IAM3D HOVERCRAFT

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THEORETICAL MAX VEHICLE PERFORMANCE

- 0-60 mph in 1.95 seconds.
- Max speed of 176 mph.
- 15.7 N of thrust per propeller.
- Capable of carrying a 100 gram cube very fast.

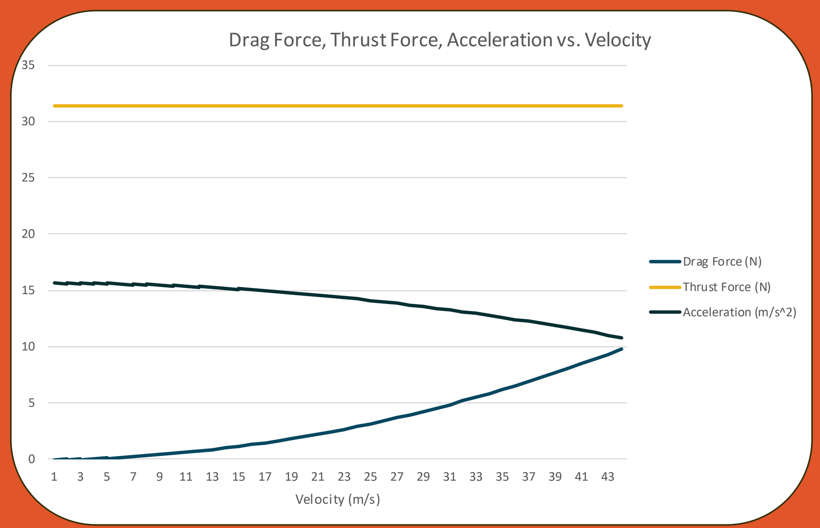

Fig. 1: Comparison of Drag, Acceleration and Thrust

VEHICLE ELECTRONICS

- Battery is a 4500 mah 22.2 volt Li-Po battery.
- Vehicle uses a FlySky G7P transceiver and FS-R7P receiver.
- Motors are iFlight Xing2 2306 1755kv paired with ReadyToSky 45A BLHeli_S ESCs.
- 8-Amp BEC to convert battery voltage to 5 volts for the receiver and servos.

Industry Sponsor

CORVALLIS 3D Printing LLC

CENTRAL BODY

- Central storage for vehicle electronics.
- Safely secures the battery using two retaining pins.
- Serves as a mounting point for the steering servo.
- Is a high flow design to allow for cooling of electronic components during operation.

Oregon State University

Project Overview

We are a team that rapidly created a fully 3D printed remote controlled hovercraft to compete in the ASME IAM3D Hovercraft Competition

