Aqua Scooter

Concept Generation and Selection

Dylan Cannon, Darin Gilliam, Eli Palomares, Elizabeth Tyler, Jiyan Wang, Tyler Winston

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NORTHERN ARIZONA UNIVERSITY

aqua SCOOTER

Overview

- Background
- Team Concepts
- Decision Matrix
  - Components
- Top Two Ideas
- Summary
- References

http://www.redferret.net/?p=8163

Problem Statement

- Design an hydrodynamic, inexpensive, aesthetically pleasing Aqua Scooter, with a marine engine that complies with EPA regulations.

Background

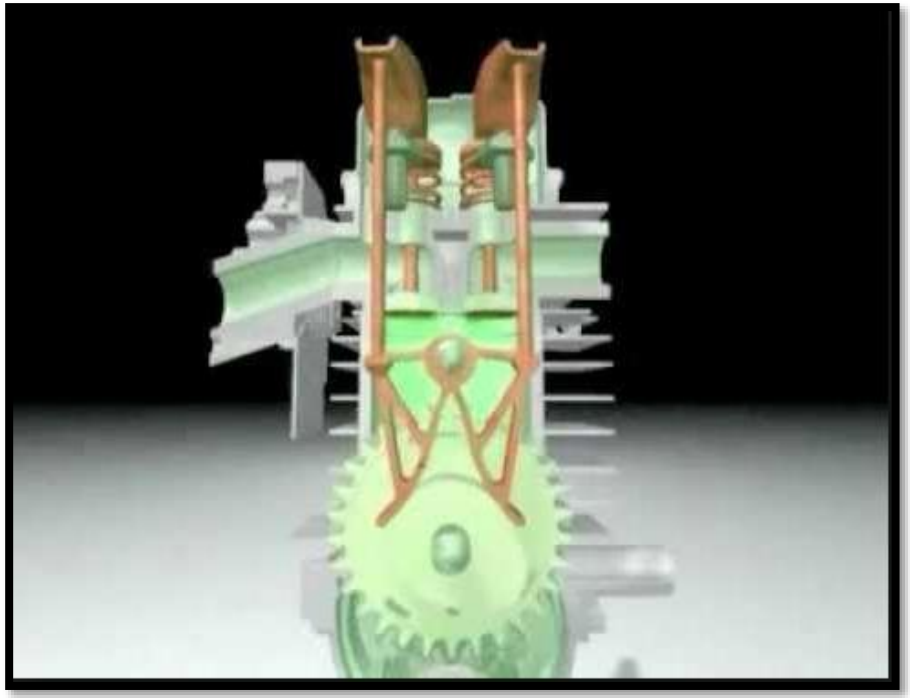
- Client’s main concern with Aqua Scooter is the EPA regulations
- Second concern is to provide an aesthetically pleasing hydrodynamic design
- Designs must address one of the main client concerns

Team Concepts

- Boomerang
- Octopus
- Magneto Hydrodynamic Propulsion System
- Propane Injected 4-Stroke
- Duck Scooter
- Tank Housing
- 2 Propeller
- 4 Mix Engine
- Enclosed Housing
- Adjustable Jet
- Catalytic Converter and Coil
- Fuel Injected 2-Stroke

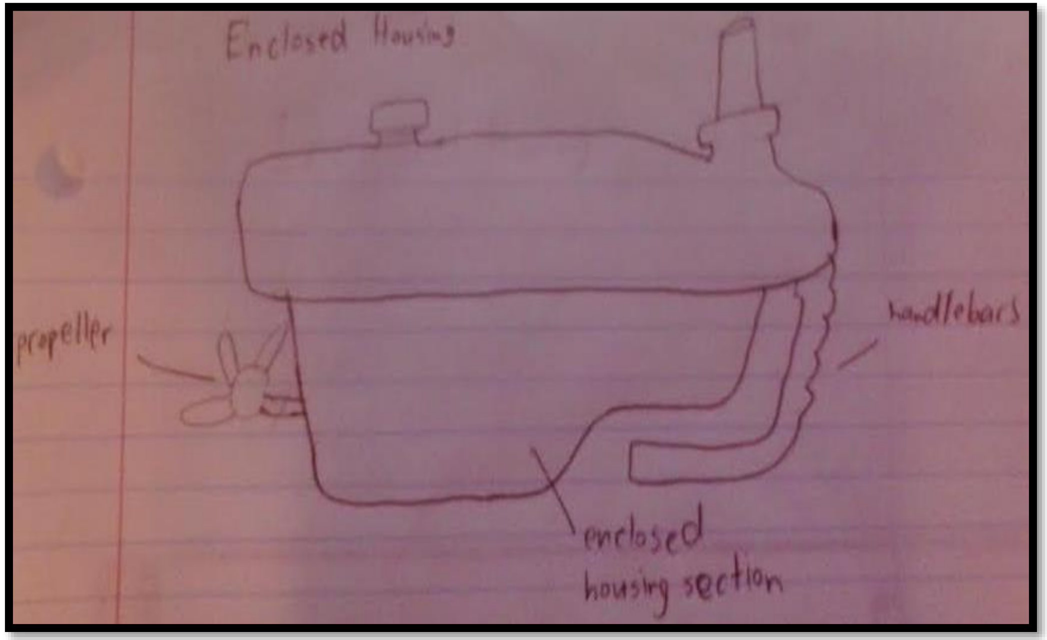
4 Mix Engine

- 4 stroke engine that uses two stroke gas, making it lighter.



