



FAMU-FSU
College of
Engineering

Team 502: Boeing Underwater Glider

Jake Burns, Tristan Hardy, Nicolas Lorin
Justin Sepulveda, Martin White

11/12/2024

Team Introductions



Jake Burns
Simulations Engineer

Tristan Hardy
Modeling Engineer

Nicolas Lorin
Controls Engineer

Justin Sepulveda
Systems Engineer

Martin White
Materials Engineer



Sponsor and Advisor



Project Sponsor
Shawn Butler



Project Sponsor
JaQuan Young



Academic Advisor
Shayne McConomy



Faculty Advisor
Kourosh Shoele



Objective

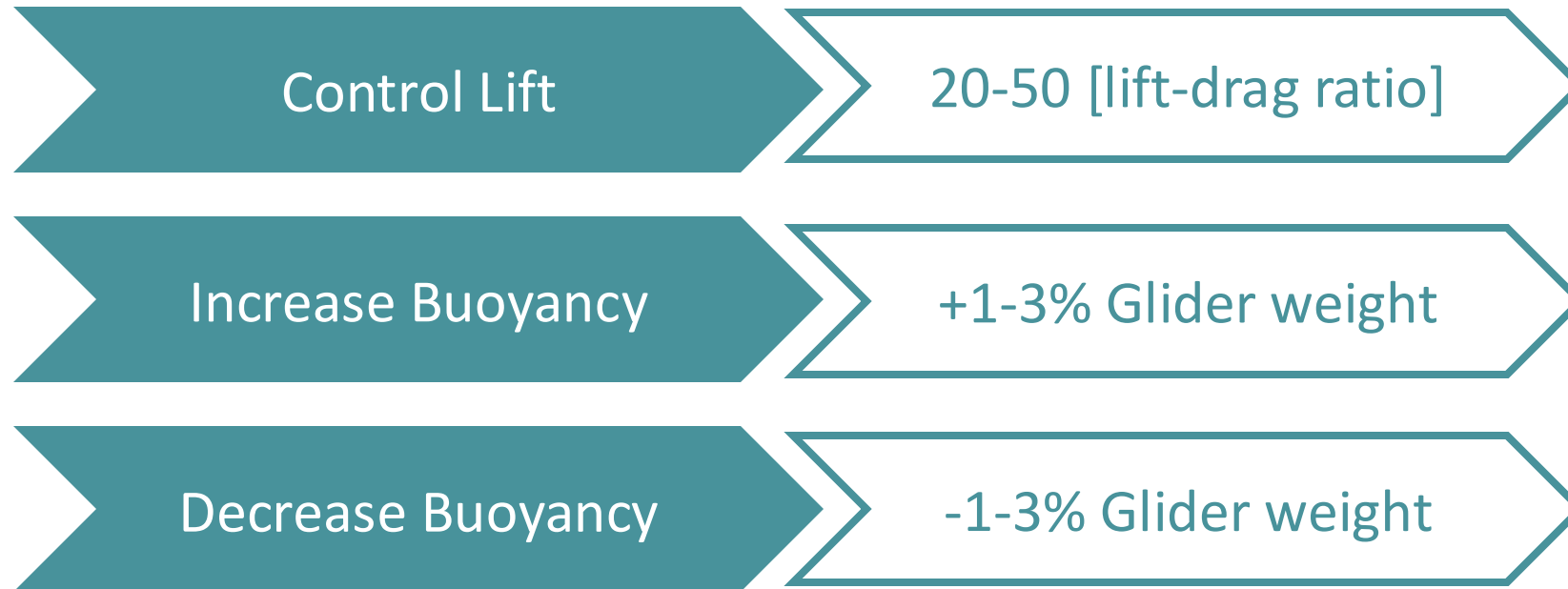
The objective of this project is to simulate and construct an underwater glider.



