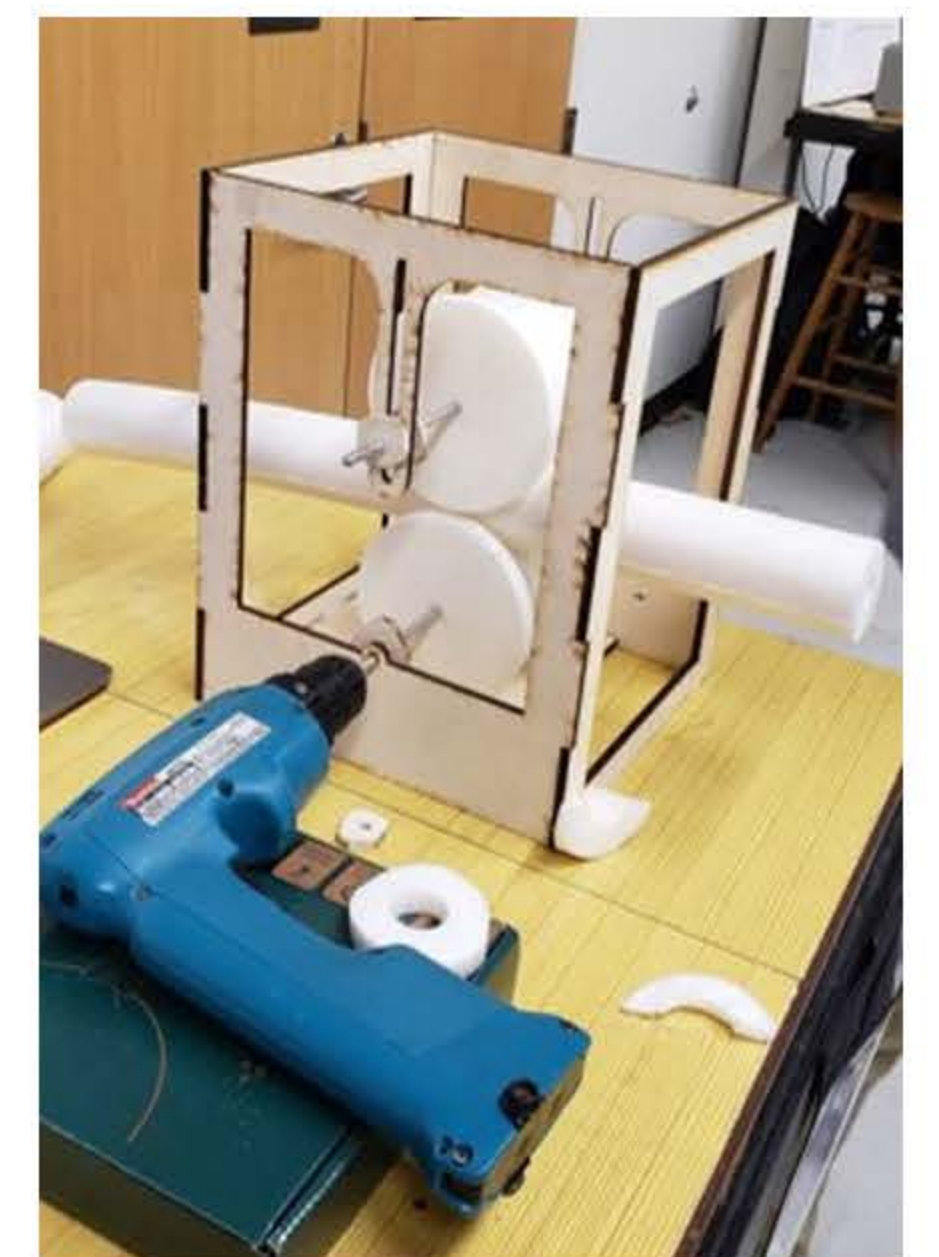


FINAL DESIGN

CONCEPT DEVELOPMENT



This prototype proves that insulation can be pulled by one wheel connected to a prime mover.



OBJECTIVE

Design and build a module that scans a work order, determines desired length, measures insulation to that length, and cuts it with minimal human input required.

