

# MicroCART Mini

## *Ethics and Professional Responsibility*

**sdmay25-32**

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# Project Overview

## MicroCART: Microprocessor Controlled Aerial Robotics Team

- Design a code-based mini quadcopter platform to be used in CPRE 488 and for Controls & Embedded Systems researchers
- Develop mini quadcopter printed circuit board (PCB), containing a Microcontroller, RF, IMU, and Wi-fi chip
- Develop software to stabilize and communicate movements
- Develop base-station to communicate with quadcopter
- Create and improve documentation and video tutorials for future teams



CrazyFlie micro-quadcopter

## Our Project Goals

- ❖ Design/Improve a code-based quadcopter platform integrating both hardware and software to be used for hands-on learning in CPRE 488's lab.
- ❖ Ensure both remote accessibility and usability for future users through documentation and tutorials

# Social Responsibility

## Education:

- Core aspect of our project is creating teaching materials for a CPRE 488 Lab
- Improvement after utilization:
  - Reducing bugs
  - Increasing clarity
  - Improving documentation



# Work Competence

- Absences and being late to meetings
- Mediocre quality of work produced
- Negligence towards due dates set
- Changes to be made:
  - Creating GitLab issues to enforce getting work done before due dates
  - Enforcing a no tardy policy for meetings
  - Have our work created checked by our advisor before closing the issue



<i>Four Principles</i>	<b>Beneficence</b>	<b>Nonmaleficence</b>	<b>Respect for Autonomy</b>	<b>Justice</b>
<b>Public health, safety, &amp; welfare</b>	Project helps improve the learning of all who are involved	Design promotes safe practices (ie: Test Stands)	Implementation provides a framework, that participants are expected to complete	Design allows for access to all parties
<b>Global, cultural, &amp; social</b>	Brings different communities together to learn	Implementation harms no one indirectly	Design does not affect cultural practices	Benefits are shared equally amongst all parties
<b>Environmental</b>	Mini Quadcopters, are small, decreasing potential environmental impact	Rechargeable batteries and non-toxic, minimally processed materials ensure low environmental impact	Open-source design allows replacement parts to be sourced according to user's desires	Implementation does not harm the environment
<b>Economic</b>	Project teaches job-applicable skills	Project largely uses pre-existing open-source design parts	CrazyFlie is an open-source drone that can be found outside the school	Custom drone will not infringe upon any private sales; CrazyFlie software only affects our items

## Potential Ethical Issues

- Being truthful to the public (Honesty)
  - Scholar's day presentation: A previous team used a simulation instead of the real positioning of the quadcopter
    - Guaranteed 'result' vs Reality
- Work Outcomes (Integrity)
  - Covering up mistakes versus creating actual fixes
    - ie: Wooden slab covering up a hole in the sidewalk vs Concrete replacement



# Conclusion

Even though our project has few ethical risks in regard to the outcome of the project, us as the project team must remain watchful of ourselves.

How we present ourselves and our project will be important to ensure that we uphold a moral integrity and deliver worthy work.



# Works Cited

- Jones. "CprE 488 - Embedded Systems Design." Iowa State University,  
<https://class.ece.iastate.edu/cpre488/schedule.asp>