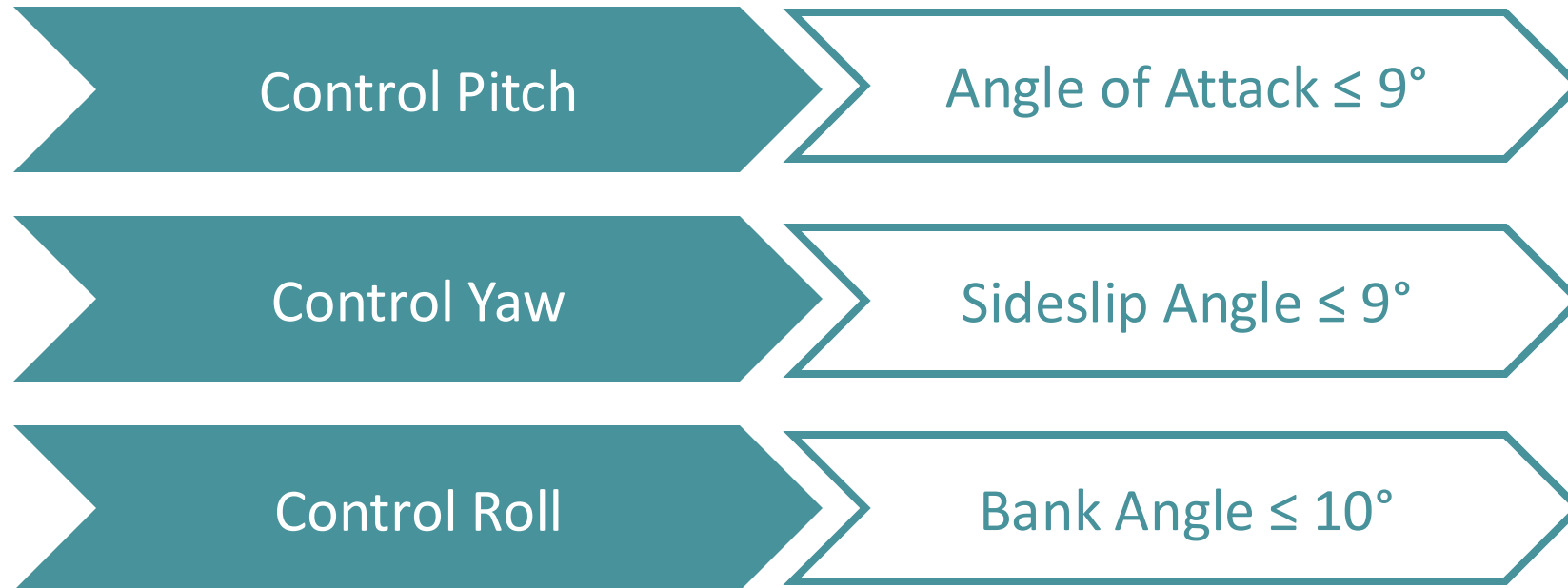
Functional Decomposition



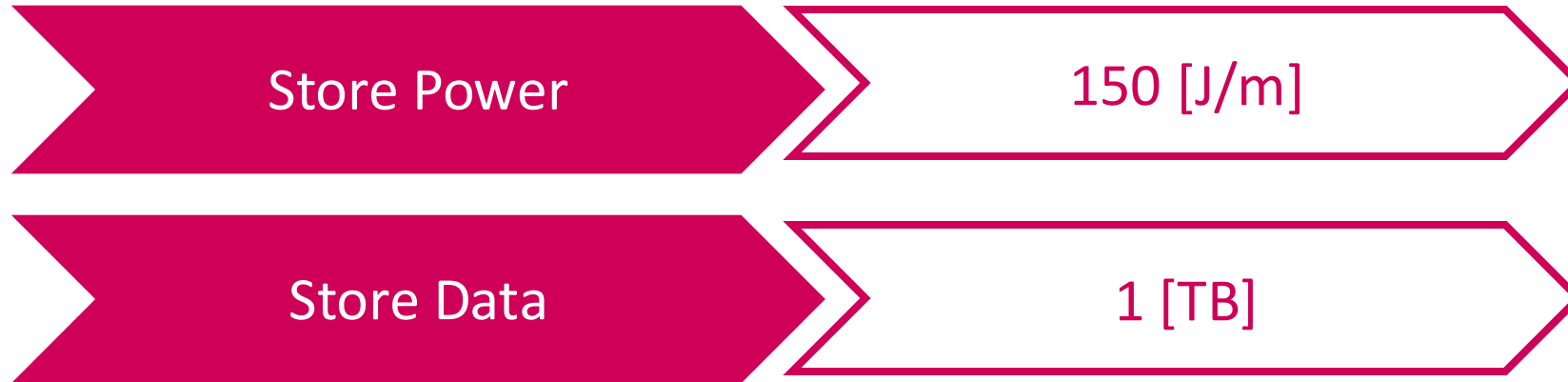
Targets and Metrics



Targets and Metrics



Targets and Metrics



Targets and Metrics

Endure Fatigue Stress

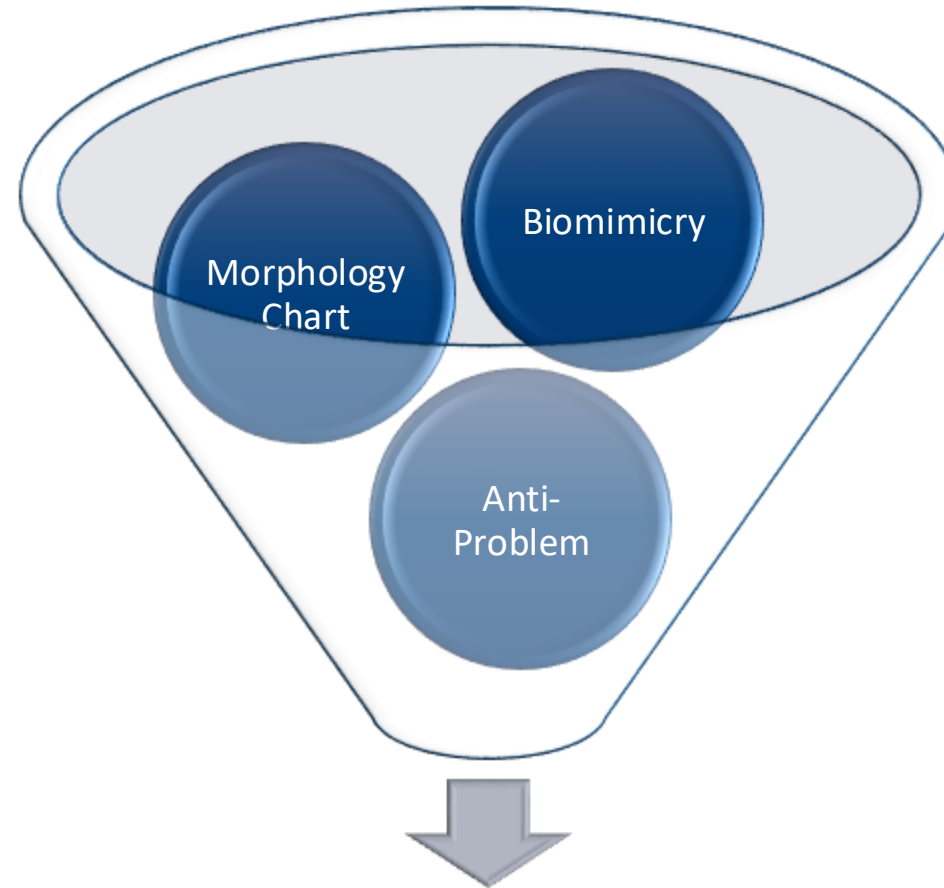
1000 [cycles]

Withstand Pressure
Difference

0.6 [MPa]