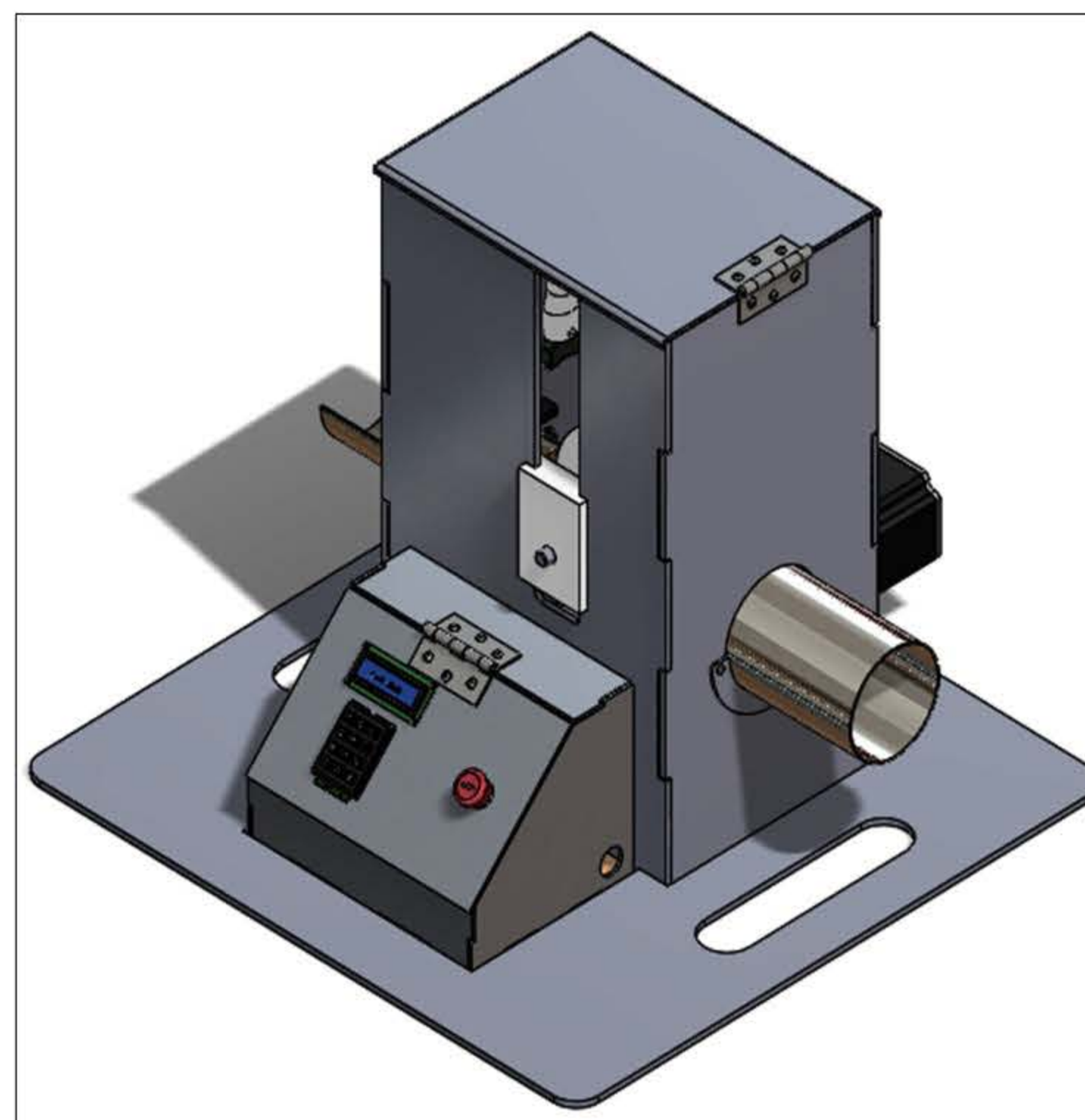
BACKGROUND

The Boeing Company would like to automate the process they use to cut insulation for airplane tubing. Currently, employees cut insulation by hand, and this can lead to many measurement errors.

