Eco-Dolphin I

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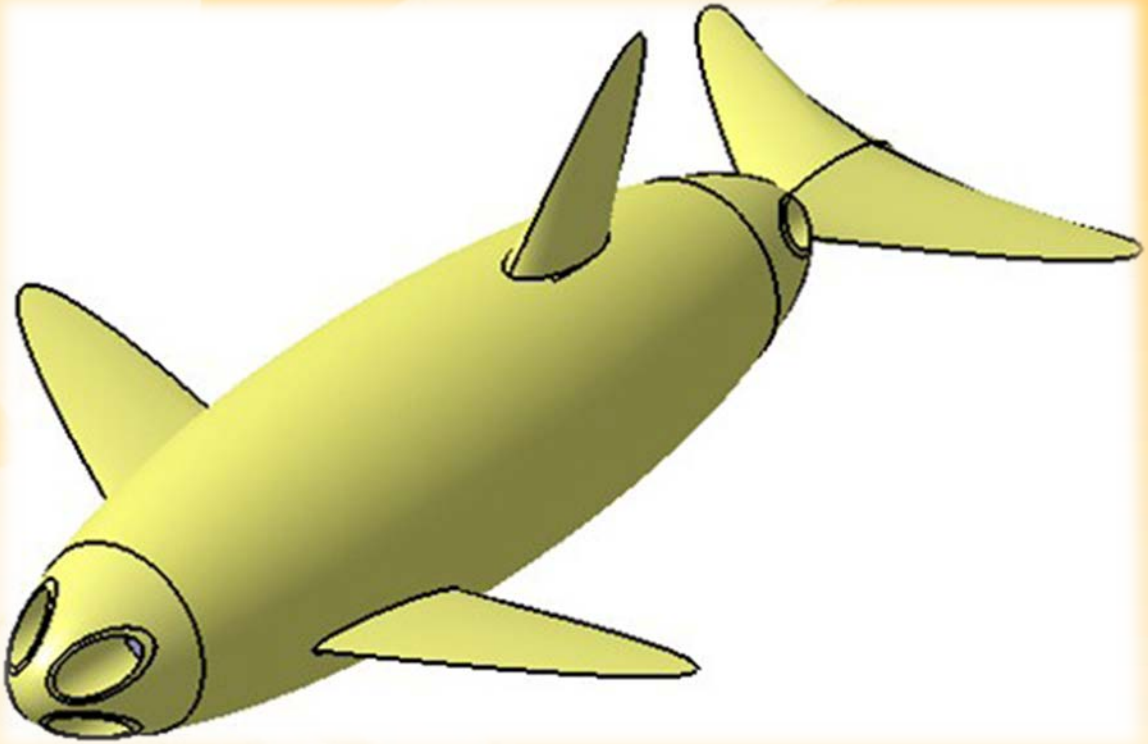

Kevin Matiko
- Lead Engineer/Designer

Carlsvi Finn
- Attitude Control Engineer

Jonathan Jaworski
- Structural Engineer

Ryan Gauthier
- Computer Engineer

Dr. Hong Liu
- Advisor

- **Highly integrated and streamlined Autonomous Underwater-Vehicle (AUV) development.**

Objectives

Phase I: Yellow Eco-dolphin

- Cruise autonomously 32 feet below the water, at 6.5 ft/sec.

Phase II: Buoy Control systems

- Communication with ground station via Buoy relay system.

Phase III: Blue and Red Eco-Dolphin

- Communication among a small fleet of AUV’s (3).