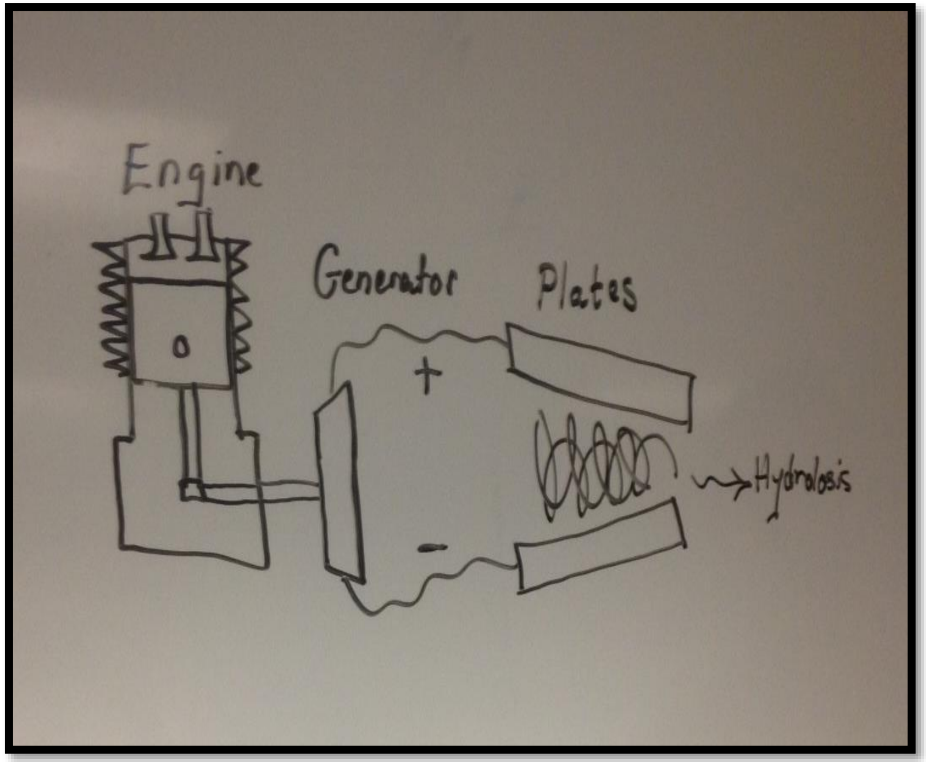
Enclosed Housing

- Enclosed housing can increase engine life.