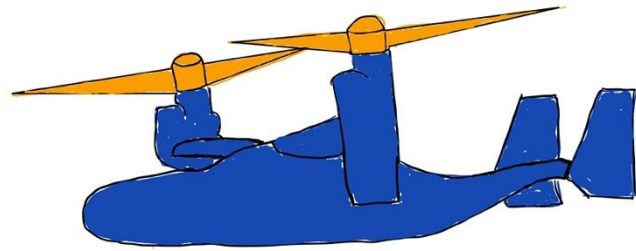


Ideation Methodology

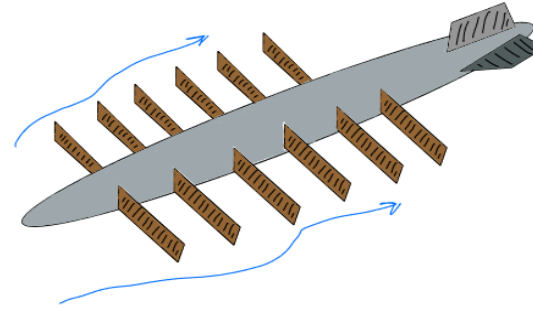


Concept Generation

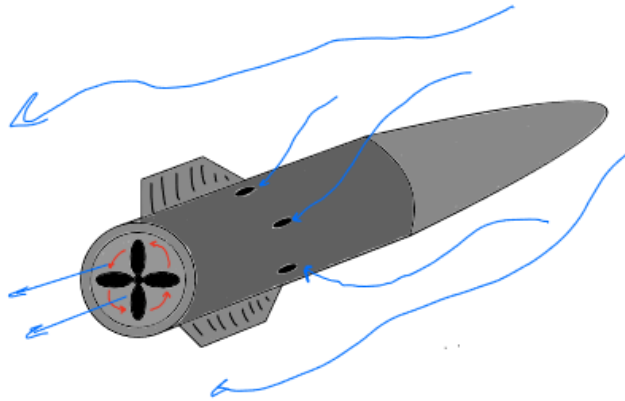
Medium Fidelity



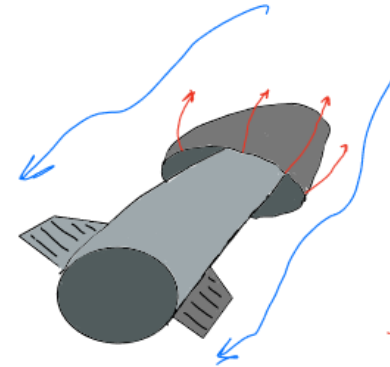
Propeller Glider