Vehicle Design

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Yellow Eco-Dolphin

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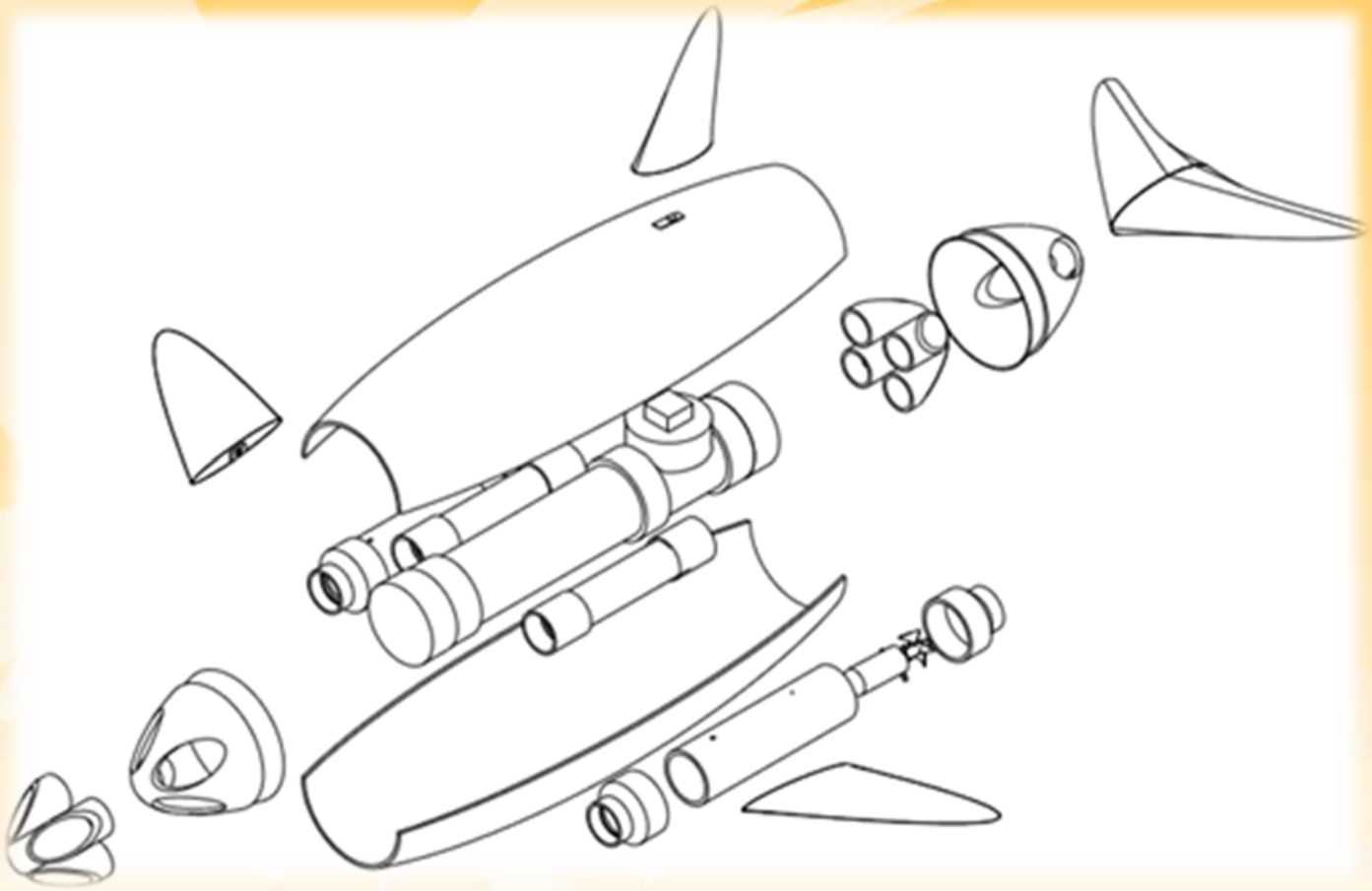

Body: Elliptic

Weight: 132lbs.

Length: 4ft.

Width: 1ft.