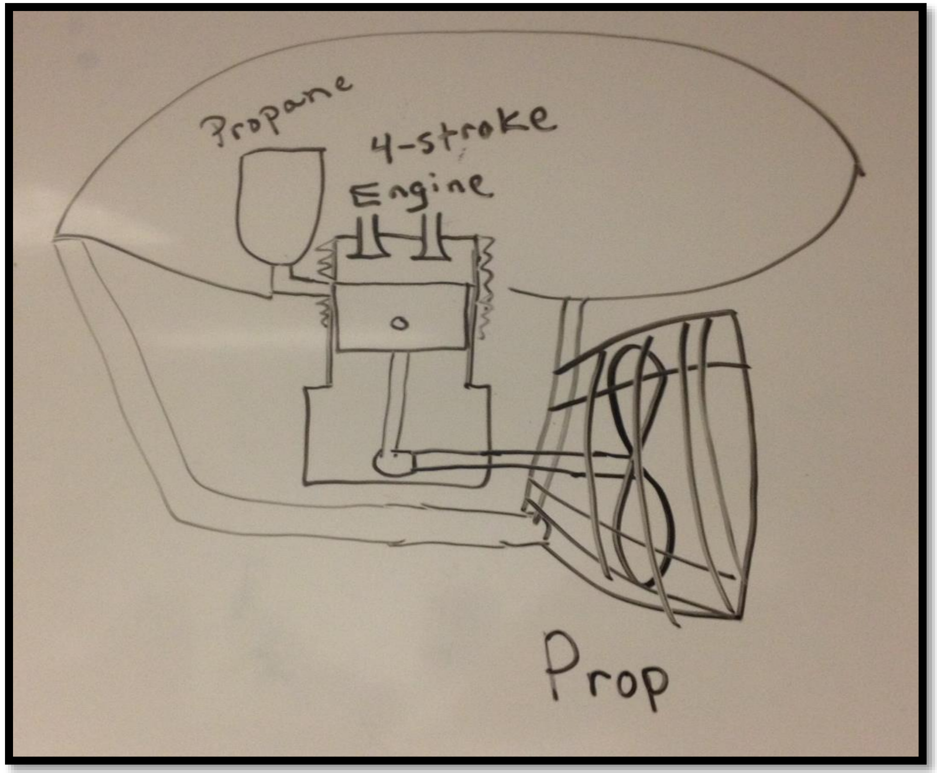
Magneto Hydrodynamic Propulsion System

- Thrust provided by rapid hydrolysis.



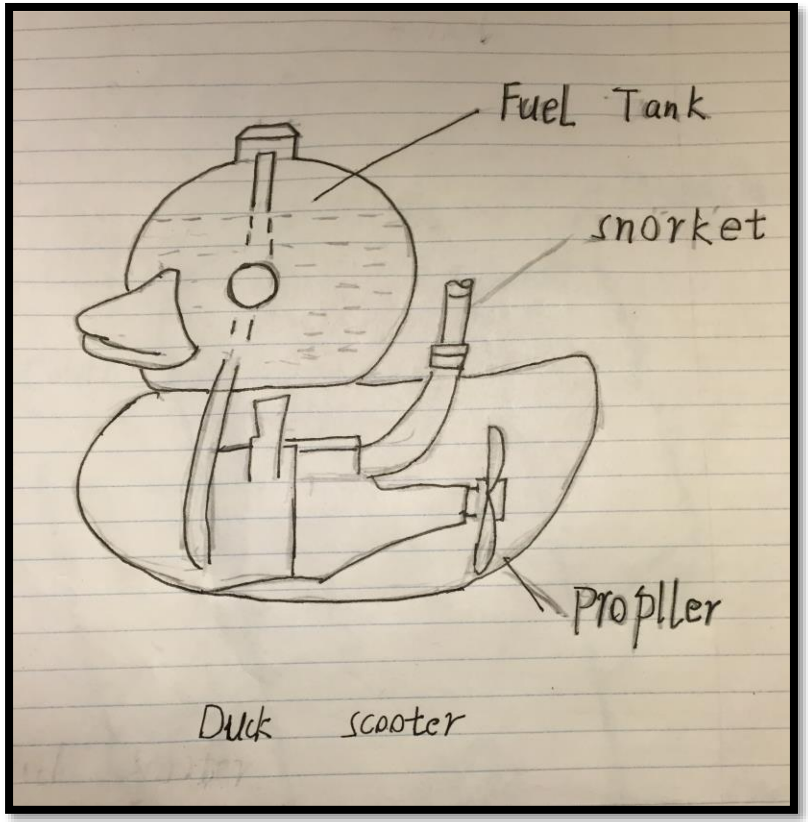
Propane Injected 4-Stroke

- Conventional 4- stroke that uses propane.



