

2025-2026

Technical Report



Linn-Benton Community College
Albany, OR - USA

TOOLS

Wade Johnson, Helen Rounsavell, Lorelai Fosselman, Dominique Klahold, Sara Leathers

FRAME

CONTROLS

Jason Fanger, Kaia Reichard

ELECTRICAL

Azreal Switzer, Eric Anderson, Chris Dalton, Sierra Brightly, Asher Richmond

GRAPHIC DESIGN

TECHNICAL WRITER

Cooper Madison-Dawson, Casey Johnson

VERTICAL PROFILER

Dwayne Wallace, Casey Bianco-Davis

MENTORS

Greg Mulder, Heather Hill

Introduction



Figure 1. The ROVrunners

From back, left to right: Asher Richmond, Wade Johnson, Casey Bianco-Davis, Chris Dalton, Heather Hill, Dwayne Wallace, Azreal Switzer, Lorelai Fosselman, Eric Anderson, Jason Fanger, Greg Mulder, Kaia Reichard, Sara Leathers

Abstract

Michelangelo is a highly modular ROV built for the MATE ROV 2026 International Competition. This year, we really wanted to push the boundaries of what could be accomplished on an ROV. We have a brand new modular housing using custom-manufactured connectors, an array of specially designed unpowered tools, and a unique buoyancy system that employs both a VBS and a precise adjustment array.

The ROVrunners (Figure 1) have been working hard for the past nine months to reach this point. Implementing the skills of old members, the fresh eyes of new members, and the guidance of our mentors, we have truly created something special.

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Teamwork

Company Profile

We are the ROVrunners, based at Linn-Benton Community College in Albany, Oregon. Because we are a two-year college, we are always bringing in new people and losing old people. While the loss of experience and integration can be a detriment, the influx of new members has its advantages.

When we bring in new members, we gain new ideas and perspectives. We strive to encourage and guide these new members as they learn to bring their ideas to life.

This strategy ensures an environment that encourages free thinking and offers a variety of important learning opportunities, so that these new members can eventually take the place of the old members in mentoring roles.

Figure 2. New Member Working on ROV



Personnel

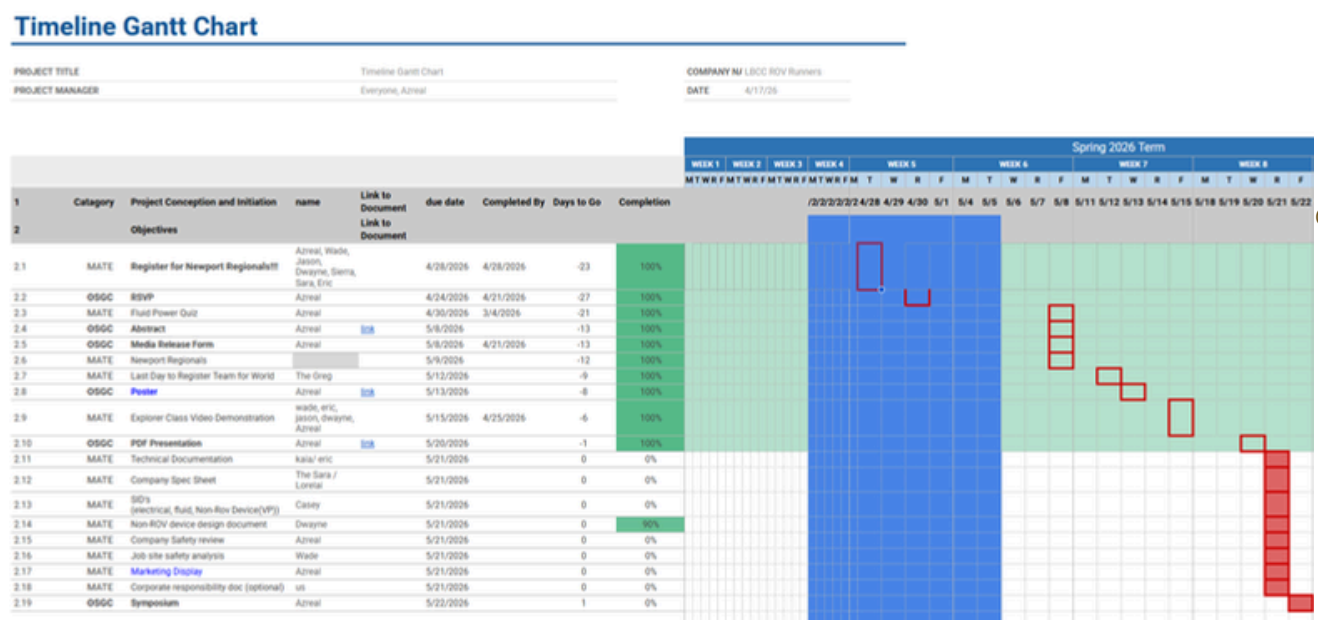
Name	Responsibilities
Asher Richmond	Graphic Design
Azreal Switzer	CEO, Cameras, Frame, Tools, Pilot
Casey Bianco-Davis	Vertical Profiler
Casey Johnson	Technical Writer
Cooper Madison-Dawson	Technical Writer
Chris Dalton	Cameras, Housing
Dominique Klahold	Tools
Dwayne Wallace	Vertical Profiler
Eric Anderson	COO, Housing, Frame, Tools, Controls, Pilot
Helen Rounsavell	Tools
Jason Fanger	Controls, Pilot
Kaia Reichard	Cameras, Technical Writer
Lorelai Fosselman	Tools, Technical Writer
Sara Leathers	Technical Writer, Frame
Sierra Brightly	Electrical
Wade Johnson	Tools, Technical Writer, Chef

