Work Report - project Vampire

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** dropped ideas and discussions has not been included in work report

Our **Project Vampire** integrates advanced aerial dynamics with sophisticated terrestrial navigation, utilising a unique orientation mechanism to transition from a car-like structure to a drone. The design addresses complex challenges in part integration, circuit design, and microprocessor coordination, ensuring seamless operation across diverse environments.

15th May to 6th June -
   a. Decided upon the project idea , decided and built the team started ideating on the design and Abstract.
   b. Started the technical research , digged research papers and similar projects that other universities are working on and found resources relevant to our project.
   c. Drew out a basic design and made a basic working CAD model of the Chassis,decided the components like strong Servos , BLDC Motors for propellers and DC motors for Wheels , decided to make it a two wheel drive bot and Arduino , Motor Driver and electronic Speed Controllers for its technical performance as a drone.
   d. Decided and designed the systems of control and command, parallelly worked on the mathematical analysis of the forces , weight and torques that the parts of the decided model might face and decided the specs of the components (Both mechanical and electrical) on the basis of that.

7th June to 13th June i.e June Second Week -
   a. Decided the control system we will be using to control the vehicle. Flysky FSi6a transmitter- receiver set.
   b. Designed simulations and circuit for arm motion in tinkercad.
   c. An online calculator or simulator **ecal** , and **rc plane online** was used to calculate the thrust generated and other information.
   d. Number of servos and deciding their orientation for arm movement.
   e. Orderning of some electrical parts.
   f. Code for arm rotation part ready with tests on real models.

14th June to 20th June i.e third Week-
   a. 3d sample model of drone with motion study formed.(in videos section of link)
   b. Code for drone and other functions are ready to be uploaded on respective electronic controllers.
   c. Decided the material to be used for the drone body , and laser cut it .

    d.   Soldered the pcb board to form a power distribution board and installed sensor and arduino nano on it.

21st June to 27th June i.e fourth Week-
    a.   Used epoxy glue to stick servos and power distribution board to the main chassis.
    b.   Decided the structure of the arm , decided to use double layered wood, with a 4mm hole in the outer side and servo horn cut on the inner part to fix it with a servo motor.
    c.   Made the model and tested it with code.
    d.   Building all connections on a breadboard.

28th June to 4th July i.e fifth Week -
    a.   Discussion on stand.
    b.   Discussion on concentric motion of tyre and propeller with different driving motors and without interference.
    c.   Usage of acrylic rods as stand to reduce stress on servo while changing mode and protecting battery
    d.   Buying materials(wires, glue,ball bearing)

5th July to 11th July i.e sixth Week -
    a.   Discussion and brainstorming on creating concentric independent motion for tyre and propeller.
    b.   Laser cutting of sample parts which will be used as tyres.
    c.   Buying material for creating tyre and belt driven motion for tyre.

12th July to 18th July i.e seventh Week-
    a.   Finalizing the design and making a 3d model for the coaxial tyre system.
    b.   Working on a Work report for the final review meeting.

19th July to 20th July i.e eight Week-
    a.   Worked on work report.
    b.   Buying material for laser cutting the tyre with spokes and coaxial system to be used in vehicle.

The drive link with all screenshots , video of simulations, code, 3d models and bill :
https://drive.google.com/drive/folders/1VQIHgKka7rpowqe24aDche_vBiRUvNMP?usp=share_link

Some key components with key features to be used in our project are as listed

component	usage
L298 Motor driver	used to control motor for car type model
Arduino nano	coded as flight controller for controlling drone
MPU6050	used as gyroscope to maintain stability during flight
Arduino Uno	used as controller to control signals to l298 and servo motors
MG995 Servo	used to control motion of arms of vehicle
A2212 1400kv BLDC motor	used to rotate propeller to produce thrust
ball bearing	to create concentric independent motion
wood sheet	to create body of vehicle and arm