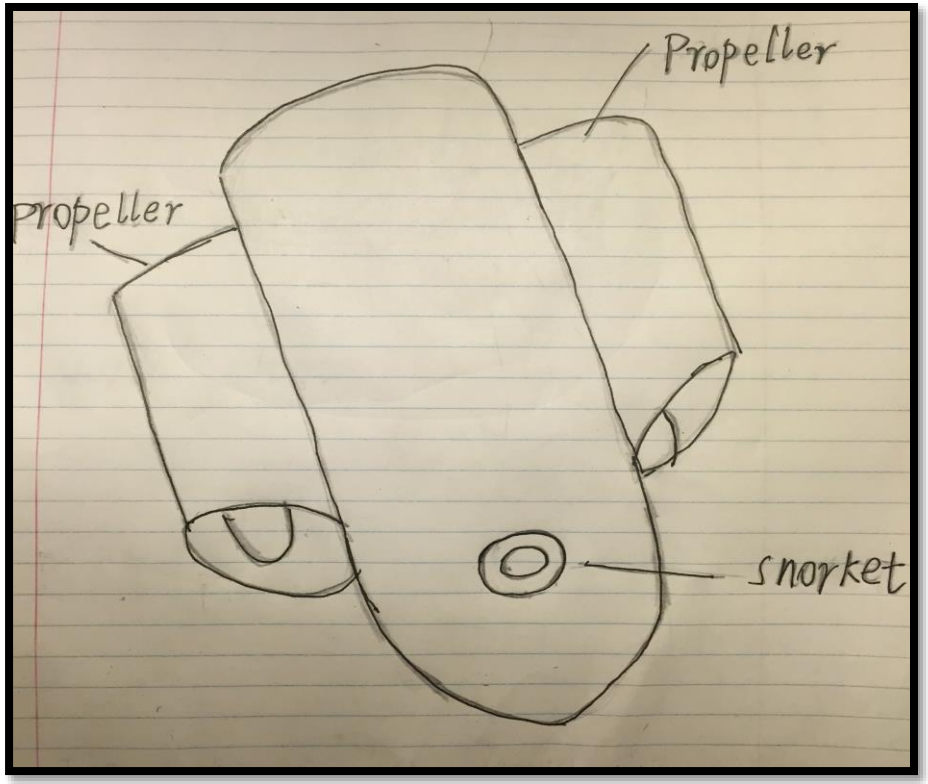
Duck Scooter

- It is a fuel injected 4 stroke engine with kid friendly design.



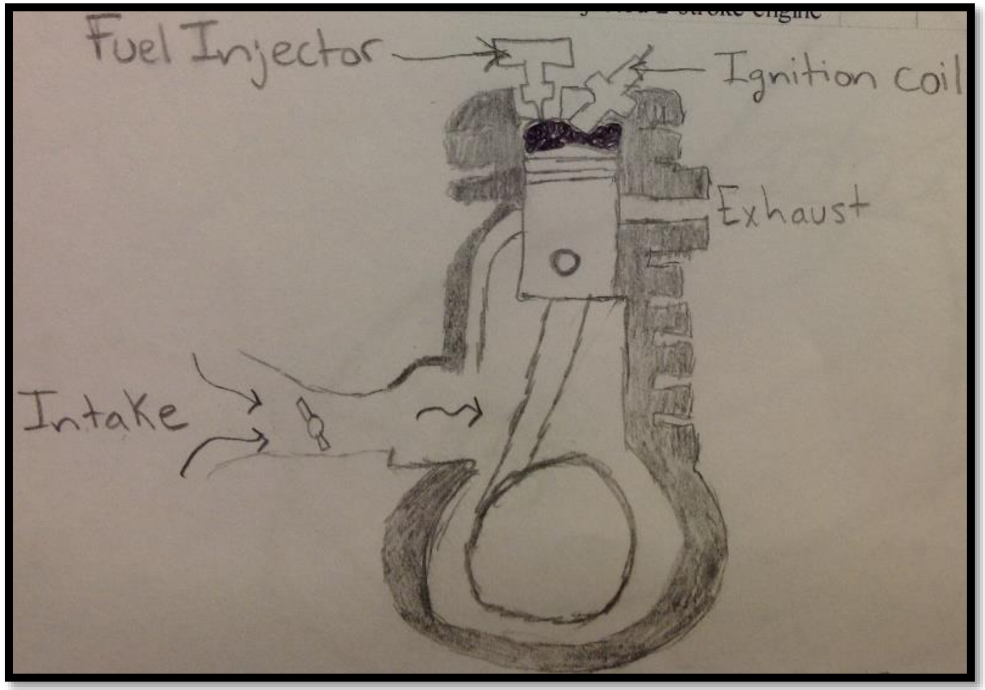
2 Propeller

- Provides higher speed with 2 propellers and a 4 stroke engine.



