Modular R.O.V for Sub-Sea Operations

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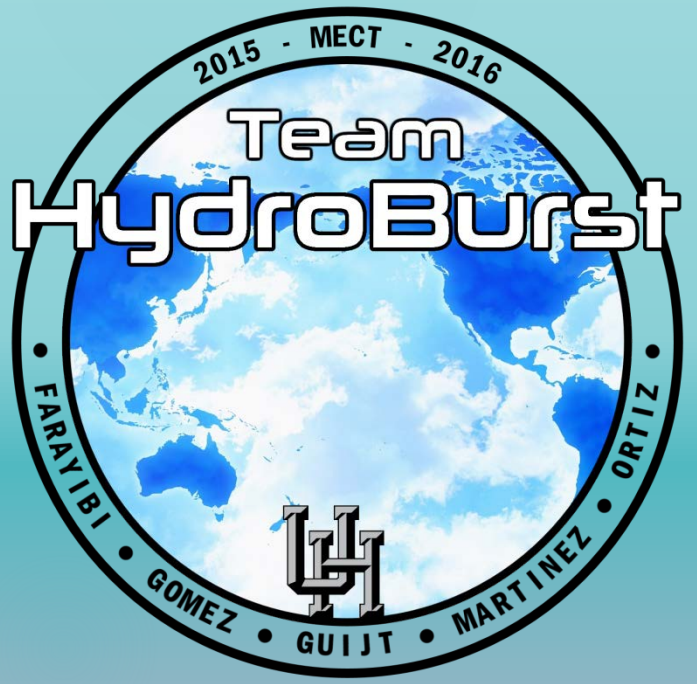
FALL SEMESTER CONCLUSION

12/07/2015



Olly

ROV Presentation Outline

- Team Objective
- CFD Analysis
- Frame Selection
- Control System
- Propulsion System
- Arm Module
- Buoyancy
- Tether Management System
- Project Budget
- Semester Gantt Chart
- The Final Design

Team Objective

- Team HydroBurst's primary objective is to design, test, and construct a modular underwater remotely operated vehicle (ROV) to compete in the 2016 National and International MATE Competitions.

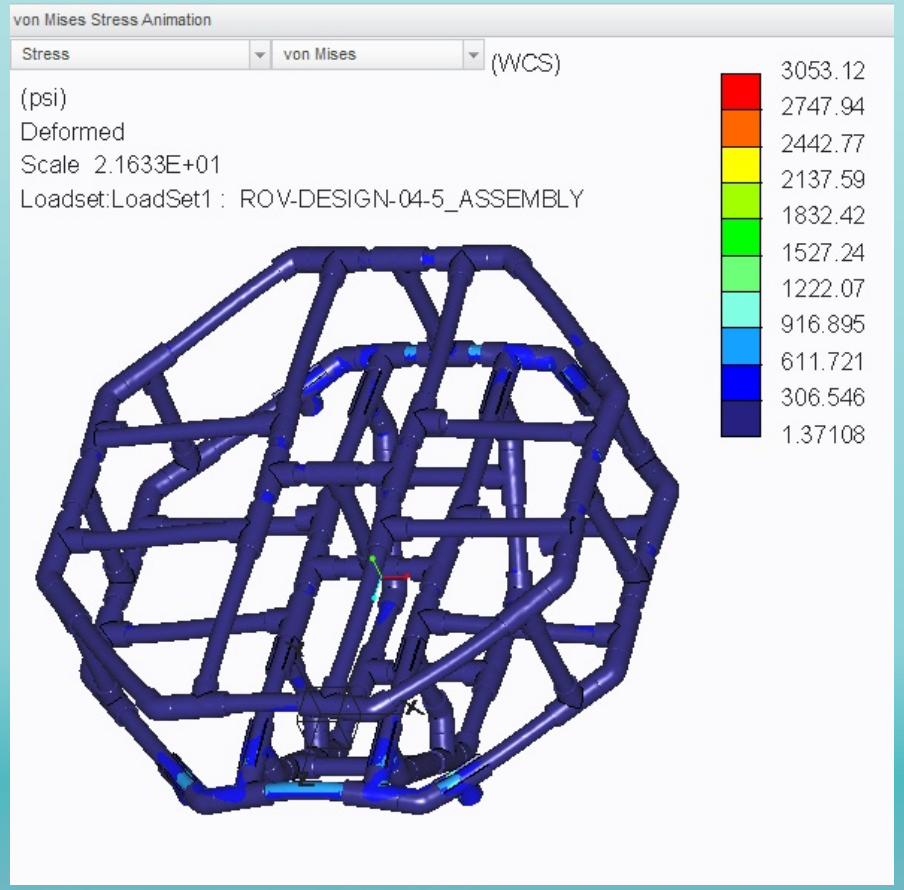
MATE
MARINE ADVANCED TECHNOLOGY EDUCATION CENTER