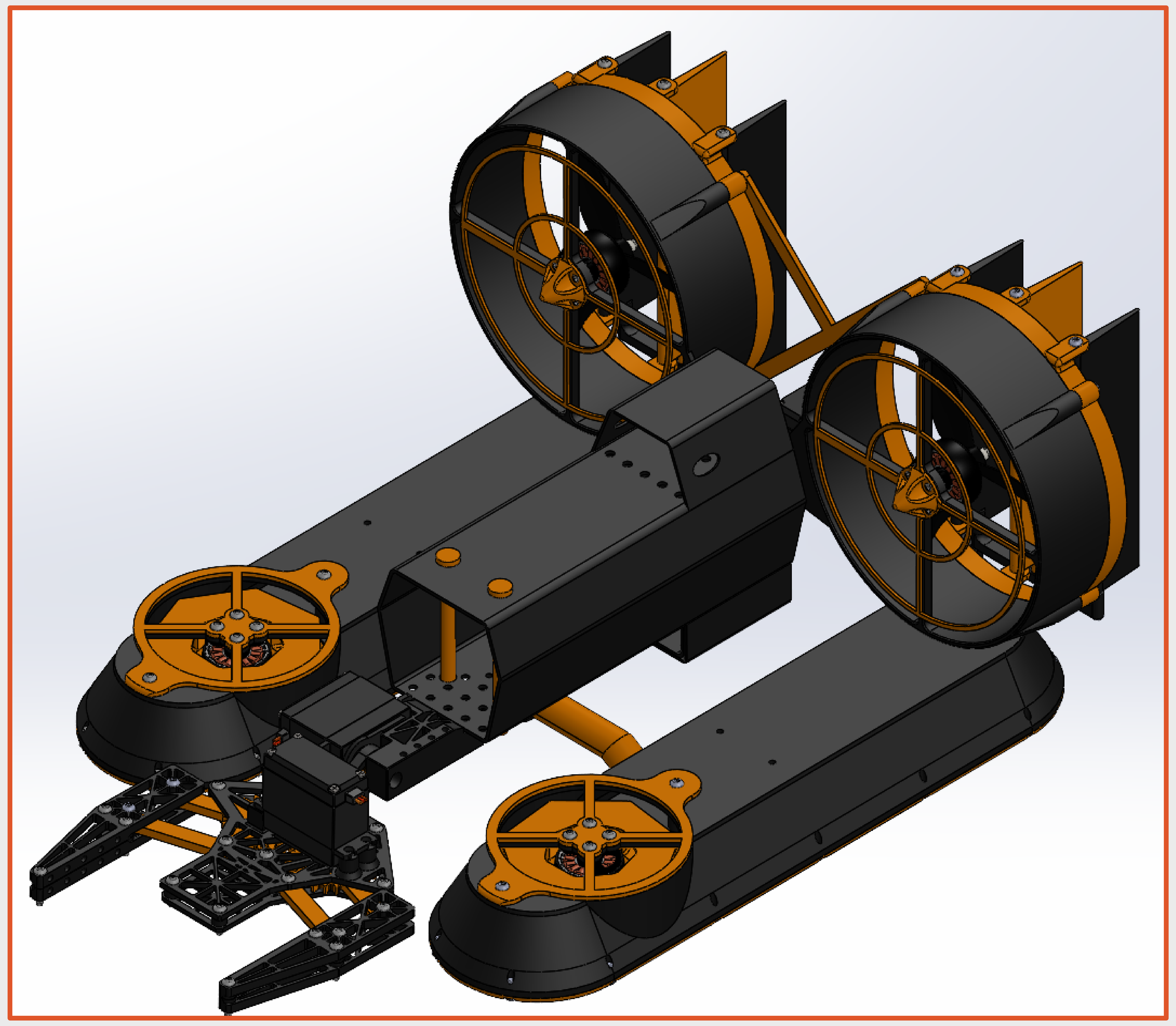

Fig. 2: Render of Competition Hovercraft

MAIN SPONSOR

OSU School of MIME
Dr. Sarah Oman

THRUSTER

- Steering and propulsion are combined into a two-thruster assembly that supports the central body and alignment of the lift pontoons.
- Propulsion uses the same 6S (22.2 V) motors as the lift pontoon paired with 51466 propellers to generates 1600 grams of thrust.
- The thruster shroud connects to a modular aileron assembly actuated with a single servo.