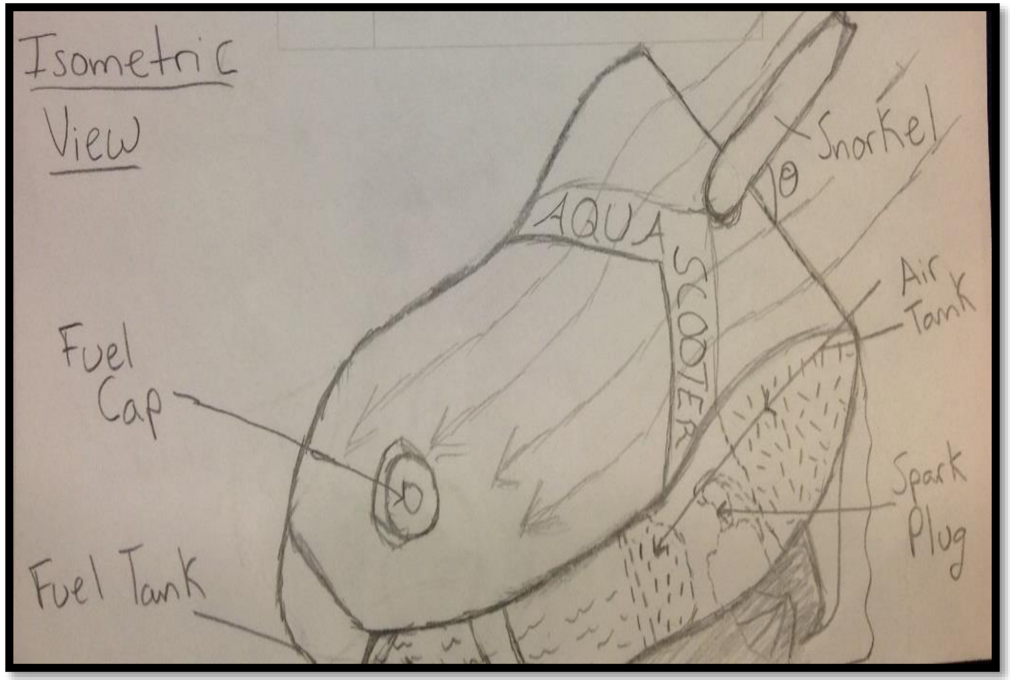
Fuel Injected 2-Stroke

- Fuel is electronically injected and monitored, decreasing emissions.



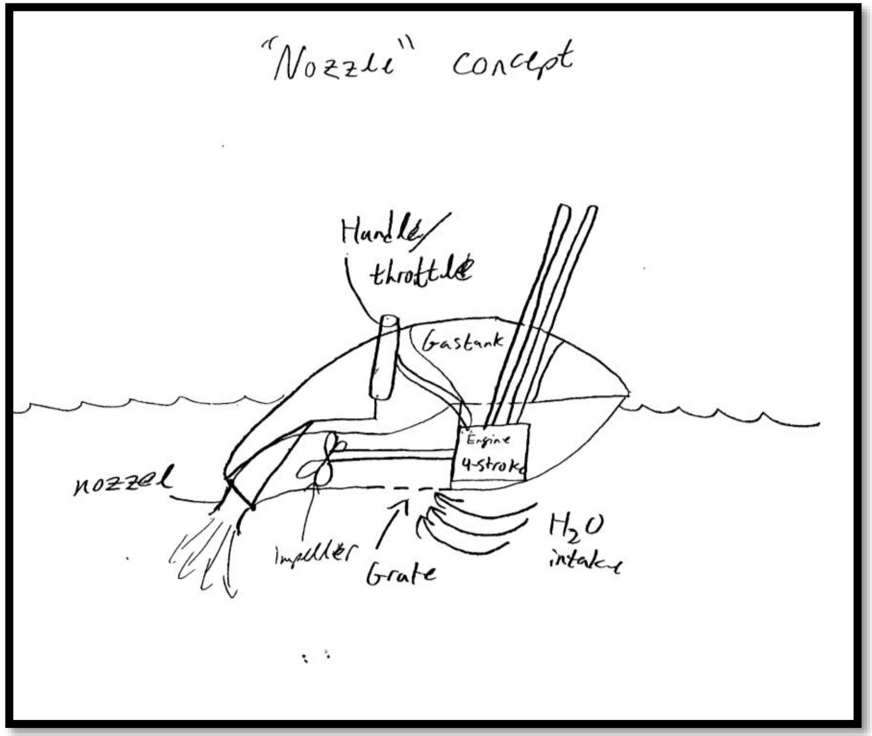
Tank Housing

- More aesthetically pleasing and hydrodynamically efficient.



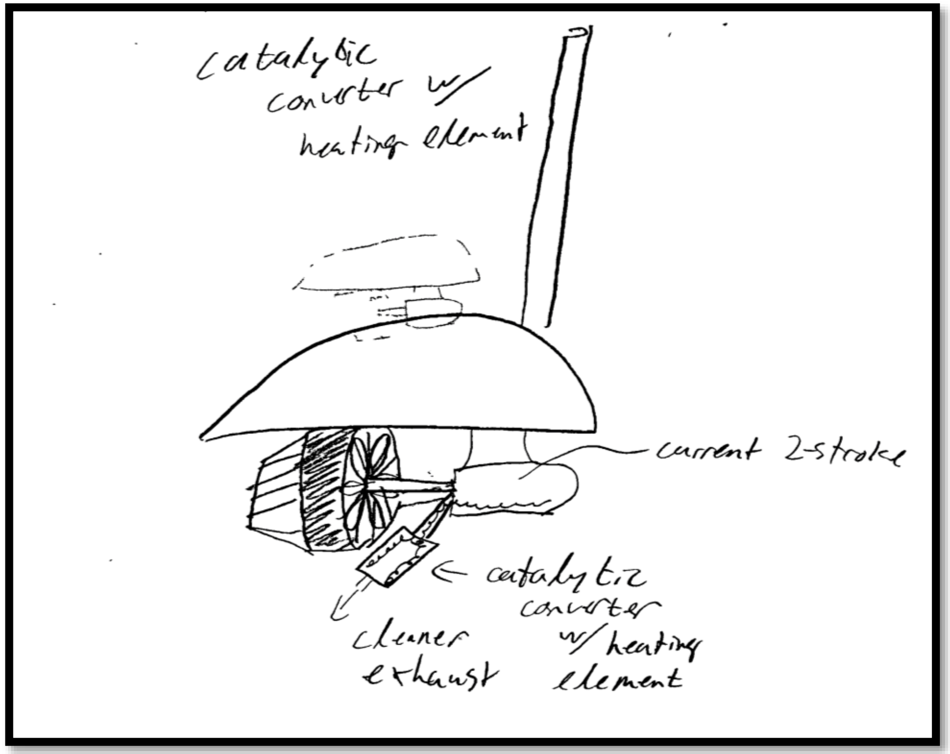
Adjustable Jet

- The nozzle can be angled differently for different thrust vectoring.



