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THE UNIVERSITY OF BRITISH COLUMBIA

UBC Mechanical Engineering
Capstone Design Project Proposals

Contact: Eric Molendyk: eric@tetrasociety.org

Project Ideas on Hands-free PPE:

1. **Hands-free COVID-19 Mask**
2. **Automated Hand-sanitizer**

The goal is to develop one or both of these ideas during the course of the MECH 45X Project. See detailed information below.

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Project Title: Hands-free COVID-19 Mask

Contact: Eric Molendyk: eric@tetrasociety.org

Background Information:

At Tetra, our focus is to find solutions to overcome environmental barriers faced by people with disabilities. While these environmental barriers are still a part of the journey, we believe Tetra solutions help foster greater independence, quality of life, and inclusion.

Clients range in age, medical conditions and needs and the breadth of gadgets span from the work place, at-home modifications, to sport and leisure as well.

Tetra recruits volunteers who work with clients to design and build assistive devices that are custom-made for the individual – these are devices that are often not available commercially or cost prohibitive. Tetra's devices cover all aspects of daily living.

Please view these links

https://www.youtube.com/watch?v=GUxn99LwIwo

https://www.youtube.com/watch?v=AsAX3WZnflg

https://www.youtube.com/watch?v=PE44tvCAcq4

https://www.youtube.com/watch?v=m84upuGc0lc

Project Main Objective(s):

In this time of COVID-19, high importance has been placed on hygiene, one of the most important ways of battling the spread of COVID-19 is wearing a mask. This can be impossible or very difficult with those of limited hand-function. If you only have one working arm, how can you secure a proper-fitting mask around the back of your head and over your ears? It would be extremely beneficial with those of limited hand-function to be able to put on a mask easier, with less dependence on hands the better.

Project Main Deliverable(s):

- Create an easy to put on mask
- In your design do not tamper with the integrity of the mask itself
- Ideally design an N95 type mask that can be properly positioned without needing the use of full hand-function

- The mask should also be equally easy to remove
- The project budget is $500

Project Milestones:

- Feasibility investigation completed Oct. 15, 2020
- Conceptual designs/mockup presentation to Tetra November 30, 2020
- Demonstration of functional unit March 15, 2021
- Delivery of design documentation and recommendation report April 10, 2021

Resources Available from the Customer:

Working in partnership with Tetra clients and staff throughout the course of the project. Mentoring from experienced Tetra engineers (volunteers) throughout the course of the project. Access to adaptive devices / equipment.

Contact Information:

Proposed By: Eric Molendyk, National Coordinator
Company Name: Tetra Society of North America
Company Address: Suite 318, 425 Carrall Street, Vancouver, BC V6B 6E3
Email Address: eric@disabilityfoundation.org
Company Phone: 604-688-6464 x 117
Company Website: tetrasociety.org
Date: August 20, 2020

Organization Profile:

Type (i.e. start-up, non-profit, government, etc.) & Sector of activity: Non-profit organization providing volunteer-created, customized assistive devices to people with physical disabilities.

Size (number of employees at the local site): Tetra is an affiliated society of the Sam Sullivan Disability Foundation. Among the in program development and implementation, administration, funds development and communications only one of the 9 staff members is dedicated to Tetra on a full-time basis.

Tetra operates 30 chapters across Canada and is supported by approximately 30 part-time contractors and by as many as 200 volunteers (chapter coordinators and engineers, technicians, etc.)

Primary contact persons for the students throughout the project:

- Eric Molendyk (National Coordinator)
- David Fong (Director of Operations)
- Ruby Ng (Tetra Executive Director)

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Project Title: Automated hand-sanitizer

Contact: Eric Molendyk: eric@tetrasociety.org

Background Information:

At Tetra, our focus is to find solutions to overcome environmental barriers faced by people with disabilities. While these environmental barriers are still a part of the journey, we believe Tetra solutions help foster greater independence, quality of life, and inclusion.

Clients range in age, medical conditions and needs and the breadth of gadgets span from the work place, at-home modifications, to sport and leisure as well.

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https://www.youtube.com/watch?v=m84upuGc0lc

Project Main Objective(s):

During this time of COVID-19 hand-washing has become more important than ever. But if you are a tetraplegic or have a disability that compromises your fine motor skills and hand-function, independently washing your hands with sanitizer is not an option. The objective of this project is if someone with limited hand-function (a quadriplegic) to be able to administer hand-sanitizer on their hands independently.

Project Main Deliverable(s):

1. create an automated hand-washing aid

- Something that is small and compact enough that the user can carry with them
- Something that operates from direct contact of a button
- Does not dispense hand-sanitizer unnecessarily

- Design it so it is easy to use and only takes a couple of presses to give the user the necessary amount of hand-sanitizer
- The budget is $500

Project Milestones:

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Resources Available from the Customer:

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