Thrust: 2 x 15 lbs

Vehicle Design

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Yellow Eco-Dolphin

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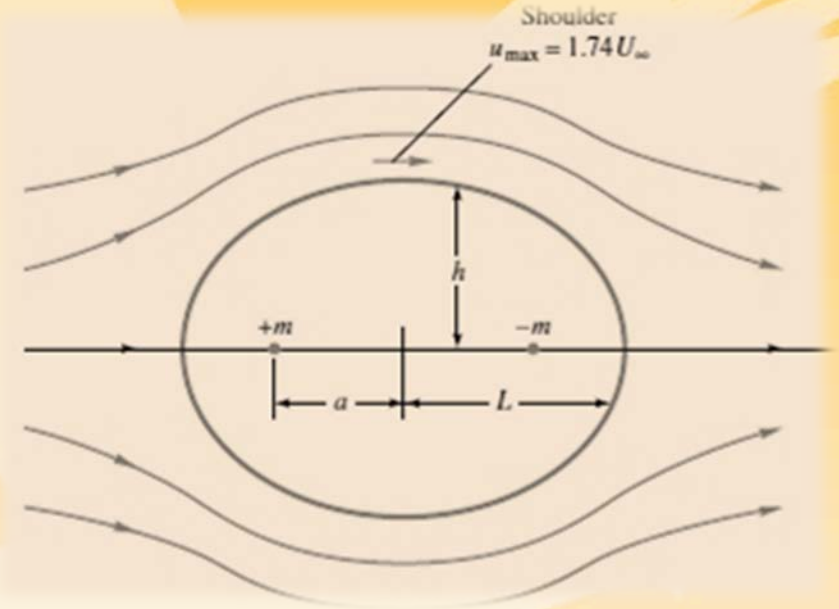

Source: White "Fluid Dynamics"

- Symmetry allows for equal and counteracting forces on top and bottom control surfaces, thus resulting in net-zero lift at zero angle of attack.

Propulsion Design

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Yellow Eco-Dolphin

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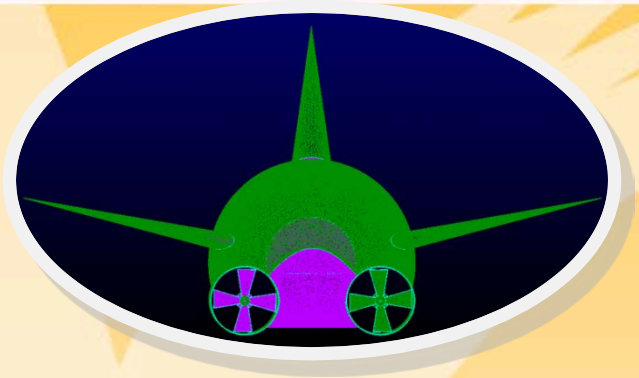