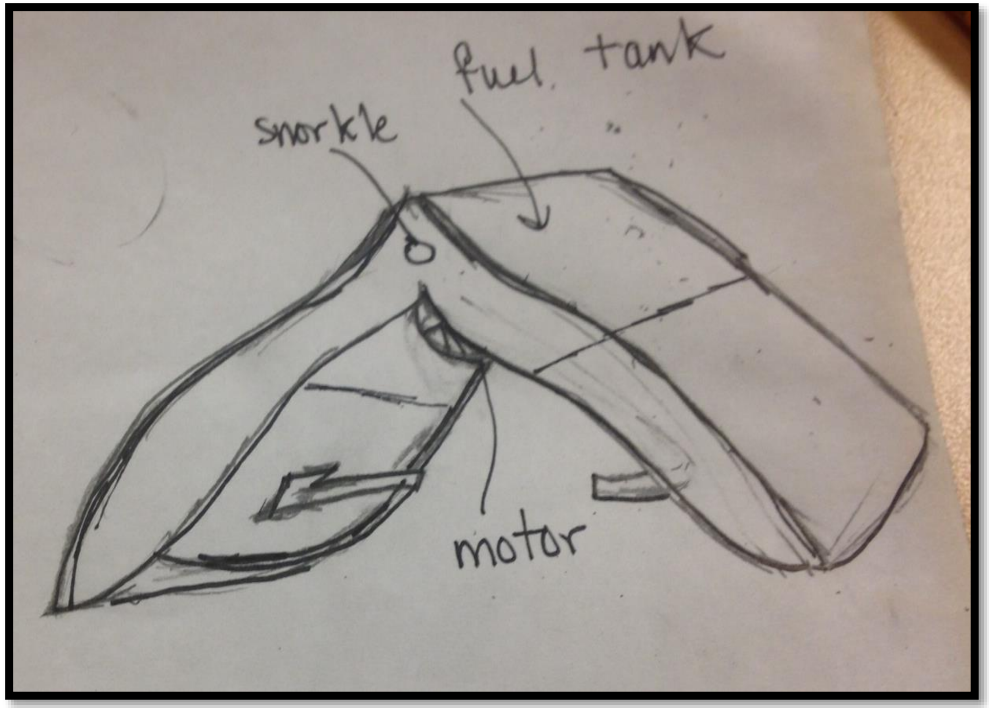
Catalytic Converter and Coil

- Catalytic converter externally heated to burn excess fuel in exhaust.



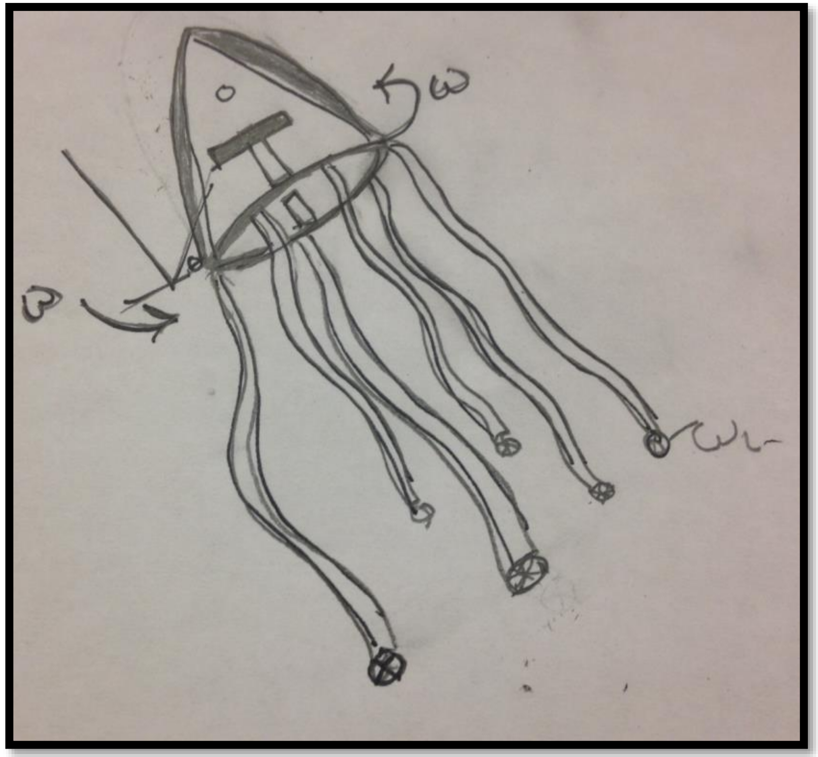
Boomerang

- Consists of boomerang skeleton system with a four stroke engine and nozzle.