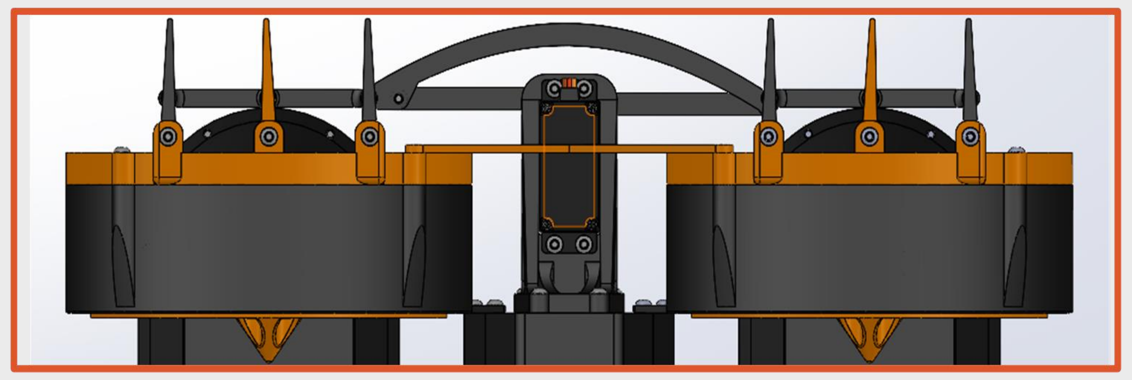

Fig. 3: Hovercraft Thruster and Steering System

GRABBER

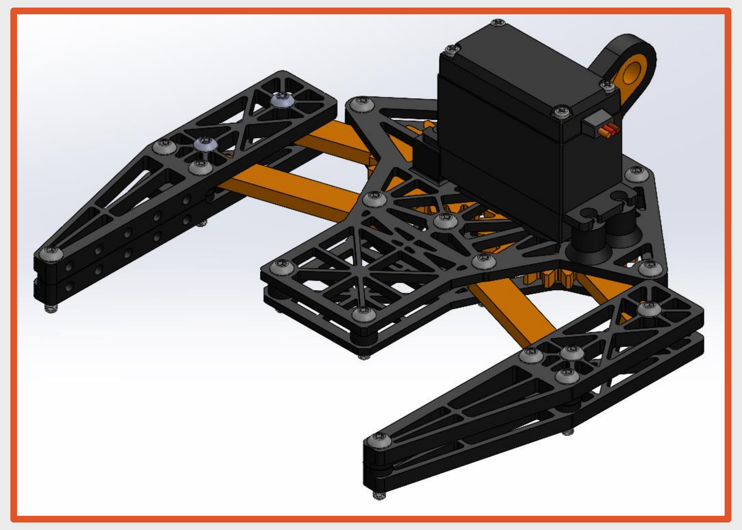

Fig. 3: Grabber's Claw

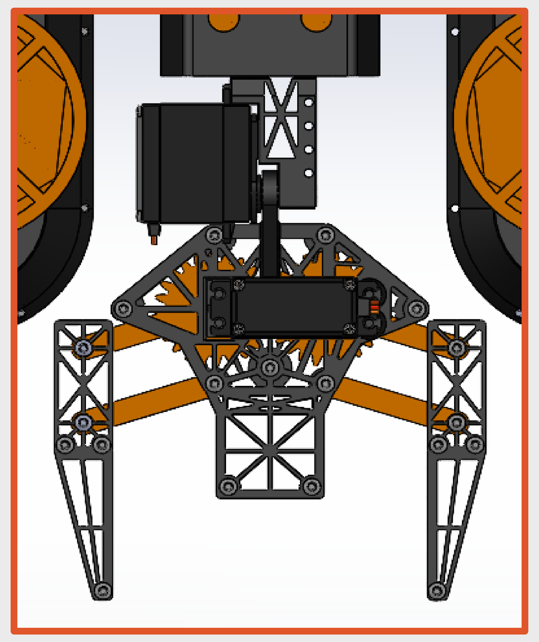

Fig. 5: Mounted Grabber

<u>Design Requirements:</u>

- Must be able to fully support 2" cube.
- Must not create noticeable friction with the ground.

<u>Design Implementations:</u>

- Uses two gears to manipulate claws and mirror movement.
- Four-bar linkage ensures claws always stay parallel.
- Skeletonized to reduce weight.
- Uses 20 kg-cm Servos.

LIFT PONTOONS

- Provides the vehicle's lift to allow it to hover.
- Utilizes iFlight Xing2 2306 1755kv motors and a 3D printed lift fan designed by the team.
- Composed of a three-part structure.
- Outer Shell: Serves as mounting locations and forms the external structure.
- Inner Shell: Serves as a directing curtain for the lift air to assist in generating a momentum curtain.
- Drag Skirt: Serves to direct lift air to form the base of the momentum curtain as well as serving as a sacrificial layer that can be easily replaced.

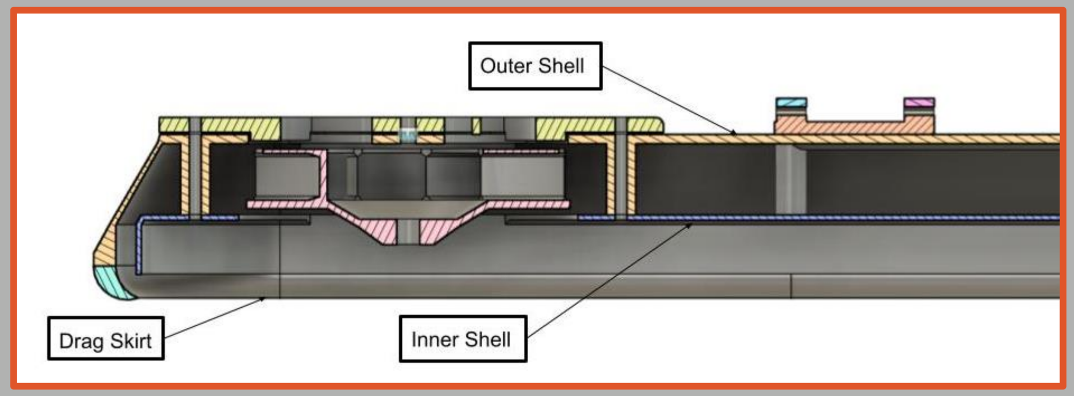

Fig. 6: Cross-sectional view of Hovercraft's Lift Pontoon

COMPETITION FEASIBILITY

Our primary focus was to evaluate if this competition is feasible for future MIME students. To do this the team designed the hovercraft and traveled to Charlotte, North Carolina to compete.

At this competition we placed first among four teams and proved IAM3D is a feasible project for future capstone teams.

Fig. 7: From Left to RIght: Miles Schubert, Walker Waggoner, Dale Sydnam, and Competition Judge