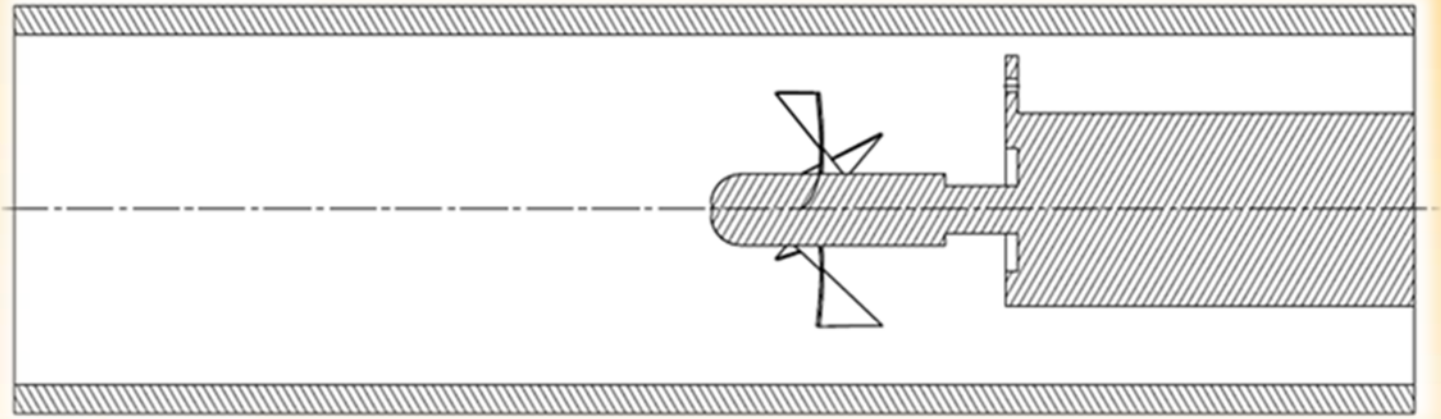

- 2 – Brushless/DC thrusters powered by two 22 volt Lithium-Polymer battery packs.

Ballast Design

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Yellow Eco-Dolphin

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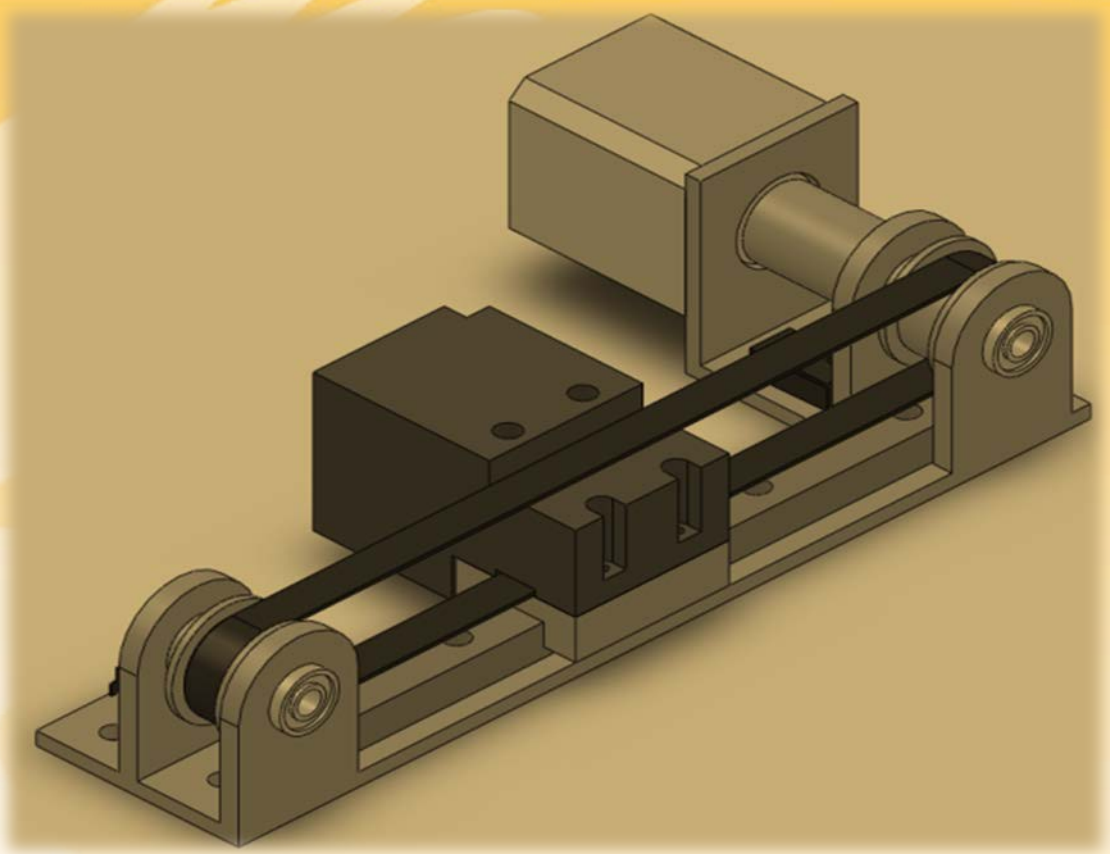

- The pitch control design involves changing the Center of gravity instead of redirecting the thrust.