Energy Harvesting Glider

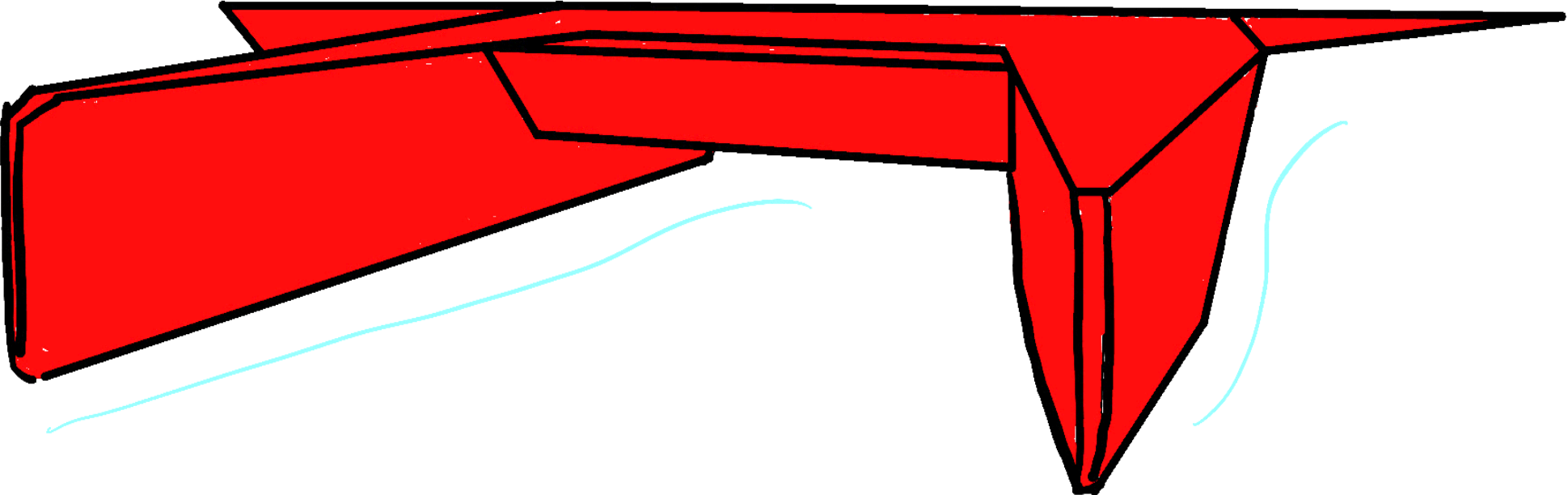


DC Motor Glider

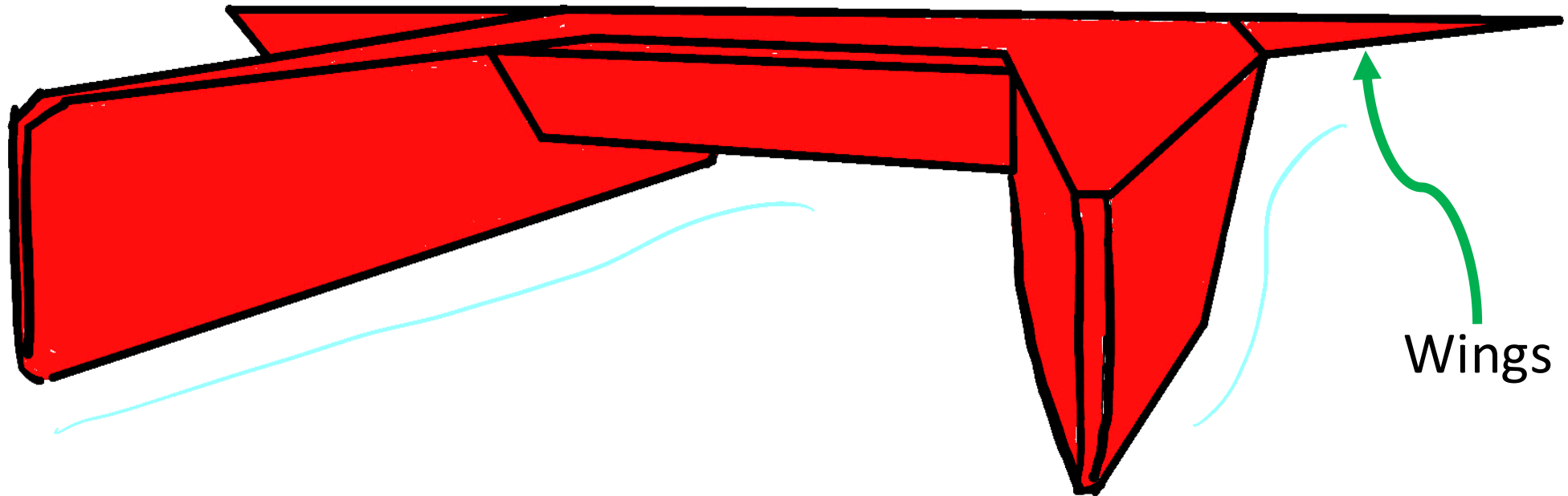


Jellyfish Glider

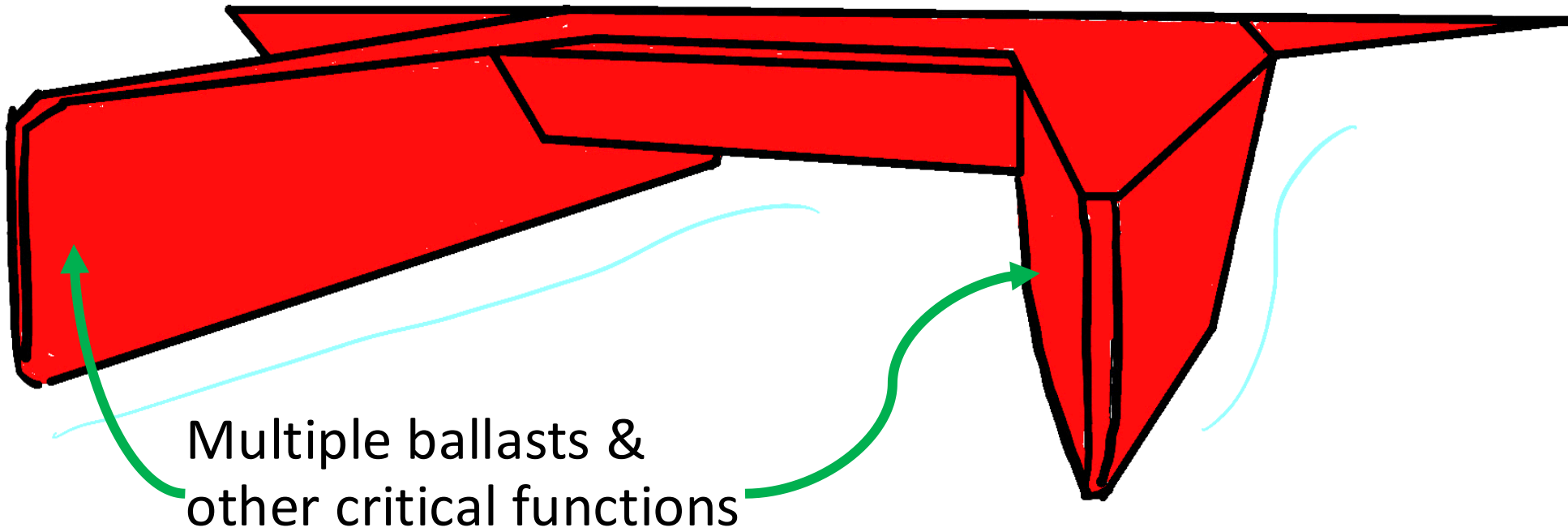
Dual Hull Glider



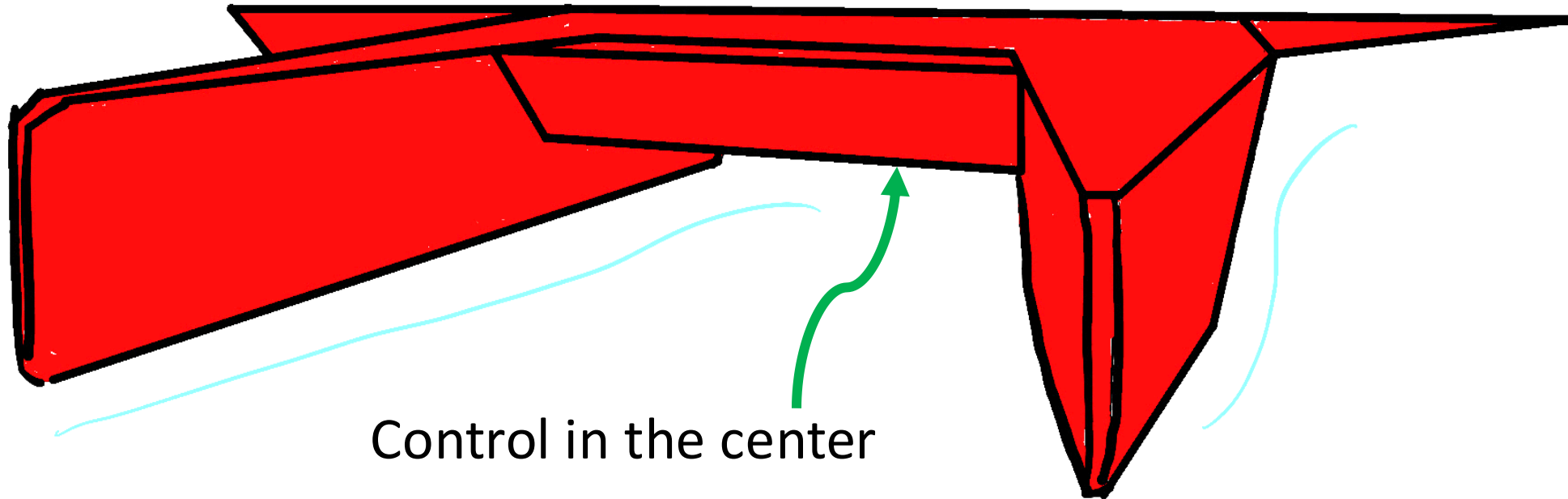
