Eco-Dolphin I

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• 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

Yellow Eco-Dolphin

- **Body:** Elliptic
- **Weight:** 132lbs.
- **Length:** 4ft.
- **Width:** 1ft.
- **Thrust:** 2 x 15 lbs
Vehicle Design

Yellow Eco-Dolphin

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

Source: White “Fluid Dynamics”
Propulsion Design

Yellow Eco-Dolphin

- 2 - Brushless/DC thrusters powered by two 22 volt Lithium-Polymer battery packs.
The pitch control design involves changing the Center of gravity instead of redirecting the thrust.
Testing

Phase 1

• We will utilize the Non-linear Wave lab in the Lehman Building.
Buoy Control System

GPS – Buoy Computer

Wireless (Buoy) – Sonar (Buoy)

Sonar (Buoy) – Sonar (Dolphin)

Wireless – Ground station

- Pose and position determined through active sonar relay system.
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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