Testing

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Phase 1

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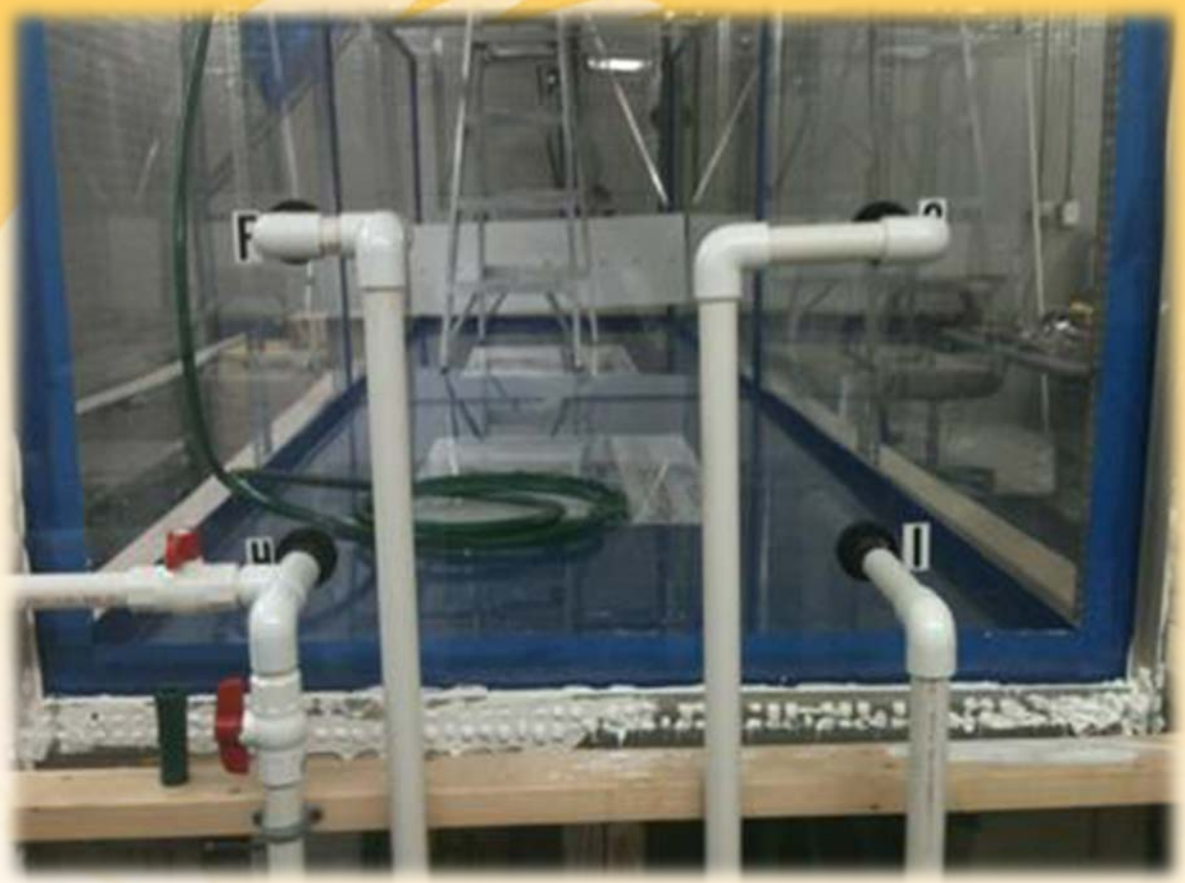

- We will utilize the Non-linear Wave lab in the Lehman Building.