Team HydroBurst
2015 · MECT · 2016
FARAYIBI · GOMEZ · GUIJT · MARTINEZ · ORTIZ

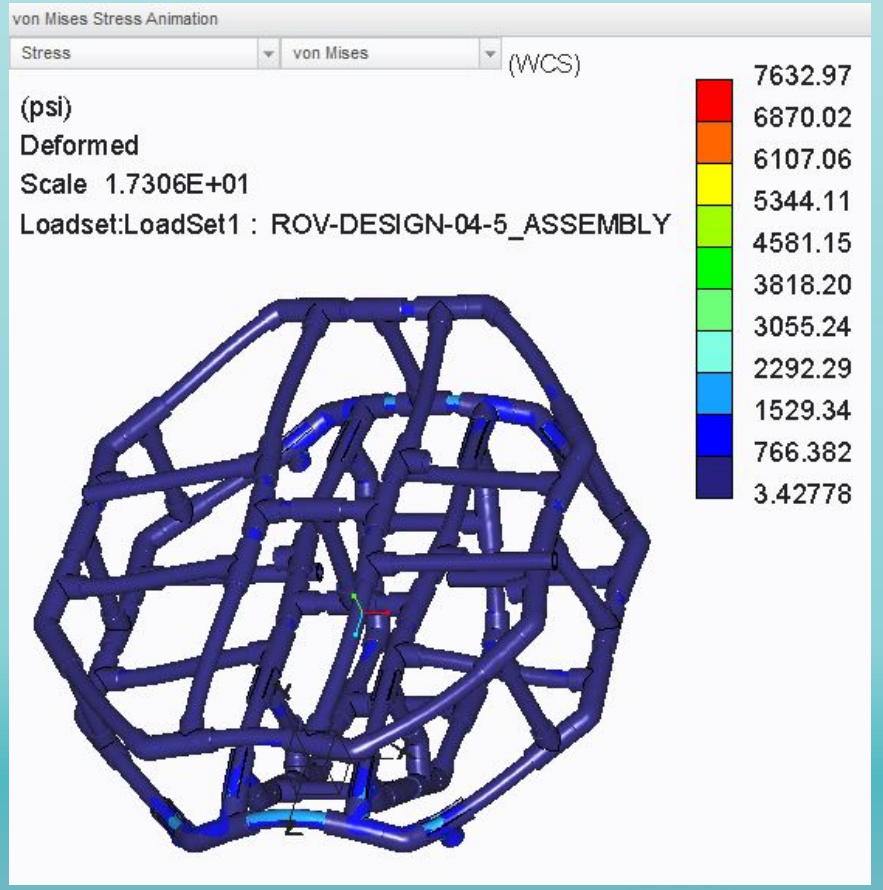
Stess Analysis

Design 5

- **40 feet Underwater**



- **100 feet Underwater**

