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Project title: WOW / Glass front cleaning drone

Date: _____

Use your notebooks for discussions and rough work. Fill out this sheet after working individually and discussing within your team.

1. In simple words, describe what you are going to build in your project, what its purpose is, and how it will function. Be as detailed as possible, covering all the major aspects of your project.
   a. What is the main goal of your project?
   b. What problem does it solve, and how?
   c. Who will use your project, and in what context?

Draw a pencil sketch of what your project will look like at the end of the course, for final demo.

(a) Goal:
Effectively clean glass surfaces and walls of high rise buildings. Also employ this for solar panels.
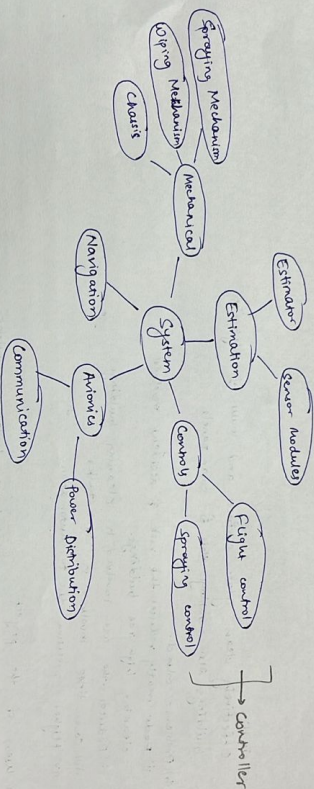
(b) Problems solved:
(i) Reduce Greatly reduces the rate of accidents involved in cleaning high rise buildings.
(ii) Reduces the cost involved in cleaning buildings.
(iii) Saves time involved in such tasks.
(iv) Higher protection due to automation.

(c) Users of the project.
(i) Big commercial complexes & high rise buildings requiring frequent cleaning.
(ii) Companies who provide cleaning such services.
(iii) With suitable modifications, this project can also be used as a fire-fighting drone.

wiper mechanism.

rotors

water hose.
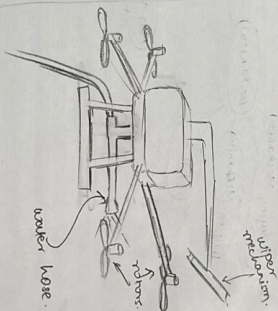
2. **Draw a block diagram of your project.** Create a visual representation showing the key components or subsystems of your project. For each block in the diagram, briefly explain its main function and how it fits into the overall system.
   a. What are the main subsystems or modules of your project?
   b. How do they interact with each other?

Mind map:

- Spraying Mechanism
  - Wiping
  - Chassis
- Mechanical
- System
  - Navigation
  - Estimation
    - Estimator
    - Sensor Modules
  - Control
    - Flight control
    - Spraying control
  - Avionics
    - Communication
    - Power Distribution

→ Controller

2

3. **Write down details for these blocks.** What are the key performance metrics for each block (e.g., power, size, speed)? What trade-offs are you considering in your design choices? Are there any constraints or limitations for each block?

Block	Key specifications of this block	Design choices for this block
(i) Controller	PX4 default control module	Cascaded PID modules for price compensation
(ii) Estimator	Extended Kalman Filter for pose estimation	Tradeoff: computation complexity vs accuracy
(iii) Sensors Module	IMU, GPS	Major tradeoff: cost vs Sensor accuracy
(iv) Power Distribution	ESC, PDB, Batteries (LiPo)	Size (weight) vs capacity
(v) Navigation	choice of autonomous vs manual	—
(vi) Communication	Telemetry, Radio	cost vs Range
(vii) Cleaning Mechanism	Spray/rollers for wiping	
(viii) Autopilot	PX4 autopilot on Pixhawk controller unit	

4. **What are the unknowns or uncertainties in this project?** Identify aspects of your project that you are uncertain about or that require further research. This may include areas where you know what you need to do but are unsure how to approach it.

    a. What technical challenges or questions are you facing?

    b. Are there any assumptions you must make in order to move forward?

Technical challenges: based on power and payload specs

(i) selecting currents based on power and payload specs

(ii) Choice of controller to ensure force compensation

(iii) High altitude pumping mechanism

(iv) Ensuring communication over large distances

Assumptions

(i) Accurate GPS data (ii) Outlet for water supply

Other things to consider from now until Milestone I deadline:

5. **Roles and Responsibilities: How will the work be divided among team members?** Assign specific tasks and responsibilities to each team member. Be clear about who is responsible for each part of the project.

    a. Who will work on which blocks or subsystems?

    b. What are the deadlines for each task?

    c. How will the team communicate and coordinate to ensure everyone is on track?

6. **Next Steps: What is your plan for the next phase of the project?** Outline what needs to be done in the short-term to move forward.

    a. What are the immediate next tasks or priorities?

    b. Are there any dependencies between tasks? How will you handle these interdependencies?

    c. What resources or materials do you need to proceed?

7. **Feedback and Collaboration: How will you gather feedback and collaborate during the project?** Describe how your team plans to share progress, give and receive feedback, and collaborate throughout the course of the project.

    a. How often will you check in with your team members?

    b. Will you conduct regular brainstorming or review sessions?