PESTICIDE DELIVERY AERIAL VEHICLE

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//SKY_WALKER

PROBLEM STATEMENT

The delivery of pesticides to crops is crucial to increase their yield and longevity but current methods of doing so are tedious or costly.

There is one solution currently existing in the markets which utilizes the benefits of aerial technology but it is uniquely designed for large sized farms, hence the high capital cost.

There is a need for a solution that is not as costly but just as effective, in order to make this technology more accessible for small to medium sized farm owners.

OBJECTIVES

To create a design for an aerial vehicle that can effectively spray pesticides whilst being more economical than current market solutions.

Constraints

- Lower tank storage $/litre value than competitors
- Modular design
- Intuitive control system

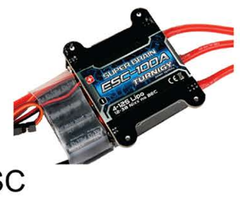
Criteria

- Minimize weight
- Minimize maintenance cost
- Minimizie prototyping cost
- Minimize fragility

POWER SYSTEM

2 x 5400 mAh LiPo
Rating: 30C
Voltage: 22.2 V

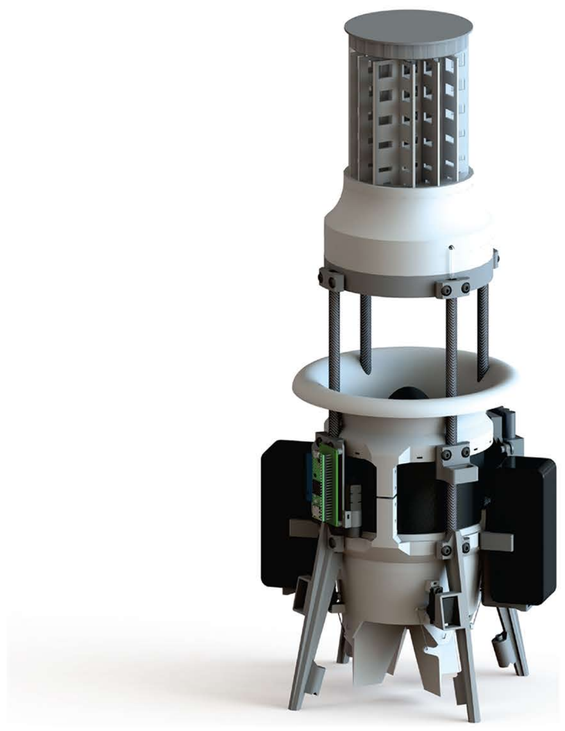
560 kV, 4400 W Brushless
Cont.Current Draw: 100A
Max NL RPM: 24900

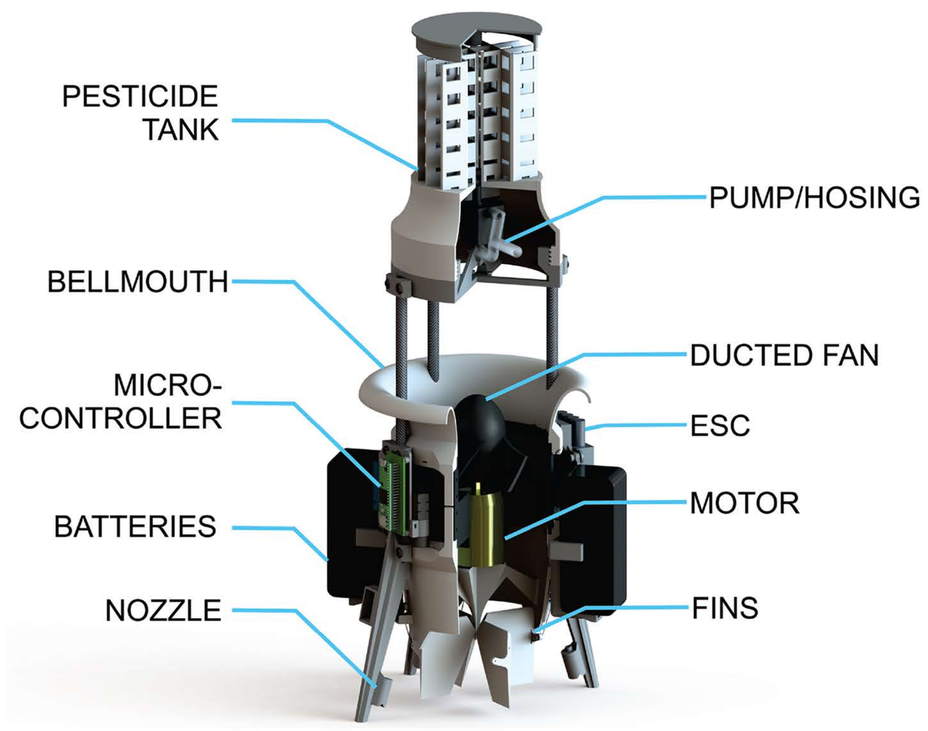


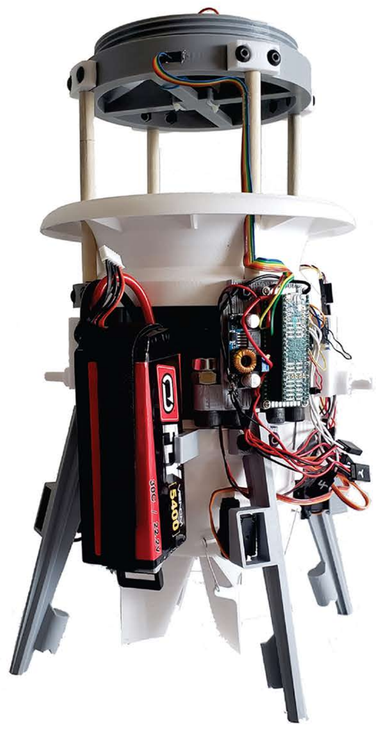
ESC
Cont. Current: 100A
Peak Current: 120A