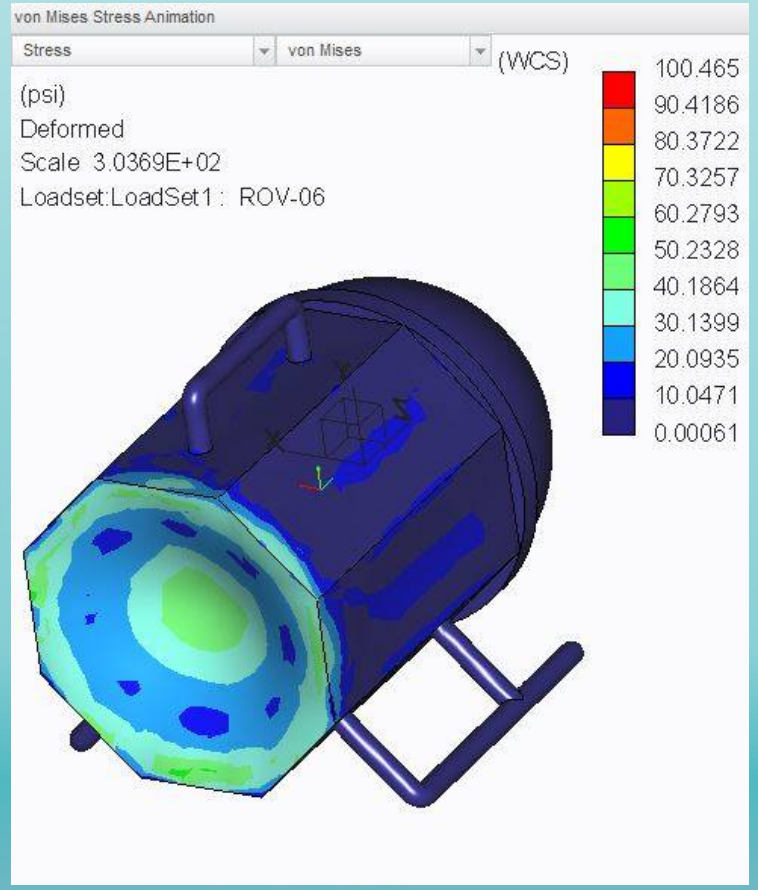


Juan

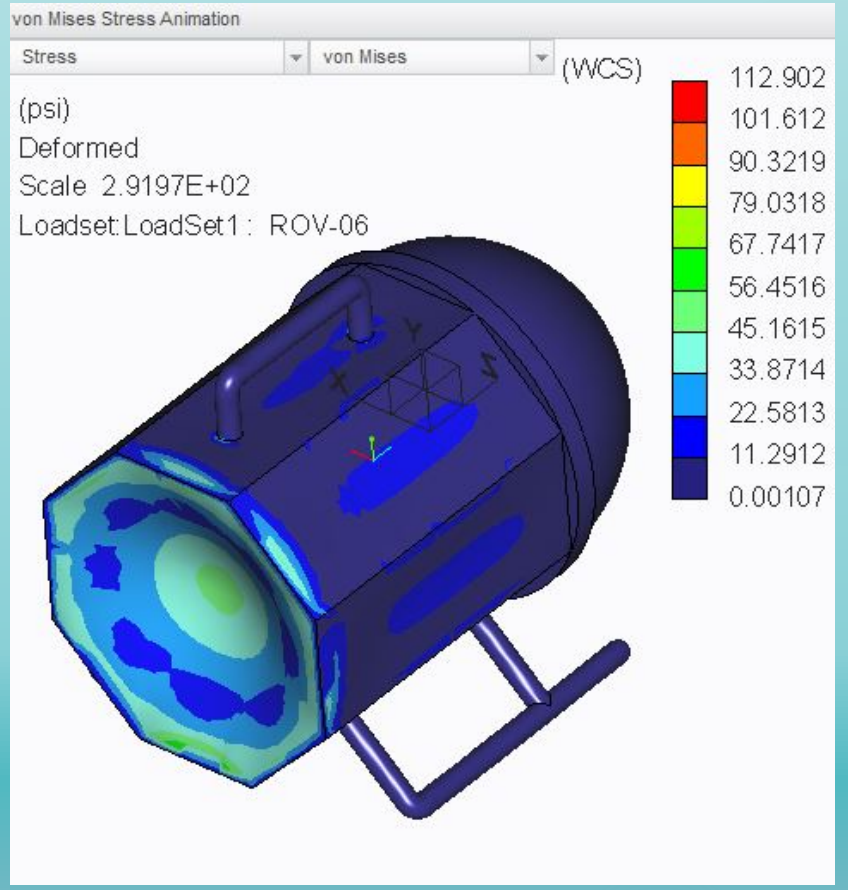
Stess Analysis

Design 6

- **40 feet Underwater**

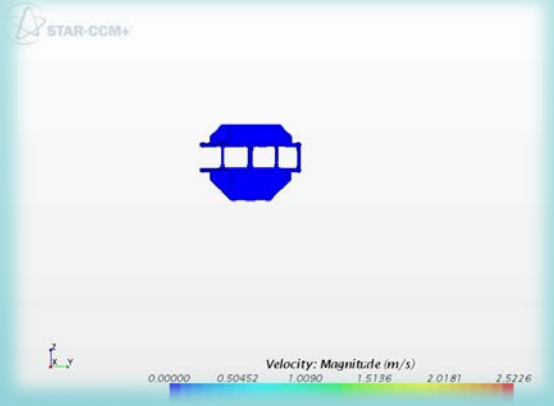


- **100 feet Underwater**