Octopus

- Legs spin around the passenger creating the movement of the device.



Decision Matrix

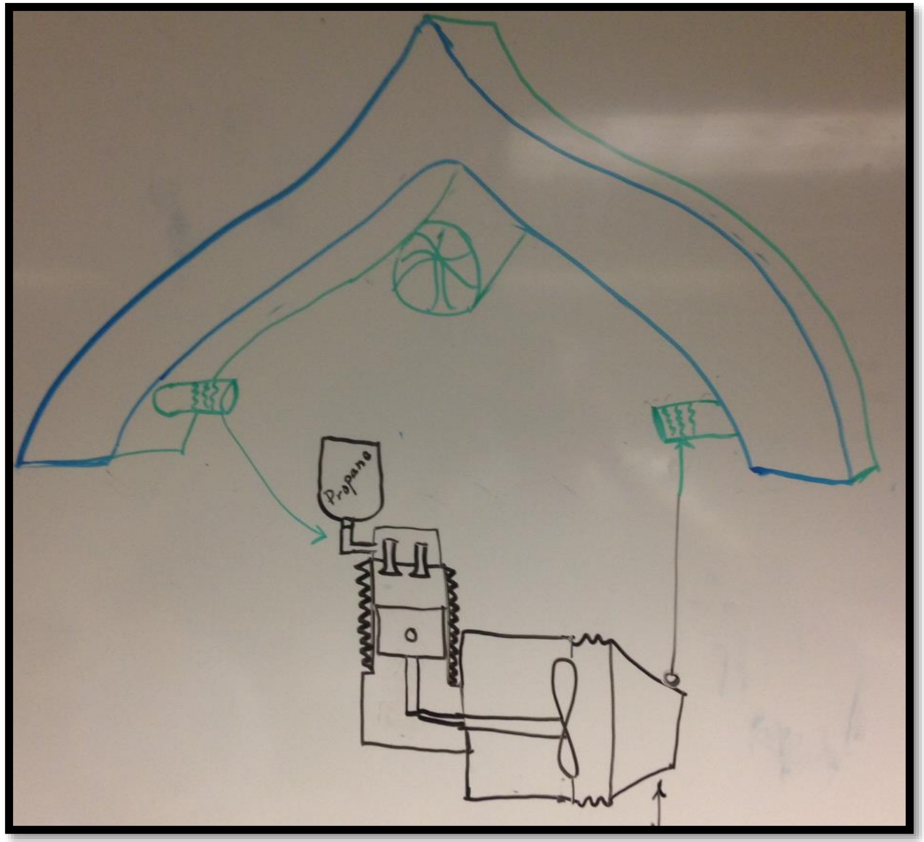
	Requirements and Criteria									
	Aesthetically Pleasing	Minimal Probability of Error	Ease of Manufacture	EPA Requirements	Complexity of Design	Provides Thrust	Hydrodynamic Efficient	Lightweight	Minimal Cost of Materials	**Total Weighted Factor**
Requirement Weighting	10%	10%	10%	20%	10%	10%	10%	10%	10%	**100%**
Boomerang	7	6	5	7	5	8	8	6	7.5	**6.65**
	0.7	0.6	0.5	1.4	0.5	0.8	0.8	0.6	0.75	
Octopus	6	3	4	7	4	8	6	6	5	**5.6**
	0.6	0.3	0.4	1.4	0.4	0.8	0.6	0.6	0.5	
Magnetohydrodynamic propulsion	5	3	3	7	2.5	9	6	4	3	**4.95**
	0.5	0.3	0.3	1.4	0.25	0.9	0.6	0.4	0.3	
Propane injected 4 stroke	7	7	7	8	7	5.5	7	6	5	**6.75**
	0.7	0.7	0.7	1.6	0.7	0.55	0.7	0.6	0.5	
Duck Scooter	8	6	6	6	6	7.5	5.5	6	5	**6.2**
	0.8	0.6	0.6	1.2	0.6	0.75	0.55	0.6	0.5	
2 Propeller	8	6	6	7.5	5	8.5	7	5.5	6	**6.7**
	0.8	0.6	0.6	1.5	0.5	0.85	0.7	0.55	0.6	
4 Mix Engine	6.5	7	8	8.5	7	9	7	6	5	**7.25**
	0.65	0.7	0.8	1.7	0.7	0.9	0.7	0.6	0.5	
Enclosed Housing	7.5	8	6	7	5	9	7	6	5	**6.75**
	0.75	0.8	0.6	1.4	0.5	0.9	0.7	0.6	0.5	
Adjustable Jet	7	6	6	8	6	8	8	6	6.5	**6.95**
	0.7	0.6	0.6	1.6	0.6	0.8	0.8	0.6	0.65	
Catalytic Converter and Coil	6	5.5	5	8	5	7	6.5	7	5	**6.3**
	0.6	0.55	0.5	1.6	0.5	0.7	0.65	0.7	0.5	
Fuel Injected 2 Stroke	7	5.5	5	8	5	9	7	7.5	4	**6.6**
	0.7	0.55	0.5	1.6	0.5	0.9	0.7	0.75	0.4	
Tank Housing	7.5	5.5	6	6	5.75	9	7.5	7	5.5	**6.575**
	0.75	0.55	0.6	1.2	0.575	0.9	0.75	0.7	0.55	