Table 1. Team Members



Resource Management

Figure 3. Gantt Chart

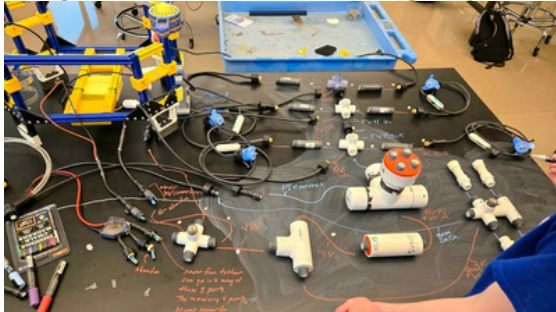


Design Philosophy

Modularity

The first major component of our design philosophy this year is modularity. We focused on the ability to adjust part positions, easily modify larger systems, and repair or replace broken parts more efficiently.

Figure 4. Modular Housing Layout



We believe that the simplest approach is often the best approach. This is shown beautifully in the success of our static tools.

Manufacturing Accessibility

The third major aspect of our philosophy is accessible manufacturing. We strive to build everything in-house and have streamlined processes for creating our custom parts. We also pushed to have all build components easily attainable, whether through your local hardware store or Amazon.

System Simplicity

Our second key point is design simplicity.

Figure 5 Simple Static Manipulator



Figure 6. Custom Connector Manufacturing



Overview

Michaelangelo

This year represents a “return to form” for the ROVrunners, as we recycled a frame from a previous year that offered greater stability, at the expense of added weight and complexity. In honor of the last vehicle to use this frame, named Leonardo for its turtle-like aesthetics, this year’s ROV (Figure 6) has been dubbed Michelangelo.