PESTICIDE DELIVERY DESIGN

- Pesticide storage capacity up to 2,000 ml
- Capable of dispensing up to 50 ml of pesticide per second
- Baffles within tank designed to minimize pesticide sloshing within flight
- Ultrasound sensor used to determine pesticide level within tank

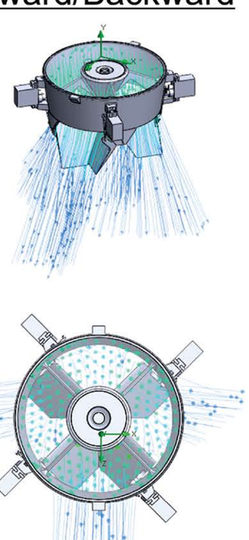




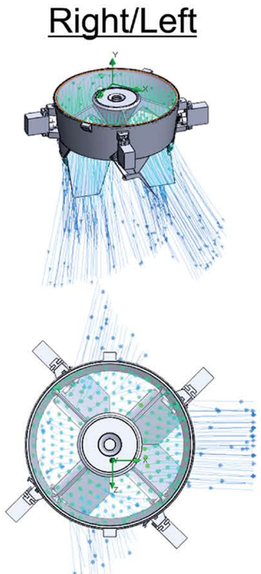


THRUST VECTORING

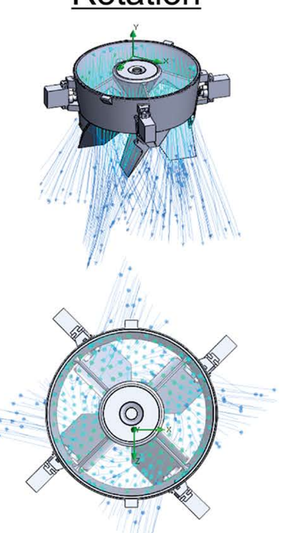
Forward/Backward



Right/Left

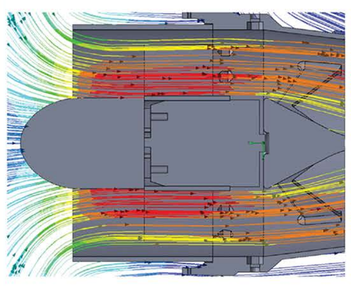


Rotation

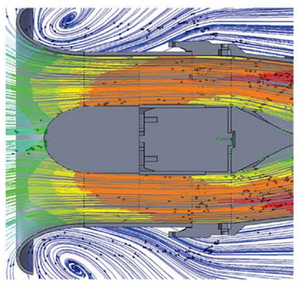


CFD ANALYSIS ON INLET

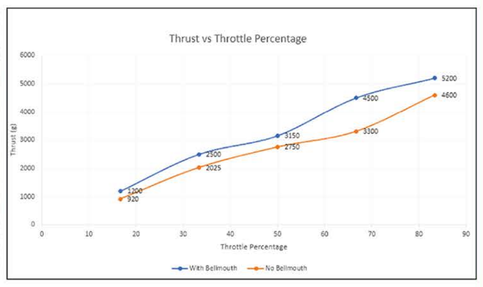
No Bellmouth



Bellmouth



Thrust Performance

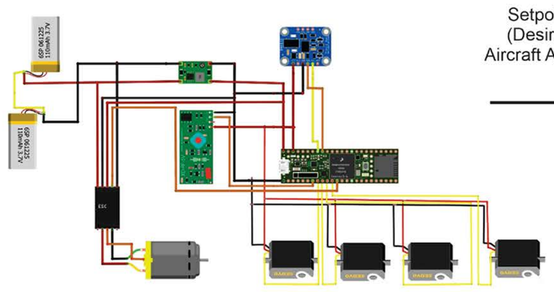


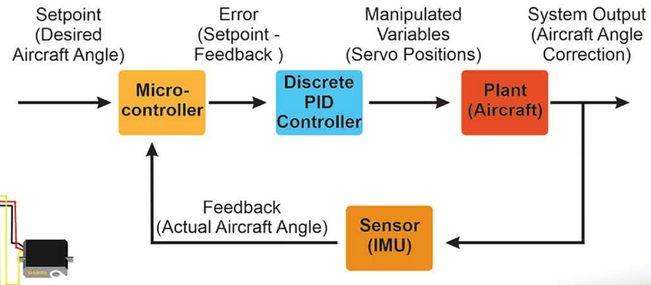
The addition of a bellmouth inlet improved thrust up to 36% and reduced noise.

FUTURE STEPS

- Improve flight stability by further experimentation with control system
- Incorporate pesticide delivery tank to working prototype and implement efficient dispensing system
- Conduct further research in battery life and thrust improvement
- Incorporate surveillance technology to expand functionality

ELECTRONIC AND CONTROLS SYSTEM





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