INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*TTI Floor Care- North America (Hoover, Dirt Devil, & Oreck)*	**Date Submitted**	*05/13/2022*
Project Title	*Hoover Vacuum hi-powered Baseboard/Edge Cleaning* **(TTI_EDGE)**	**Planned Starting Semester**	*Fall 2022*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	4	Electrical	1
Computer		Systems	

Company and Project Overview:

TTI (Techtronic Industries) is a fast-growing world leader in the principal areas of power tools, outdoor power equipment, floor care appliances, solar powered lighting, and electronic measuring products. The industry giant is headquartered in Hong Kong, maintains a customer servicing network in North America, Europe, and Australia.

TTI has combined Hoover with its existing Dirt Devil and Royal operations in Charlotte, North Carolina, to create TTI Floor Care North America- the largest floor care business in North America!

TTI is dedicated to building brand loyalty through customer satisfaction by providing customers with quality products that meet their cleaning needs. Continuing to focus on developing innovative products, and emphasizing advertising and operations, are the key drivers of TTI Floor Care North America's future growth and success!

Project Requirements:

Upright vacuum cleaners do a great job of cleaning carpets throughout a home and generally are

delivered with a variety of hand tools including a crevice tool used to clean between carpets and baseboards. The use of these tools required a “live wand” or hose that the user removes from the cleaner body to attach the tool prior to cleaning this area. This live wand or hose transports airflow and debris from the floor nozzle to the dirt cup. When detached from the cleaner body, attachments placed on the live wand or hose are used for above floor and crevice cleaning; moving airflow and debris from the attachment to the dirt cup. See an example of this type of vacuum in the picture below.

The objective of this project is to design a modification to the vacuum that would provide enhanced edge cleaning function without having a separate hose.

Project Scope:

- Nozzle design
- Cleaner controls
- Attachment design

Requirements:

- Create a design that can be applied across upright vacuums that with a simple user interface, changes the cleaner to “Edge Cleaning” mode:

- Edge cleaning tools should not damage or mar baseboards
- Cleaning performance in “Edge Cleaning” mode should significantly improve debris pick up in crevices when a cleaner nozzle is in close proximity to a wall or baseboard.
- User should be able to place the cleaner in “Standard” mode with a simple user interface
- Edge cleaning design should not negatively affect cleaning in “standard” mode
- Cleaner cost increase should be no more than $4/cleaner

Expected Deliverables/Results:

1) Working cleaner prototype including edge cleaning tools
2) Bill of Material
3) Source code and executable for cleaner
4) CAD models
5) Design analytics (CFD, FEA, other)

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team’s work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter’s location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. All deliverables will be delivered to TTi Floorcare North America at 8405 IBM Drive Charlotte, NC 28262 within 7 days of Expo.

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

- Preferred to have at least one team member with experience in PTC Creo