Buoy Control System

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Phase 2

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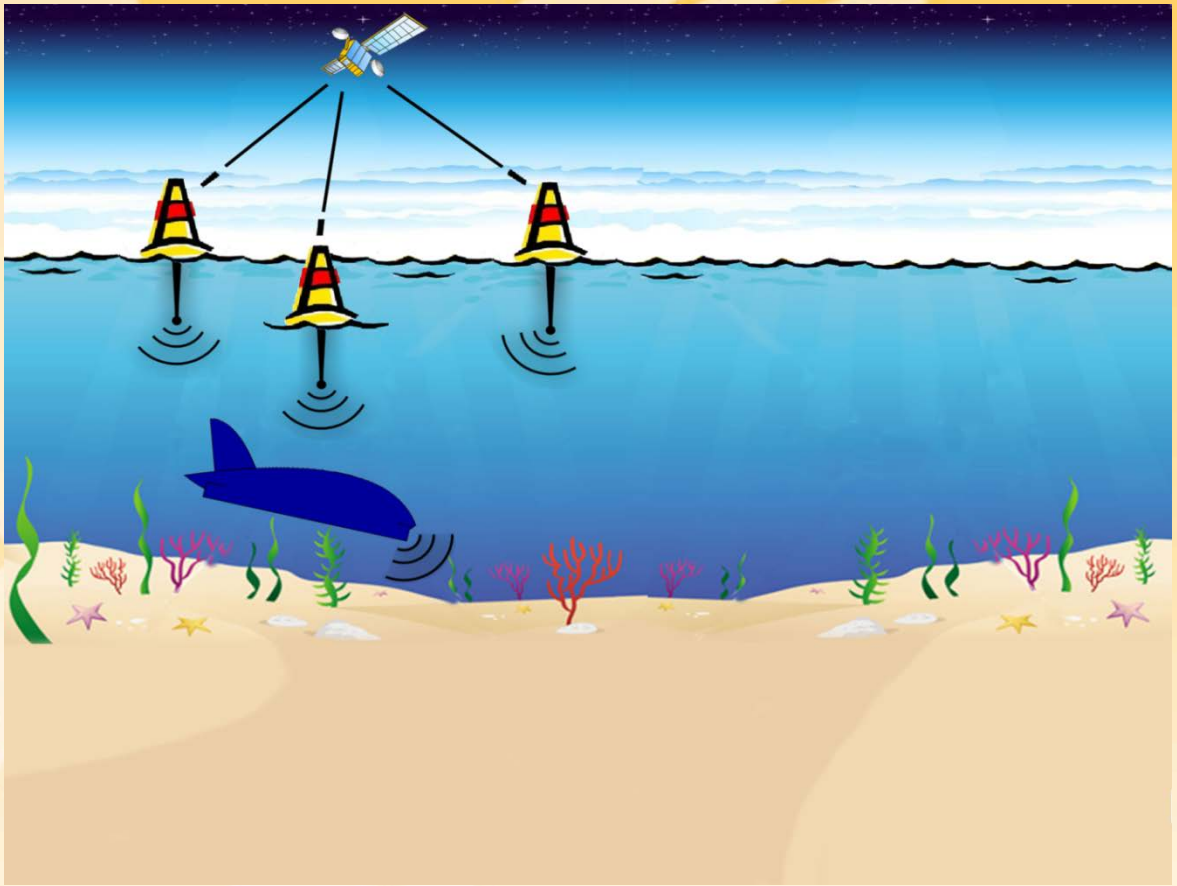

GPS –
Buoy Computer

Wireless (Buoy) –
Sonar (Buoy)

Sonar (Buoy) –
Sonar (Dolphin)

Wireless –
Ground station

- Pose and position determined through active sonar relay system.

Blue & Red Eco-Dolphin

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Phase 3

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- Cooperatively missions such as surveillance or environmental monitoring.
- Send and receive high volume message, including pictures through wireless network when it is surfaced.
- Communicating small volume messages, commands and status under water through acoustic sensor network.
- The fleet can relay message from ground station (Laptop) to surfaced AUV, then from surfaced AUV to submerged team members to fulfill mission cooperatively.

Conclusion

- **AUV Research and Development**
- **Testing and Simulation**
- **Building a Cooperative fleet of AUV's**
- **Mathematical modeling and underwater mapping**

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