Dual Hull Glider



Dual Hull Glider

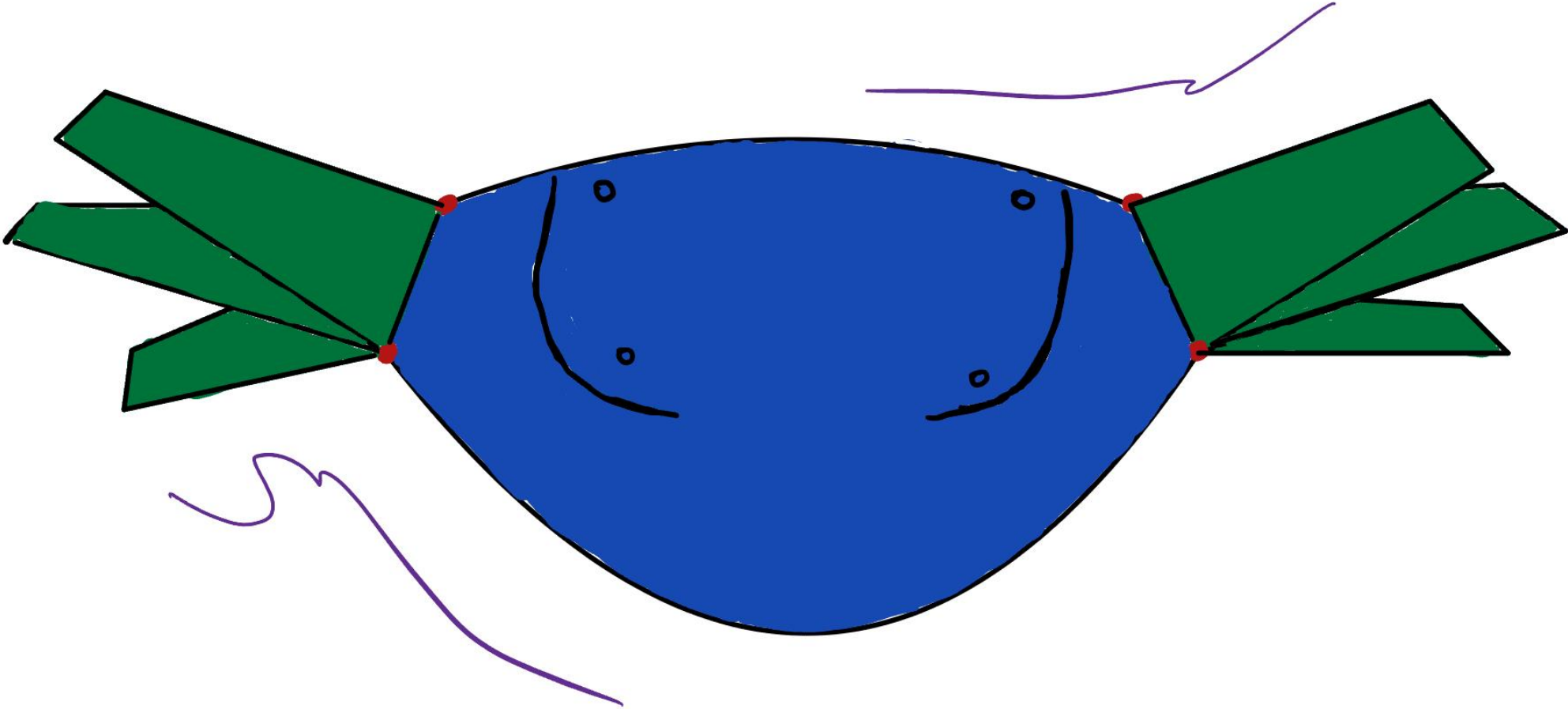


Dual Hull Glider

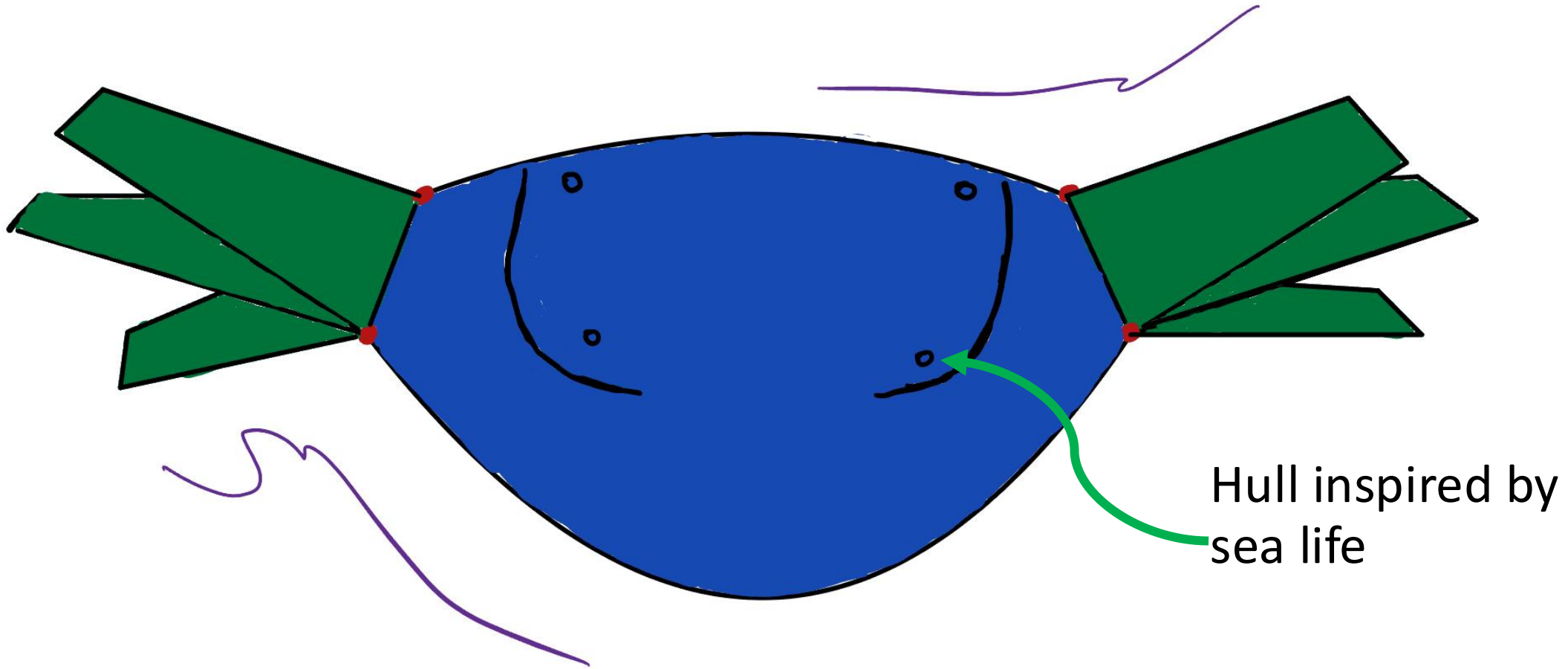


Control in the center

Adjustable Wing Glider

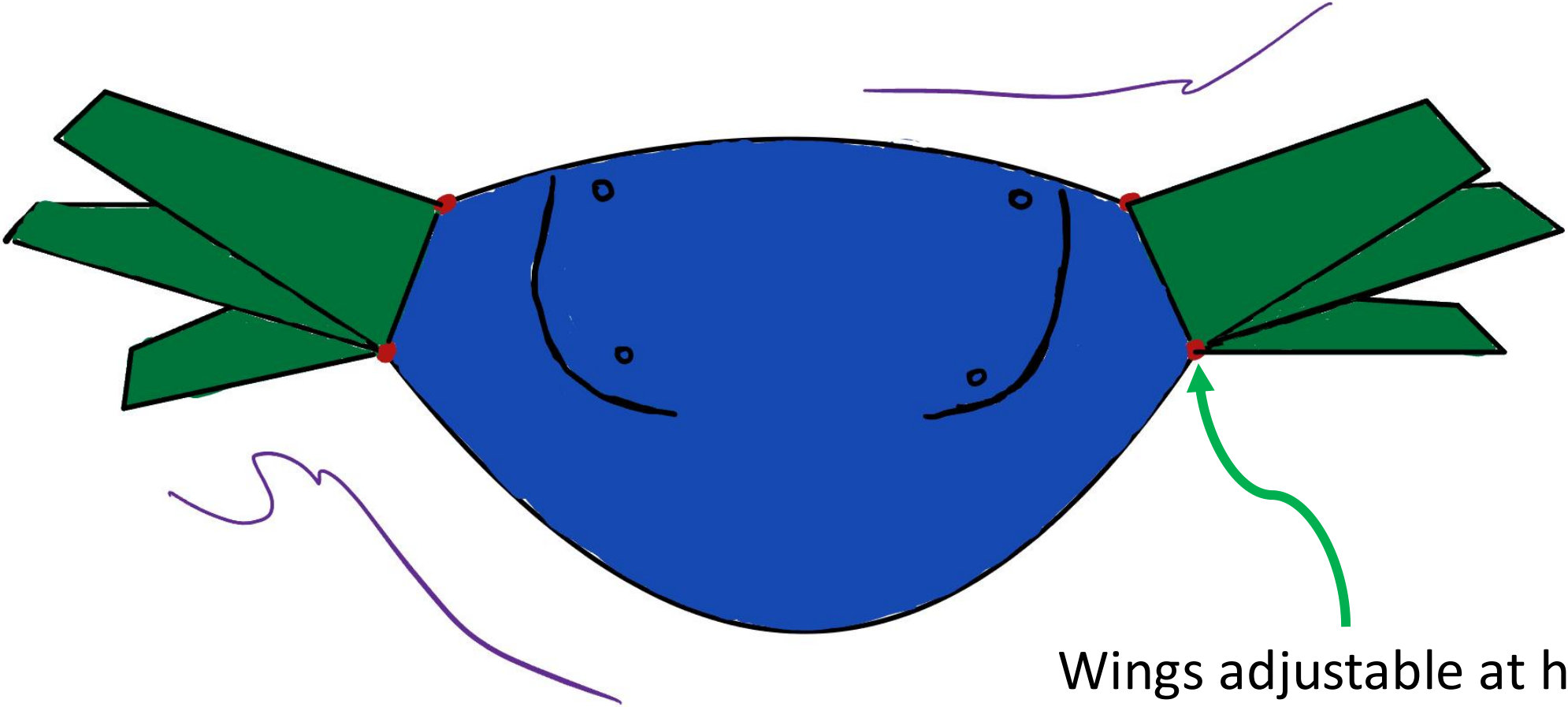


Adjustable Wing Glider