VALUE PROPOSITION

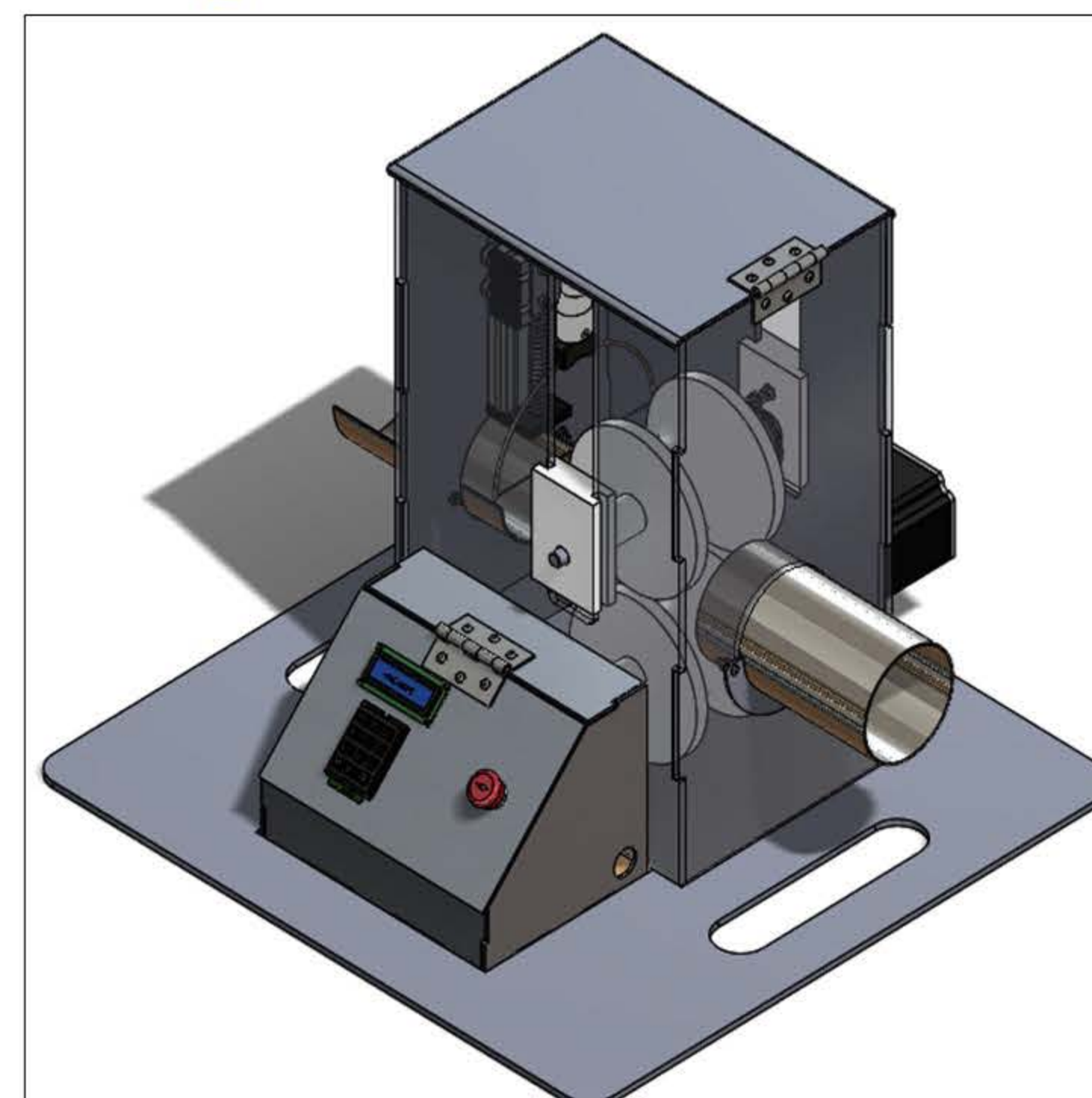
This project will add value to the Boeing Tubing, Duct and Reservoir Center (TDRC) by:

- Minimizing human error from cutting insulation
- Reducing cost of measuring and cutting insulation
- Minimizing time spent measuring and cutting job order