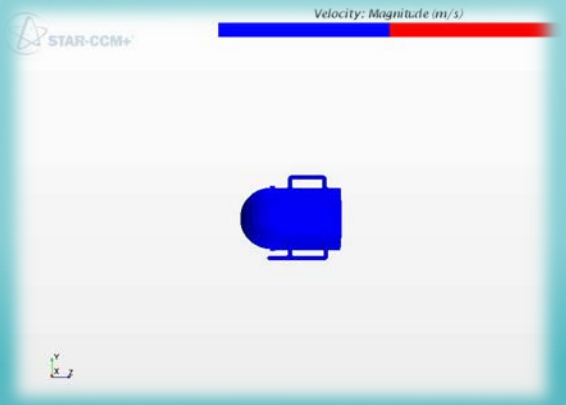


CFD Analysis

- Design 05



- Design 06



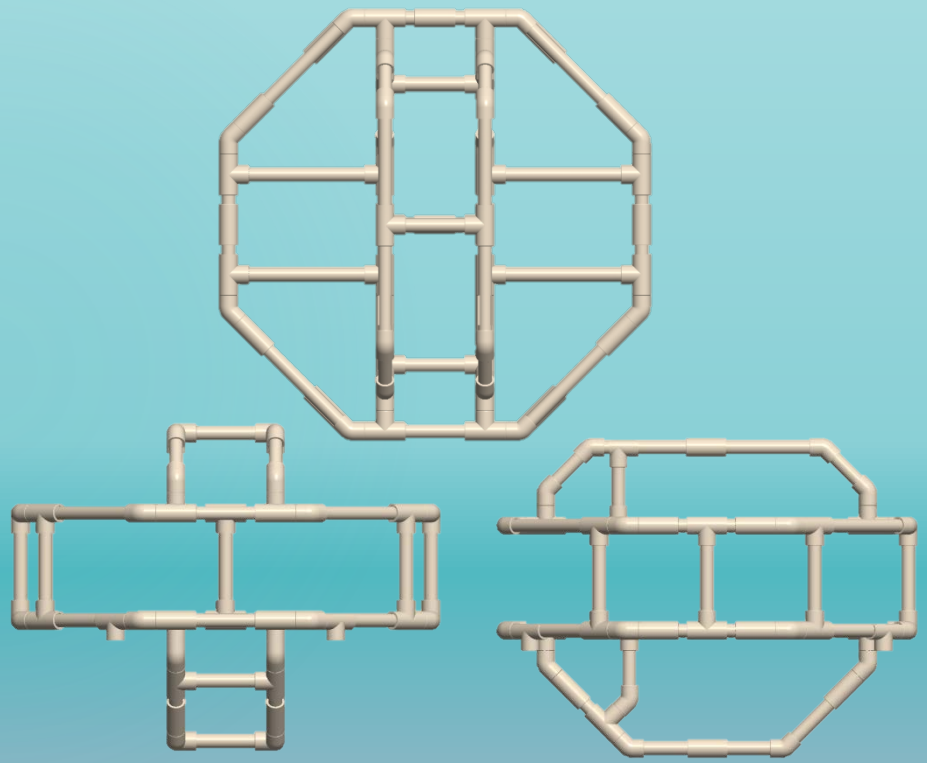
Frame	5	6
Coefficient of Drag	0.685	1.661
Coefficient of Lift	49.565	3015.476
Pressure Drop (Pa)	8.366	6.872