Hull inspired by
sea life

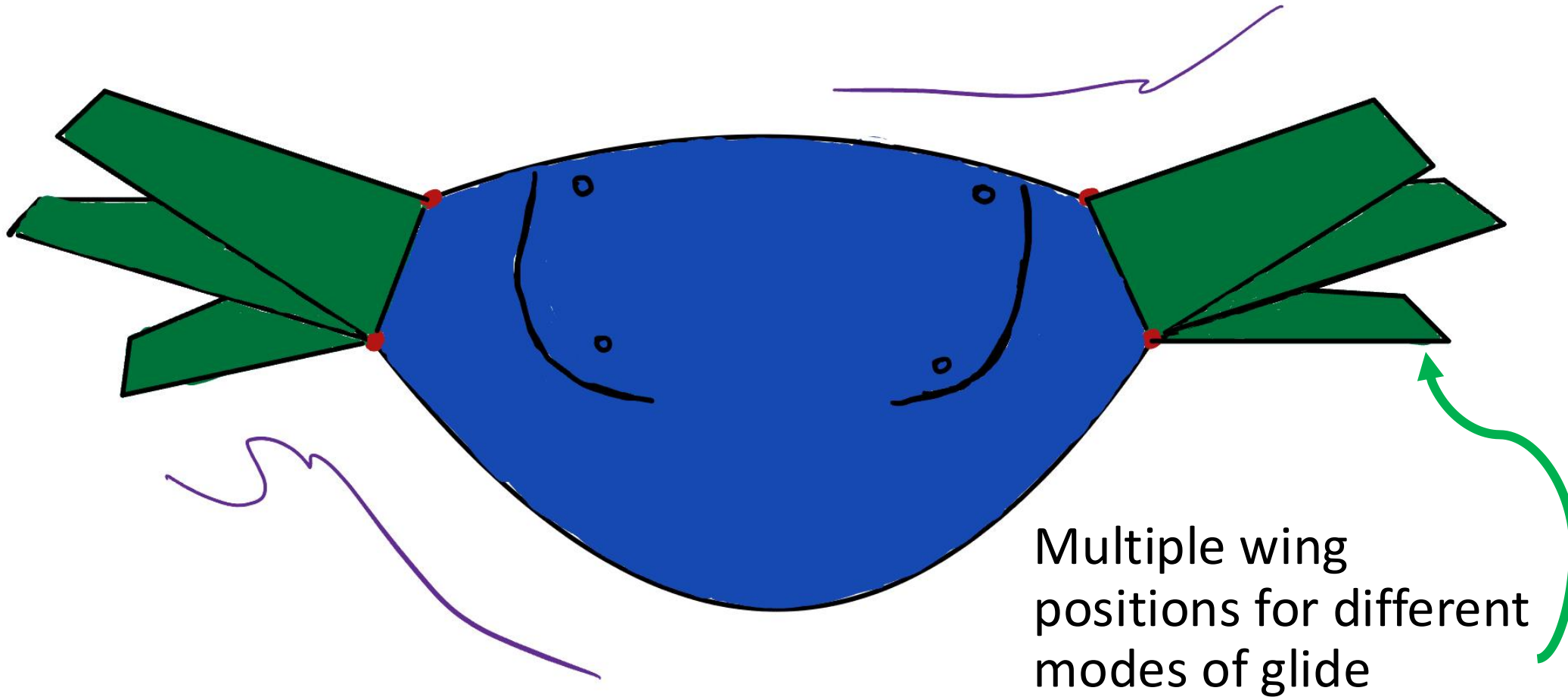
Adjustable Wing Glider



Wings adjustable at hinge

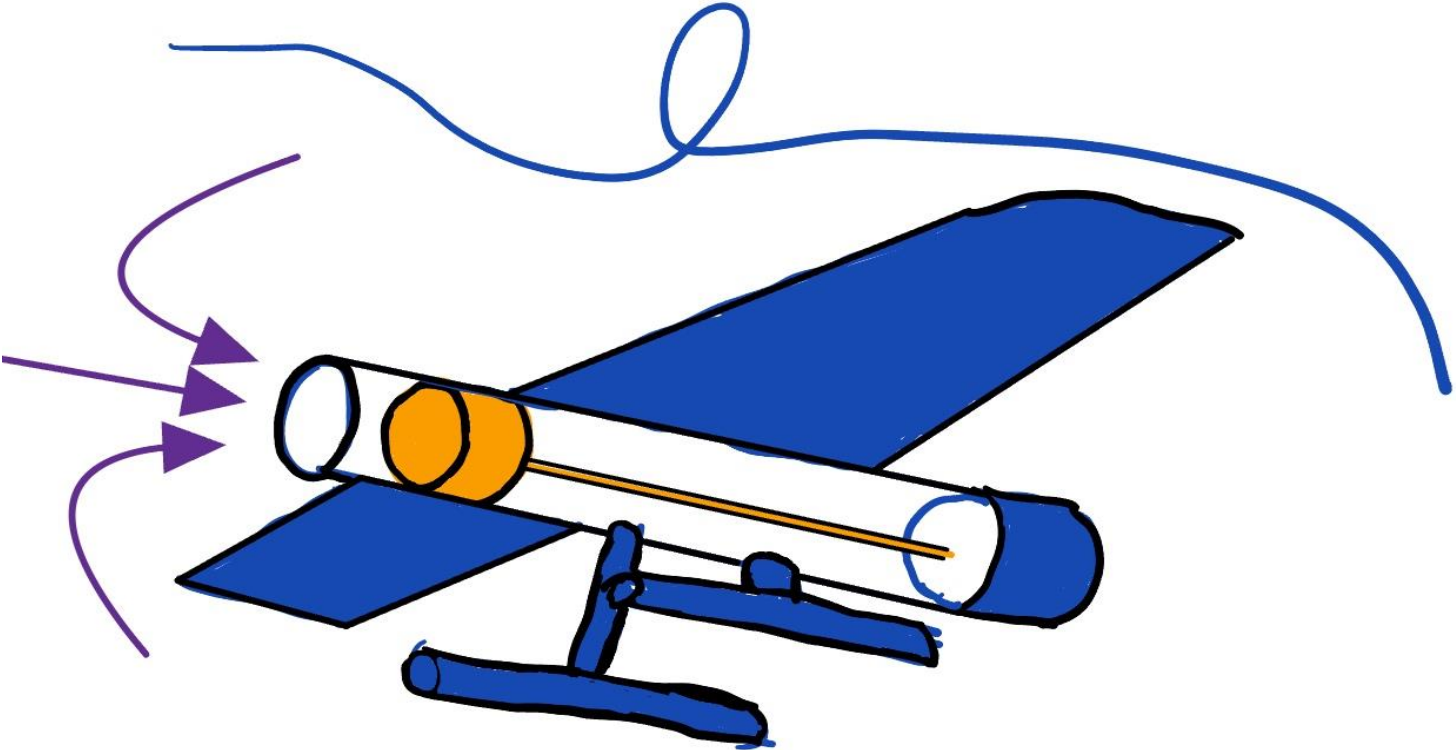


Adjustable Wing Glider

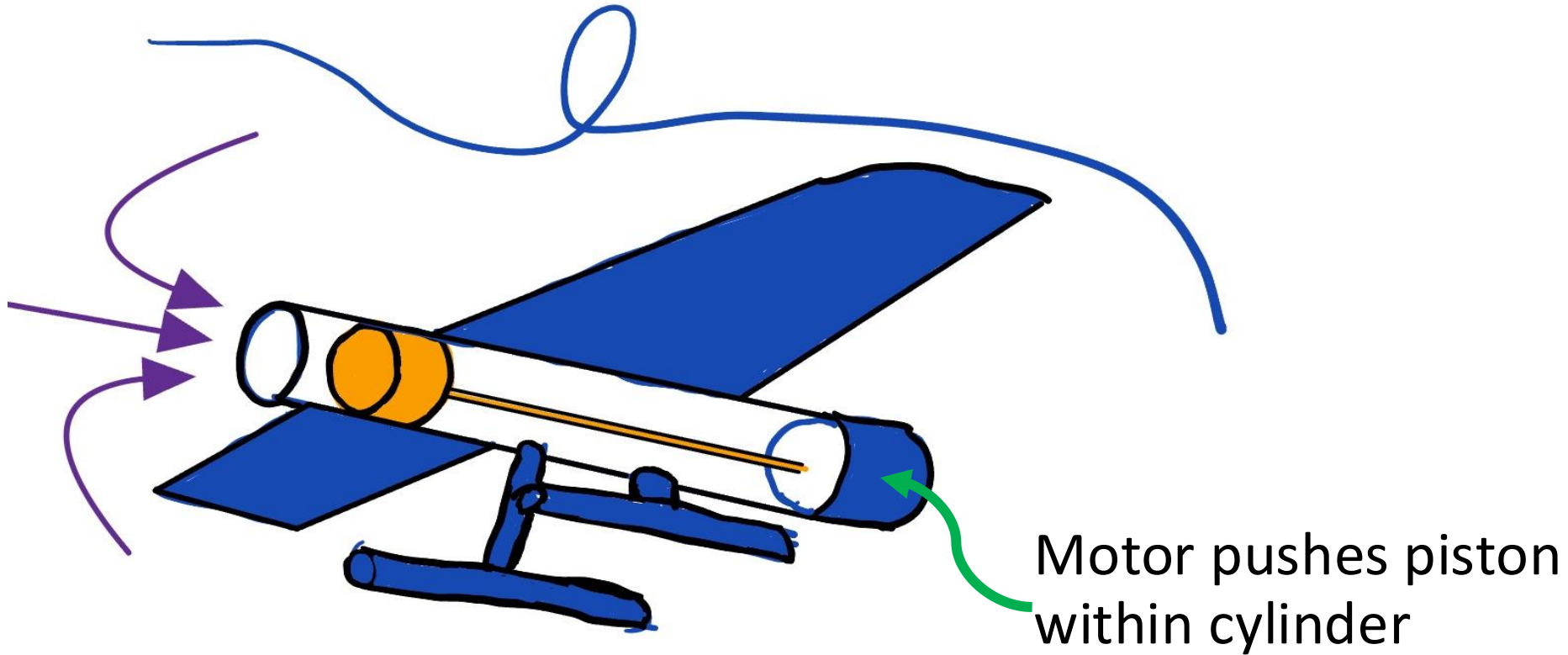