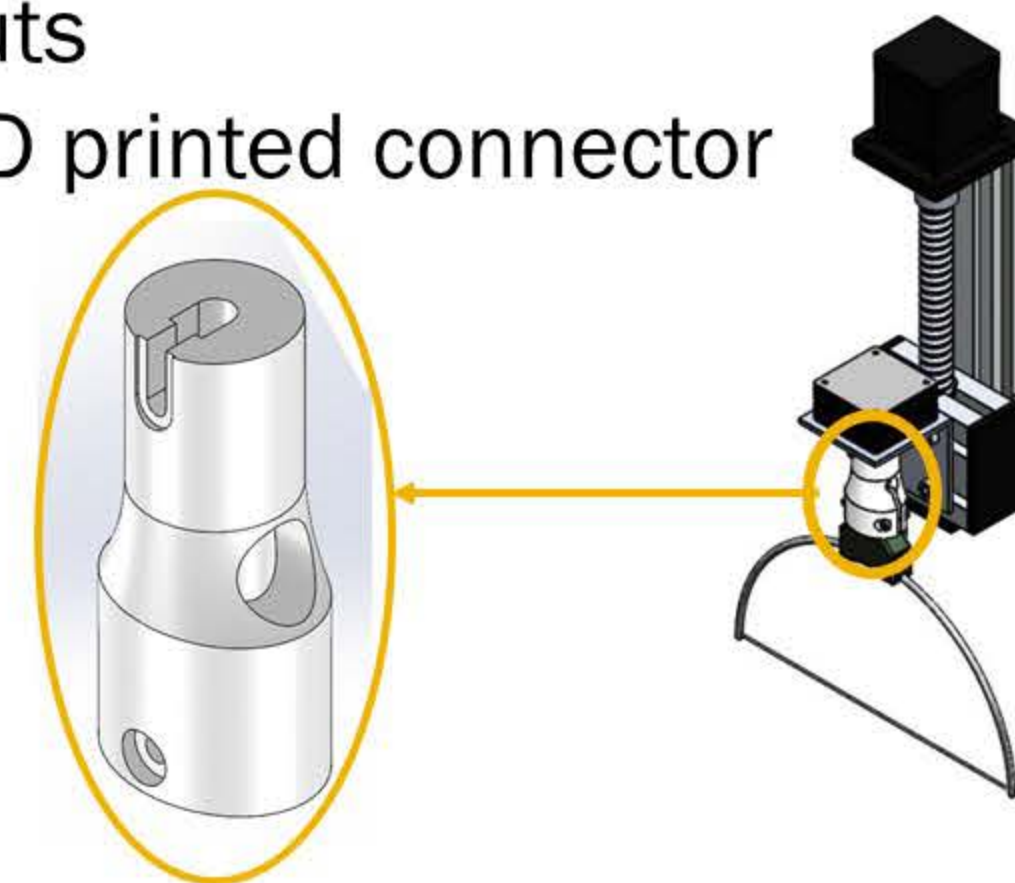
FRAME ASSEMBLY

- Entrance/exit gutters
- Hinged lid
- Debris ramp
- Handles
- Welded 1/4" steel



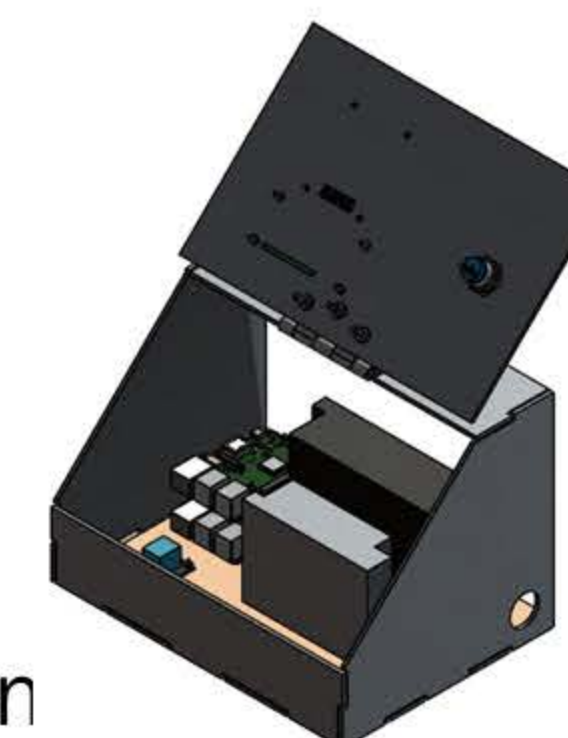
CUTTER ASSEMBLY

- Linear Actuated Heated Wire Cutter
- Stepper motor executes angled cuts
- 3D printed connector



