

Senior Design Project Description

Company Name	TTI Floor Care North America	Date Submitted	July 7, 2017
Project Title	Manipulative Effort Test Station Automation (TTI_TEST)	Planned Starting Semester	Fall 2017

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical (1 ELET/1 ELE)	2
Computer	1	Systems	1
Other ()			

Project Overview:

Provide background information and a summary statement about the project

One of the typical complaints in the use of an upright vacuum cleaner is that high performing cleaners on high pile carpet can be difficult to push. TTI Floorcare has a test station to determine the manipulative effort required to push an upright vacuum cleaner as a measure of its comfort during use in a consumer's home. The test station is in need of upgrade and automation. The goal of this project is to improve the usability of the test station through automation by developing a newly automated test station which permits more autonomous data collection.

Initial Project Requirements:

This is a more detailed description of the project output itself – describing the scope and specifications for what the project team will actually be designing and producing.

The test station shall perform the following:

- 1) Perform ASTM standard F1409 including all applicable measurements automatically.
- 2) Perform the following additional measurements
 - a. Electrical Current, Voltage, and Power Measurements (AC and DC)
 - b. Brush roll speed measurement
 - c. Pressure measurement (x 4 locations)



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The test station shall utilize

- 1) Utilize National Instruments Hardware and Labview software as its primary controller.
- 2) The primary material used shall be 80/20 Aluminum.

The test station shall also be easily movable.

The team will be required to visit TTI Floorcare North America for a demonstration of the current Manipulative Effort Test Station to better understand the requirements and uses of the final test stand product.

The hardware and software costs required to complete this project are expected to be greater than the \$3000 budget allocated. Therefore, additional hardware will be provided by TTI Floor Care North America as required.

Expected Deliverables/Results:

List all deliverables that the team is to provide to the supporter.

Expected Deliverables Include:

- 1) Automated Manipulative Effort Test Station
- 2) Bill of Material for the Test Station
- 3) Labview source code and executable
- 4) CAD models
- 5) Wiring Diagrams
- 6) Calibration and User's Manual

Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the Industry Supporter. Please specify what disposition you would like for the hardware developed by the Project team.

All deliverables will be delivered to TTI Floorcare North America at 8405 IBM Drive Charlotte, NC 28262.

List here any specific skills, requirements, knowledge needed or suggested (If none please state none):

Labview Programming