Multiple wing positions for different modes of glide

Piston Glider



Piston Glider

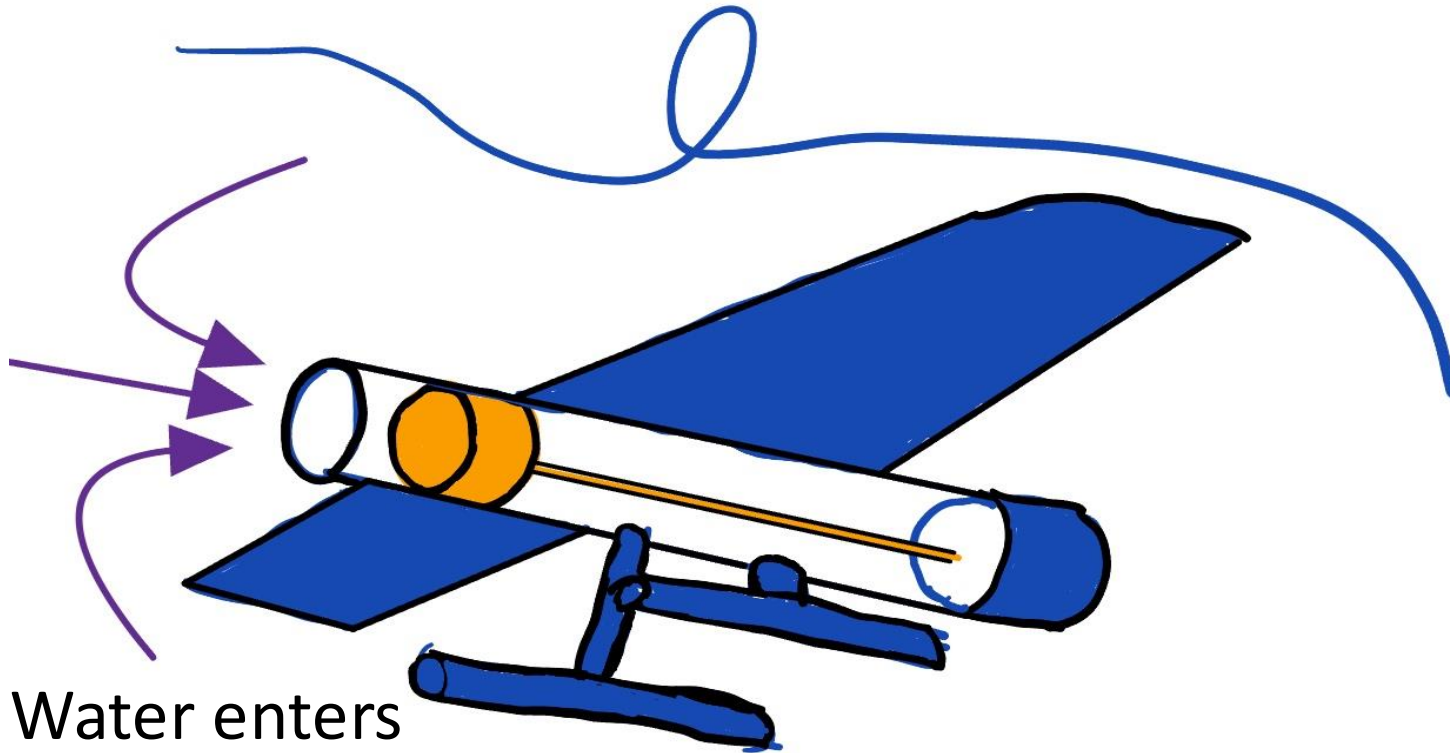


Nicolas Lorin



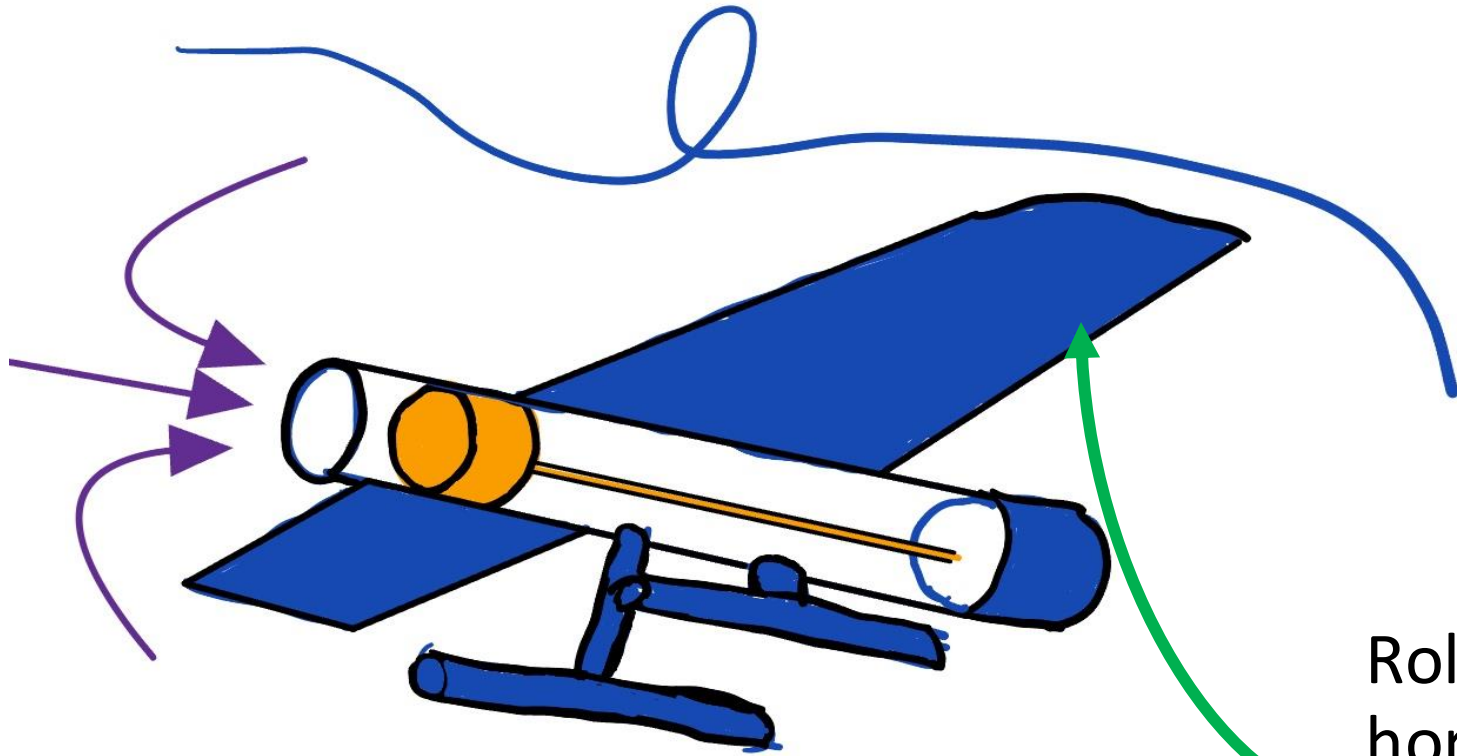
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Piston Glider