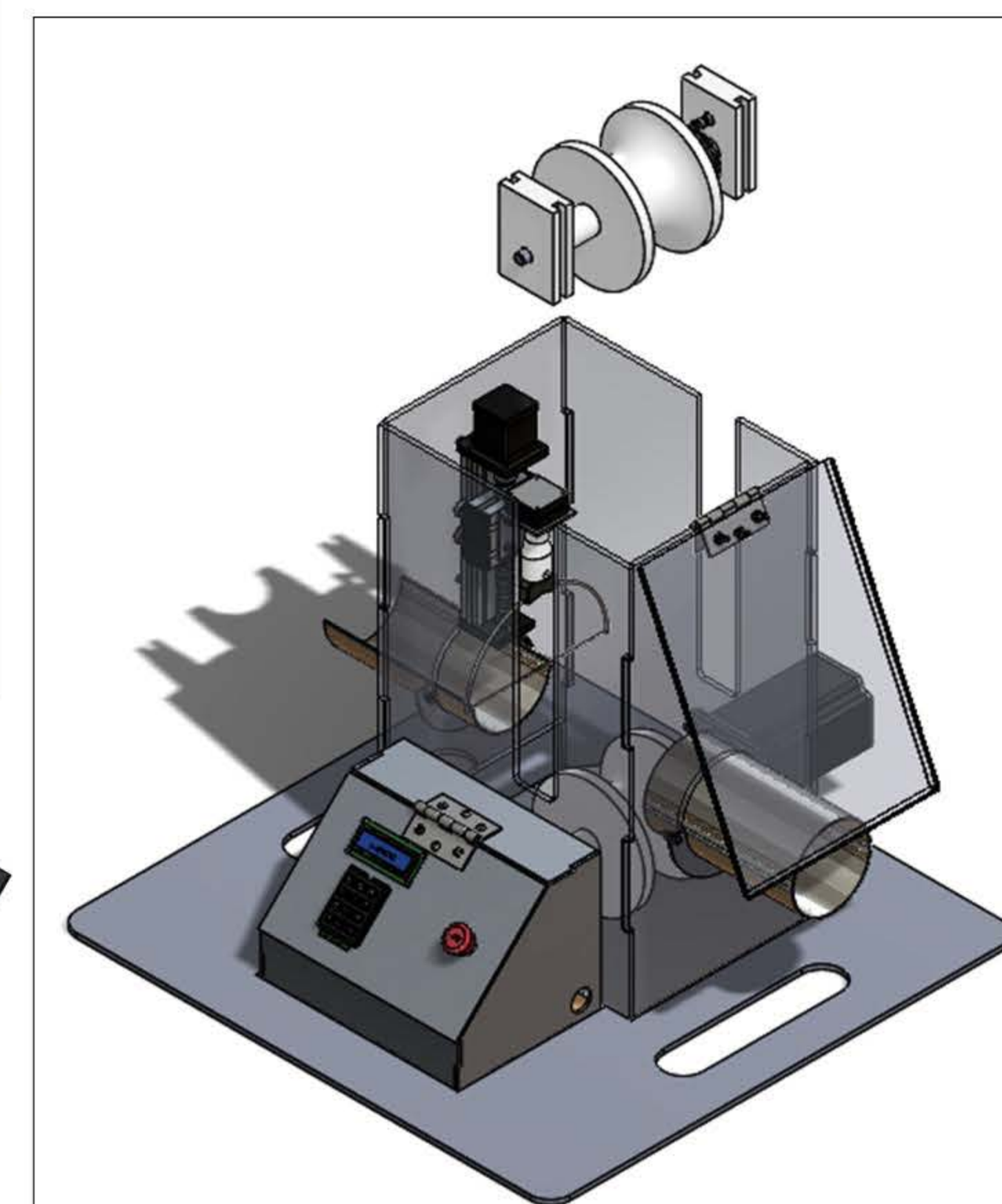
POWER BOX

- Houses electrical components
- Touchpad interface
- Emergency Stop
- LCD indicator screen



INTAKE ASSEMBLY

- Keyed Shafts
- Stepper motor driven
- Encoder feedback loop
- Removable top wheel assembly
- 3D Printed Linear Bearings



KEY REQUIREMENTS

- Process will take less time than the current method
- Cutter may not alter the insulation's integrity
- Insulation will be cut within +/- 0.270" tolerance
- Module will have easy access to all components for maintenance
- Must fit within size specification provided by Boeing

FUTURE WORK

- Fully assemble measuring and cutting module
- Install module in Boeing's Tubing Duct and Reservoir Center to be used by employees

ACKNOWLEDGEMENTS

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