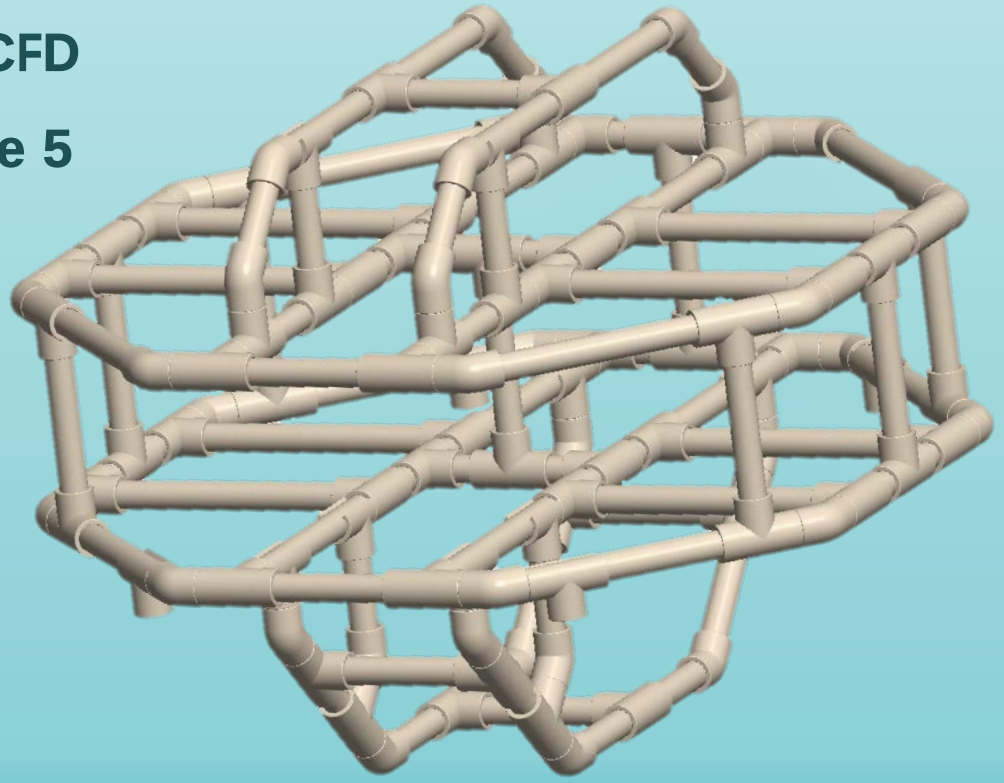
Simulations created by Gustav Guijt

Juan

Frame Selection

- Based on the Results of the Stress Analysis and CFD Analysis, we decided to continue with the Frame 5 design for our final product:





Control System

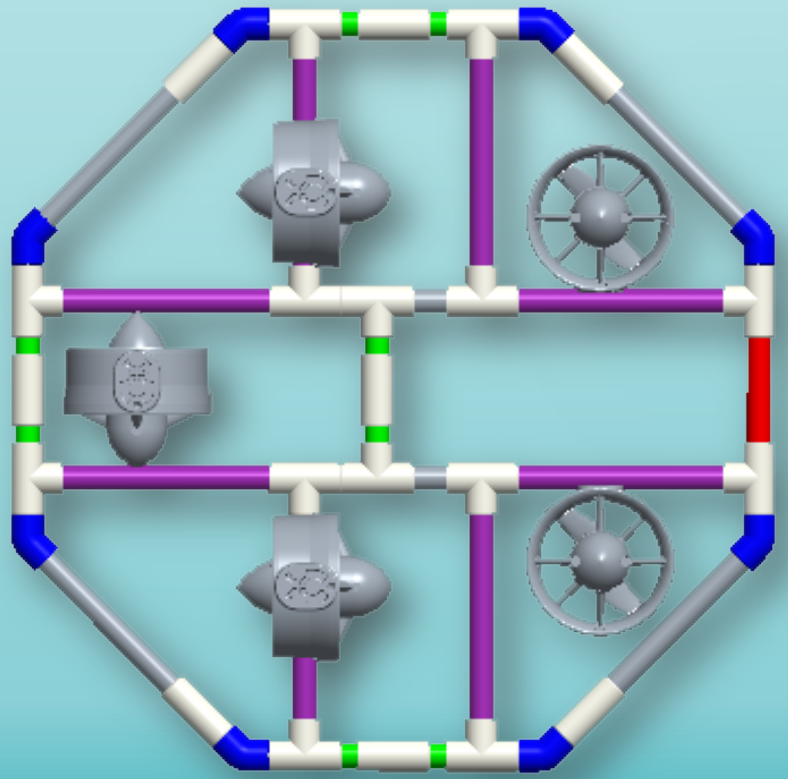
David

Propulsion System

- BlueRobotics T100 Thruster
  - Price: $119.00 - $199.00 each
  - Motor Type: High efficiency brushless
  - Weight in air = 0.93 lb.
  - Maximum Power = 130W
  - Operating Voltage = 12 volts
  - Maximum Thrust:
    - 5.2 lbf Forward
    - 4 lbf Reverse

Propulsion System
Thruster Layout

- 2x Up/Down Thrusters:
  - Helps compensate for the weight of extended arms.
- 2x Forward/Backward Thrusters:
  - Turning and forwards motion.
- 1x Rotation Thruster:
  - Rotation on spot, and reduces turning circle.



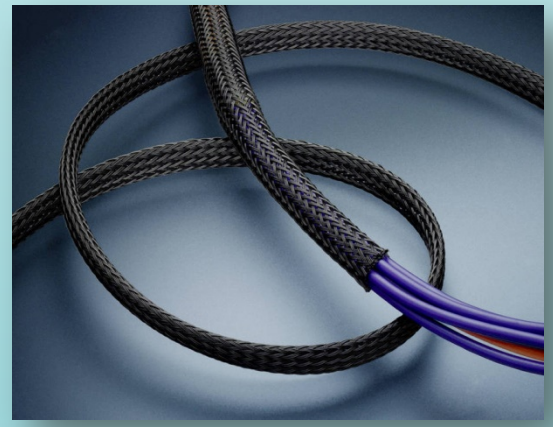
Arm Module

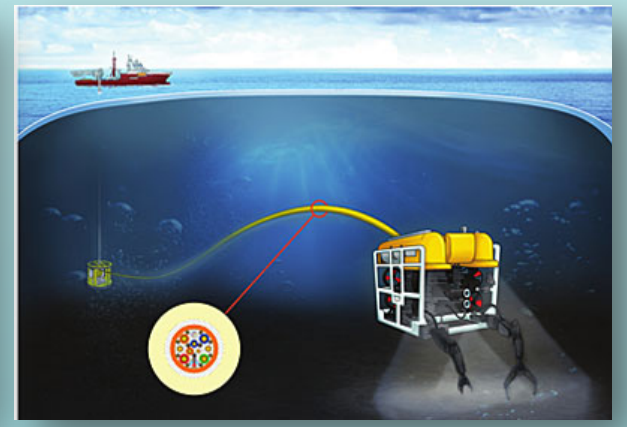
Victor

Buoyancy

Tether Management System

- MATE Competition:
  - Tether is included in the total weight of the ROV, and needs to be able to reach a depth of 40 feet.
- Team Decisions:
  - Minimize the number of cables in Tether to reduce weight.
  - Need 100 foot tether.
- Cable Design:
  - Necessary Cables:
    - 100ft Power
    - 100ft Ethernet
  - Cable Management:
    - Mesh Sleeve