Criteria

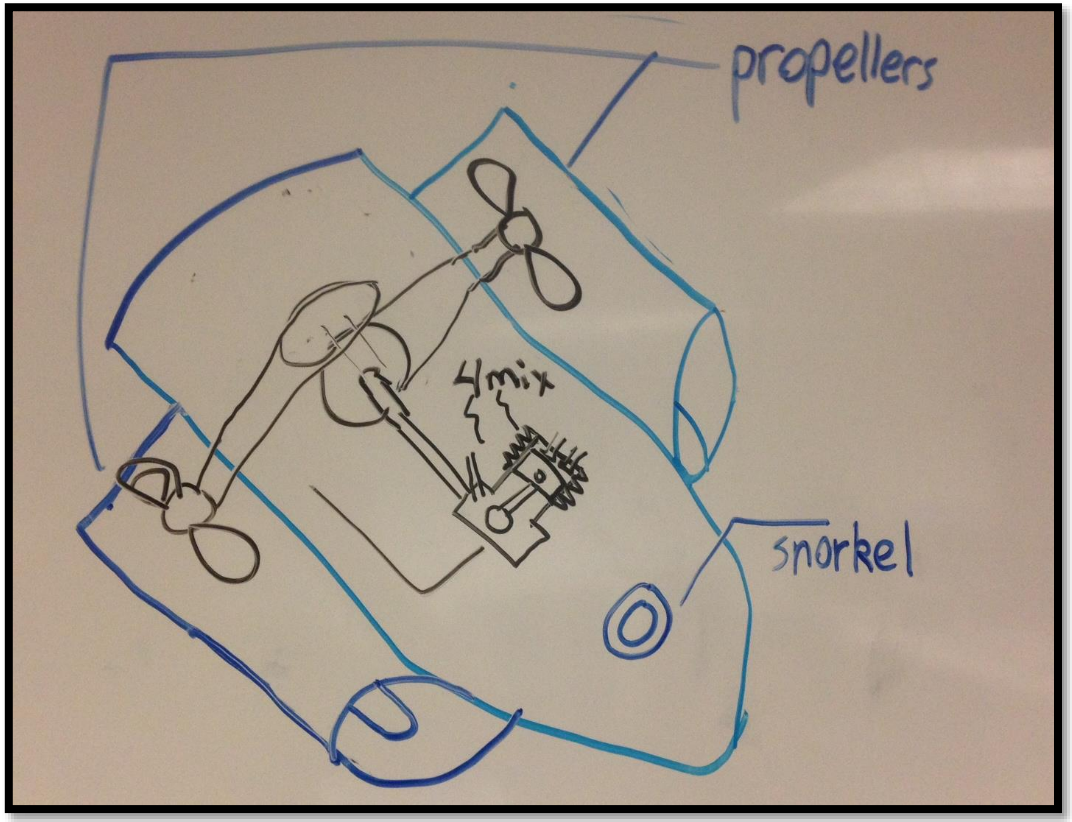
• Aesthetically Pleasing	10%
• Minimal Probability of Error	10%
• Ease of Manufacture	10%
• EPA Regulations	20%
• Complexity of Design	10%
• Provides Thrust	10%
• Hydrodynamically Efficient	10%
• Lightweight	10%
• Minimal Cost of Materials	10%

Top Two Ideas

- Boomerang with 4-stroke Propane Engine with Adjustable Jet



- Two Propeller with 4-stroke 4-mix Engine with Adjustable Jet



Summary

- Individually, each team member conceptualized varying design components and criteria.
- As a group, a final decision matrix was constructed based on all the concepts and criteria.
- Based on the group decision matrix, two final designs were developed.

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Any Questions?