

San Diego State University

Hypothesis

Using reaction wheels, a drone can actively correct pitch and roll disturbances, maintaining stability and attitude control independently from aerodynamic forces

Research Importance

Research into reaction wheel integration is important because it solves current challenges with drone stability, enabling smoother and more precise flight, even in difficult conditions. This research helps develop more reliable drones that handle well at low speeds where traditional drones may fail.



5/7/25





Initial Prototype



The initial prototype was created in SolidWorks with the following design considerations:

- Symmetry for mass moment of inertia
- Simple designs for ease of 3D printing
- Quadcopter design with enough space for reaction wheels and setup

Real World Applications

Reaction wheels control and stabilize orientation without aerodynamic forces. They produce torque by spinning internal wheels, allowing precise orientation adjustments.It is commonly used in satellites and spacecraft for:

- Accurate attitude control
- Telescope stabilization
- Precise pointing directions



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Test Type
Drift
Tilt Recovery
Load Change
Off-Center Load Change
Impulse Response
Wind Disturbance
Maneuverability