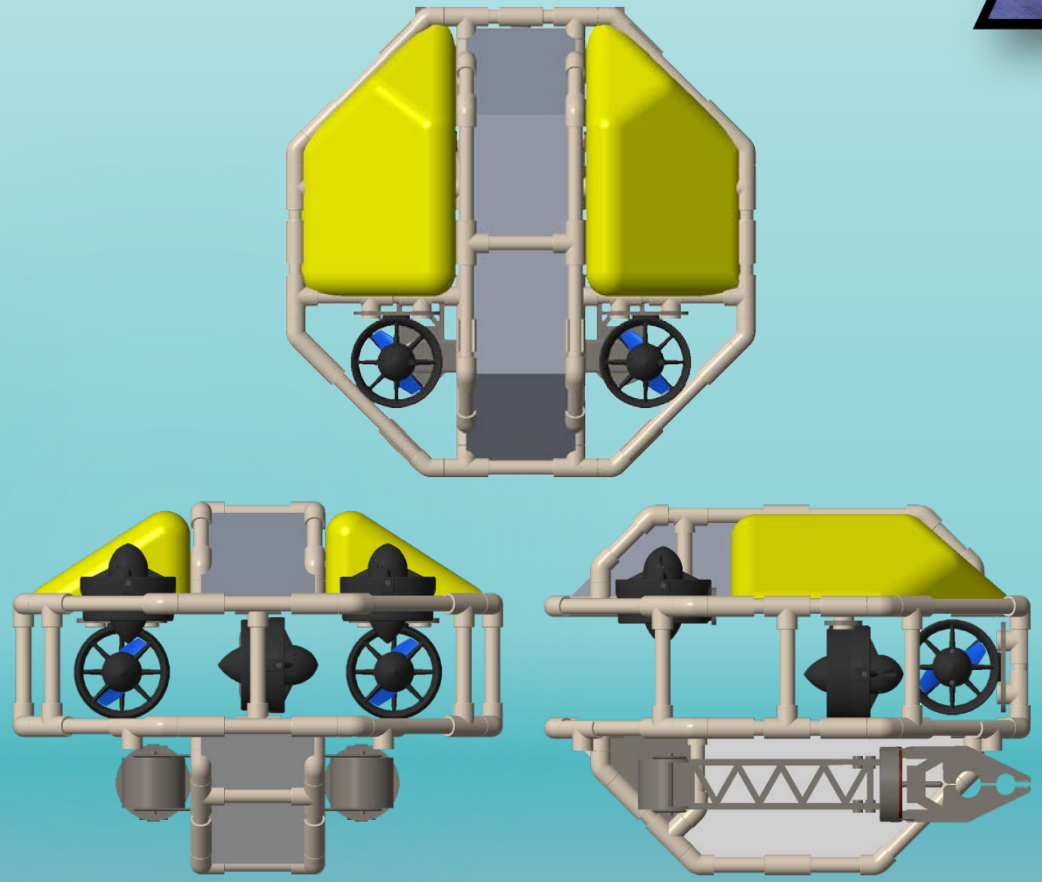


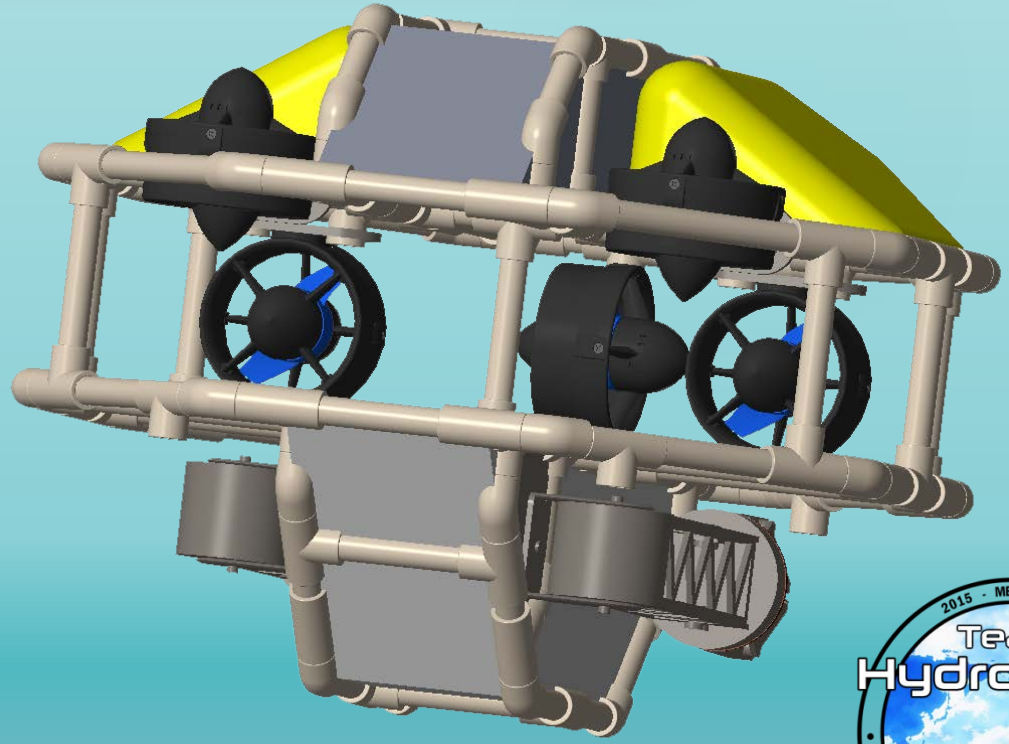


Gustav

The Final Design

- Introducing Team HydroBurst's ROV, The NEREIDES





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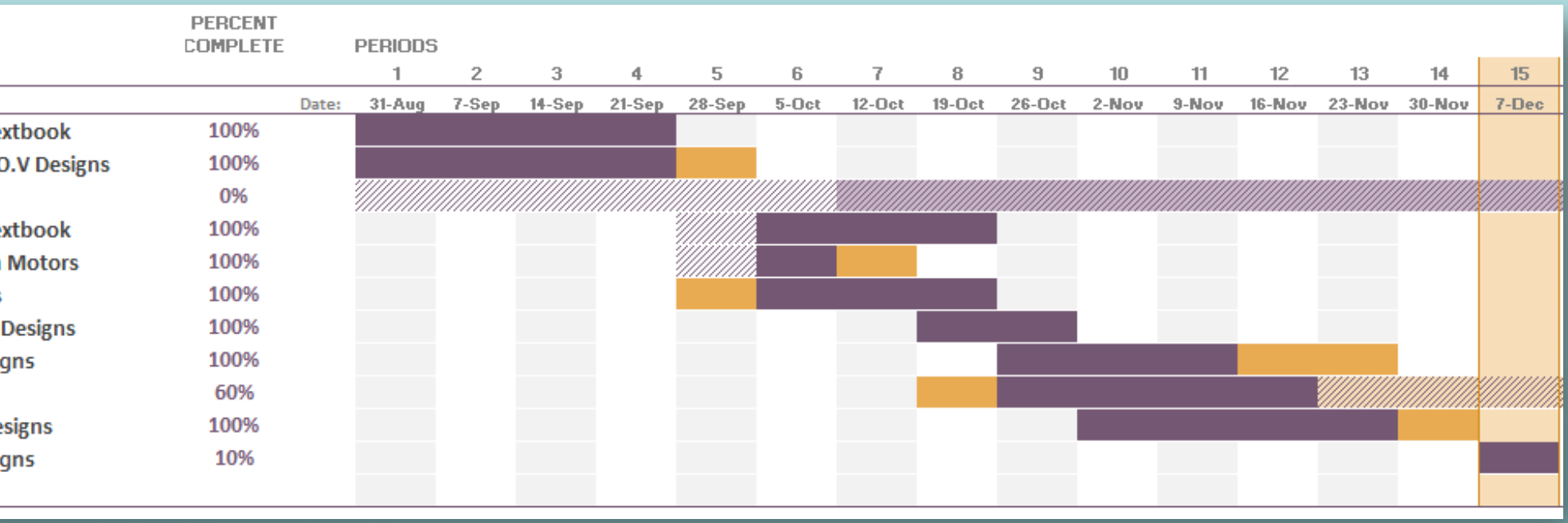
Project Budget

- Current Cash Flow:
  - Expenditures:
    - CPVC components ($86.35)
  - Income:
    - No Sponsors as of 12/07

Estimated Project Budget	
Expenditures:	**Cost:**
Prototyping	$700
Frame	$300
Propulsion System	$1100
Control System	$600
Arm System	$800
Tether Management System	$300
Competition	$200
Total:	**$4,000**

Semester Gantt Chart

ACTIVITY	PERCENT COMPLETE
Chapters 1-3 of Textbook	100%
Research Basic R.O.V Designs	100%
Find Sponsers	0%
Chapters 4-6 of Textbook	100%
Design / Research Motors	100%
Auto-CAD Designs	100%
Stress Analysis of Designs	100%
Update CAD Designs	100%
Design Arm	60%
CFD Analysis of Designs	100%
Update CAD Designs	10%



Thank You for Listening!