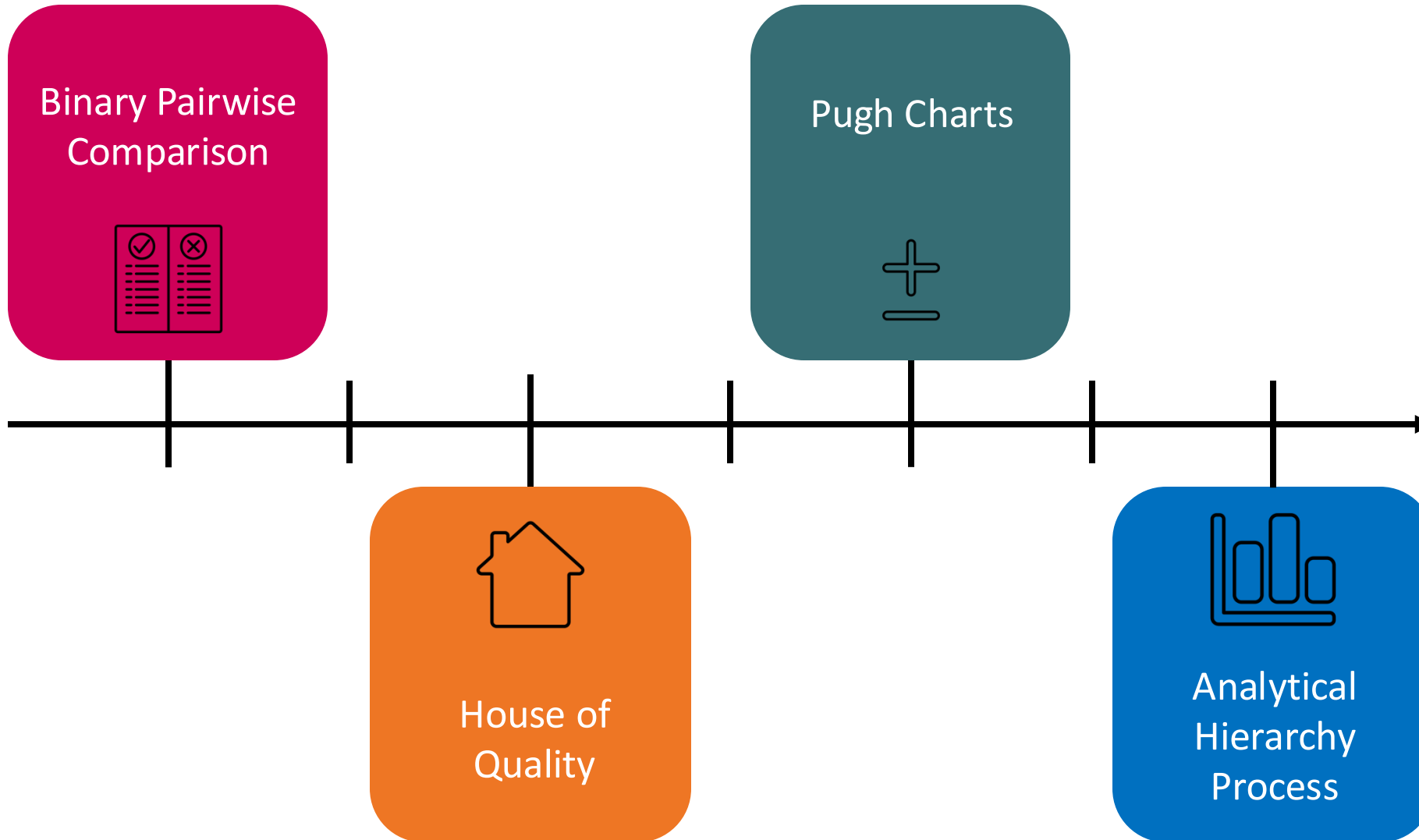
Water enters
chamber,
sinking glider

Piston Glider



Roll, pitch, & yaw via
horizontal control
surfaces

Concept Selection Process



Pairwise Comparison

Survivability

Simulation

Path Optimization



House of Quality

Store Power

3

Store Data

Endure Fatigue
Stress

Regulate Drag

Control Lift

Increase
Buoyancy

4

Decrease
Buoyancy

5

Withstand
Pressure

1

Control
Orientation

2



First Pugh Chart Iteration

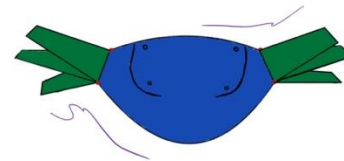
Datum



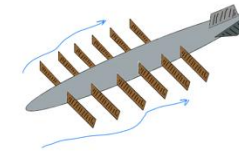
Boeing Wave Glider



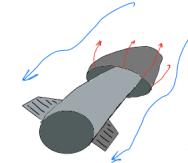
Propeller Glider



Adjustable Wing Glider



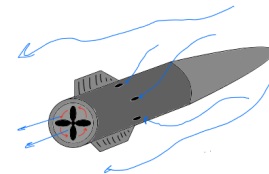
Energy Harvesting Glider



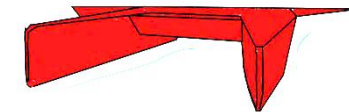
Jellyfish Glider



Piston Glider



DC Motor Glider



Dual Hull Glider

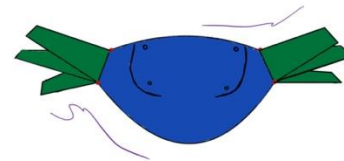


Second Pugh Chart Iteration

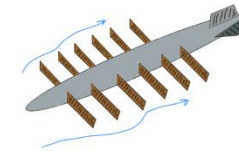
Datum



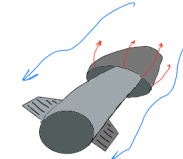
Propeller
Glider



Adjustable Wing
Glider



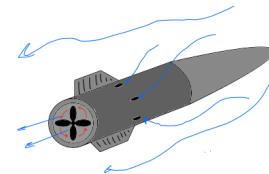
Energy Harvesting
Glider



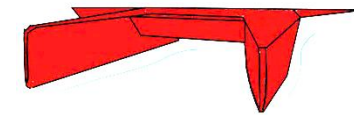
Jellyfish
Glider



Piston Glider



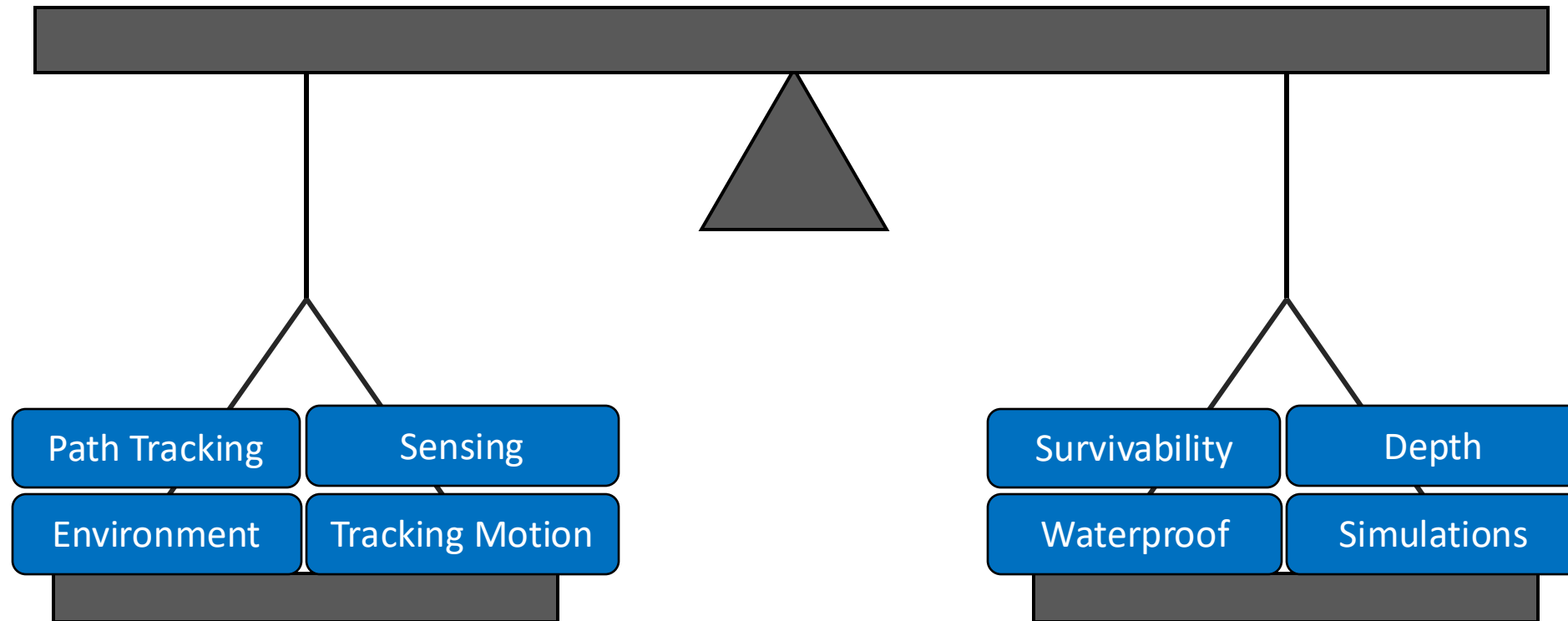
DC Motor Glider



Dual Hull Glider

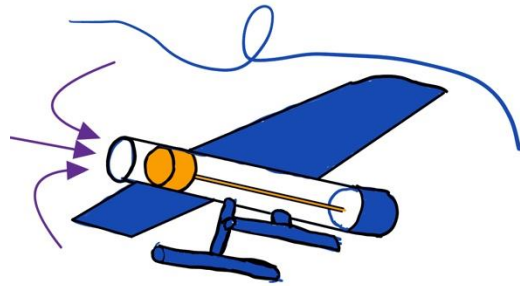


Analytical Hierarchy Process



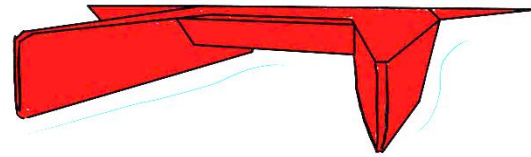
Analytical Hierarchy Process

Alternative Value Chart



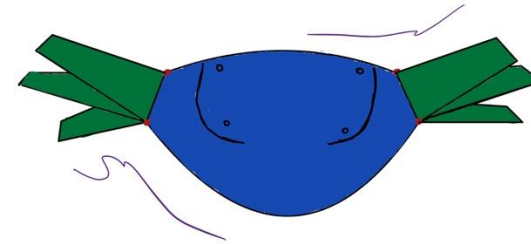
Piston Excavated Buoyancy

0.354



Dual Hull Glider

0.394



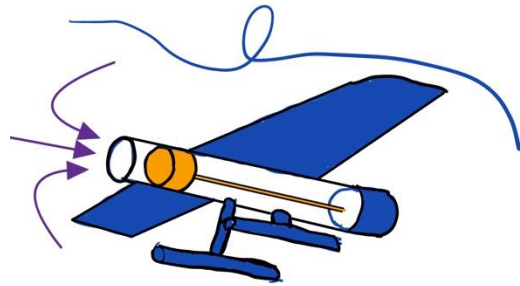
Adjustable Wing Glider

0.253



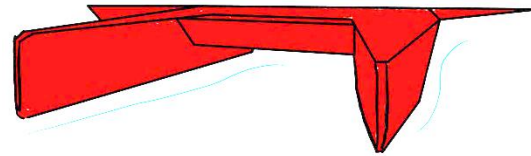
Analytical Hierarchy Process

Alternative Value Chart



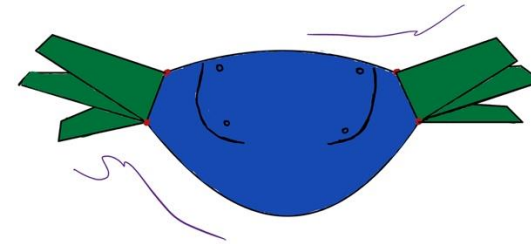
Piston Excavated Buoyancy

0.354



Dual Hull Glider

0.394

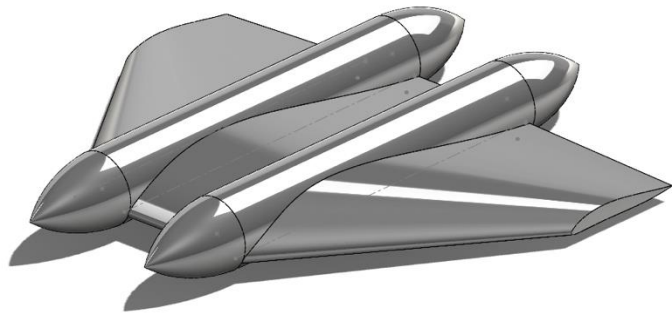
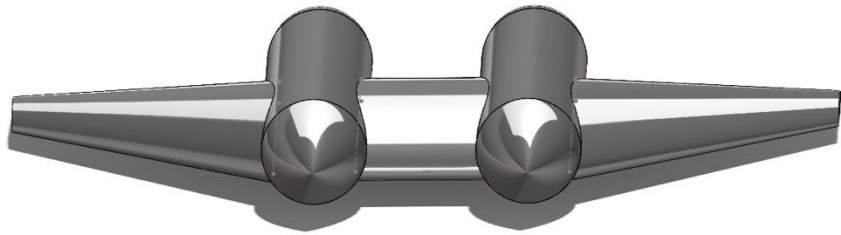


Adjustable Wing Glider

0.253



Final Selection



Preliminary CAD Design



Preliminary Glide Profile Animation

Connect on LinkedIn

Jake Burns



Tristan Hardy



Nicolas Lorin



Justin Sepulveda



Martin White

