NJIT New Jersey's Science & Technology University

ENGR 423-101 Fall 2020

Fire Fighting Swarm

Tri-copter Design for Department of Defense Applications in Fire Fighting

Team Members

Jake Albert, Mechanical Engineering, ja469@njit.edu
Bryan Cullano, Mechanical Engineering, bc355@njit.edu
Farhan Sarfraz, Mechanical Engineering, fms29@njit.edu
Ben Totten, Mechanical Engineering, bat8@njit.edu

NJIT New Jersey's Science & Technology University

Title of Project:

Fire Fighting Swarm

A. Problem Statement (What problem are you trying to address through research or product development?)

Through product development, the problem that is being addressed is how to improve firefighting capabilities.

B. Significance (Why is the problem important? What is the value proposition to users or society?)

This is important because it is a way to deal with fires from a distance so it improves on safety. Another method is aerial firefighting, where planes or helicopters drop water or some other agent to put out the fires. However, with a swarm of drones, costs of fuel can be reduced and also there is a portability aspect to it.

C. Approach (How will you solve the problem? What is your overall approach? Briefly present methods or procedures critical to your approach.)

To solve this problem, the team must collaborate to come up with and decide on design ideas, backed up with data such as calculations and research. The overall methodology to reach this goal comes in the form of various deliverables. We decided to focus heavily on mechanical design since we are all mechanical engineers and try to keep the programming aspect on the simpler side. The focus is to keep things simple and apply what we learn in class to our specific application.

D. Innovation (What is the innovation or novelty in your approach?)

The innovation to our approach is the different delivery method of firefighting substances, whether its water or powder. It is a different approach to firefighting to make it safer by keeping firefighters at a safe distance and it incorporates a new type of projectile, though the projectile will not be developed for this project.

E. Expected Outcomes and Deliverables (What do you expect as the outcome of research or deliverables towards product development?)

The expected outcome for product development is to have a working model of a single drone at the end of the project. Deliverables would include a mechanical design, a working program, a prototype, successful test results, and the final model.

F. Users/Market and Potential Impact (What impact do you expect if the proposed work is successful?)

If successful, these drones could be used to approach firefighting in a new way and could lead innovations in other fields using a similar point of view. Though there are other benefits, the main focus is safety, so new drones could be developed with that objective in mind.

G. Resources Needed (Provide a list of resources needed to pursue this project and develop a prototype.)

- 3D printing (printer, PETG filament)
- Motors
- Drone Propeller
- Raspberry Pi and camera module
- Battery