Figure 7. General Layout of ROV and Components

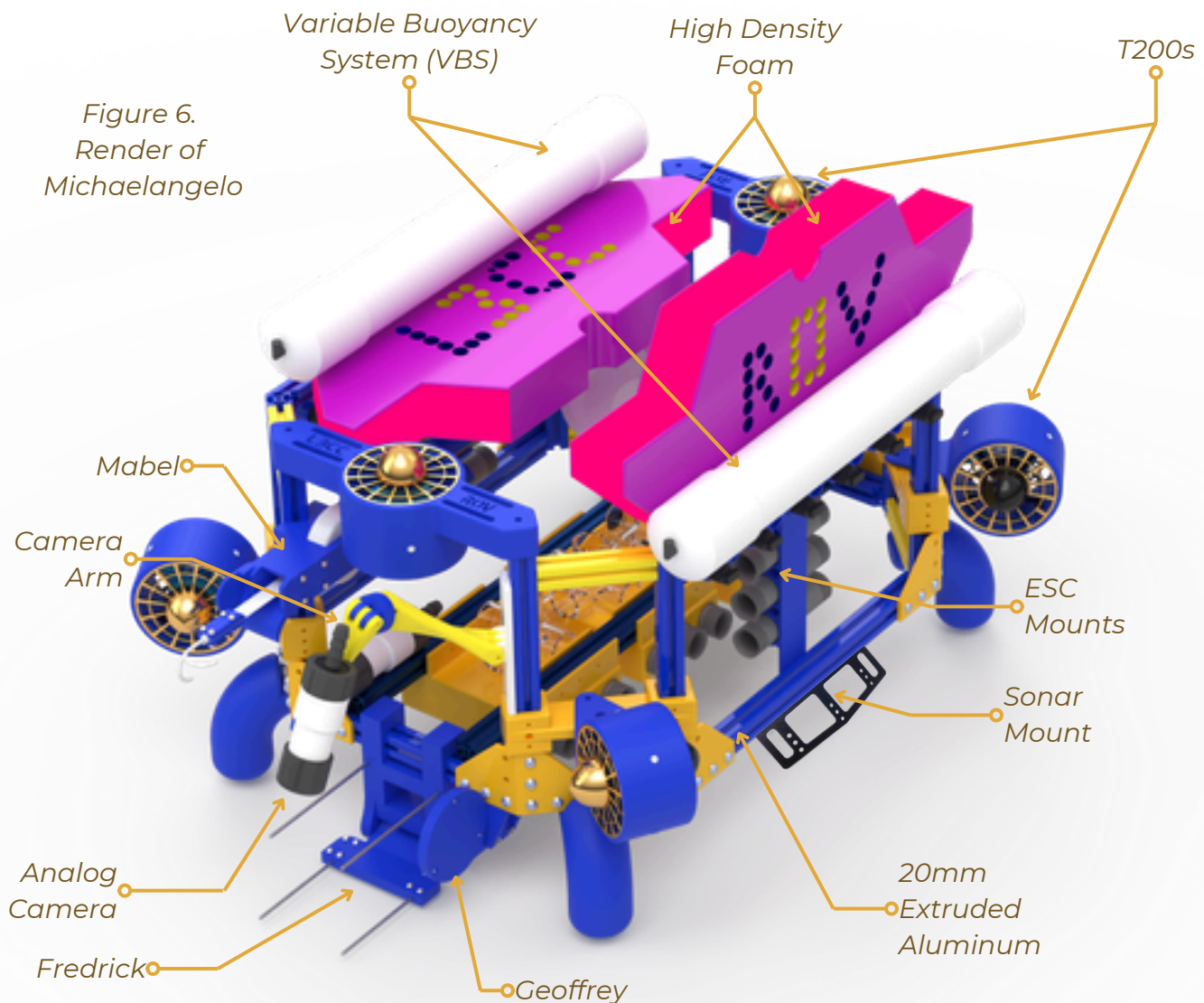


Figure 6.
Render of
Michaelangelo

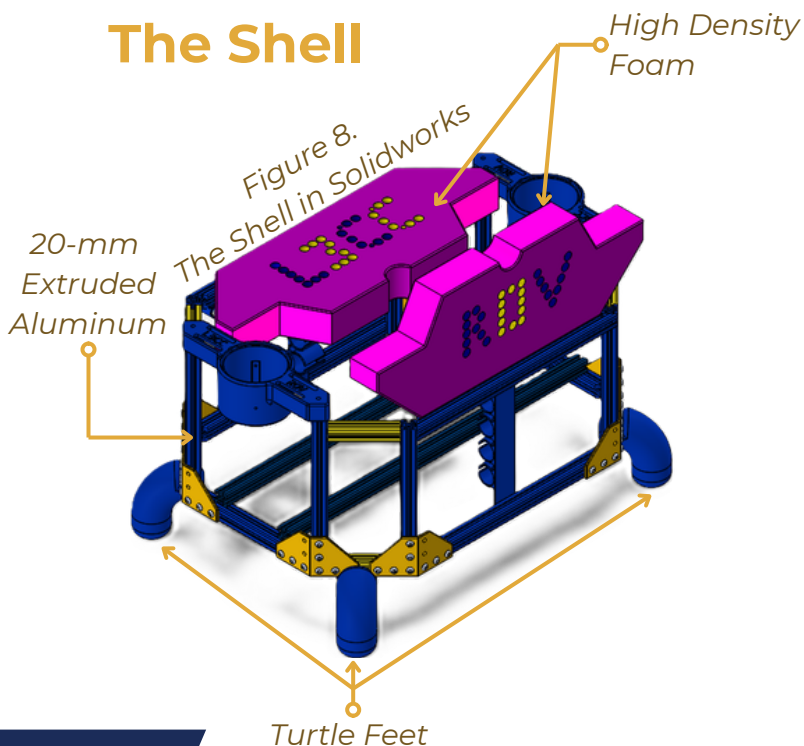


Build vs Buy Old vs New

We prefer building most things ourselves — such as software, connectors, and housings — because they can be fine-tuned for our needs and remade from hardware store parts. We only reuse select proven components from prior years, such as the thrusters and frame.

Frame

The Shell



Michelangelo's frame is constructed of 20-mm powder-coated extruded aluminum in LBCC blue and yellow. Aluminum extrusion was chosen for its lightweight strength and ease of attaching components with t-nuts. Like Leonardo, it features 3D-printed "turtle feet" that reduce ground contact for smoother movement while increasing height, allowing components to be mounted below the aluminum "belly." It also includes LBCC's signature bright pink "cowboy hat" high-density buoyancy foam, attached with hinges for easy interior access.

Adjustable Buoyancy

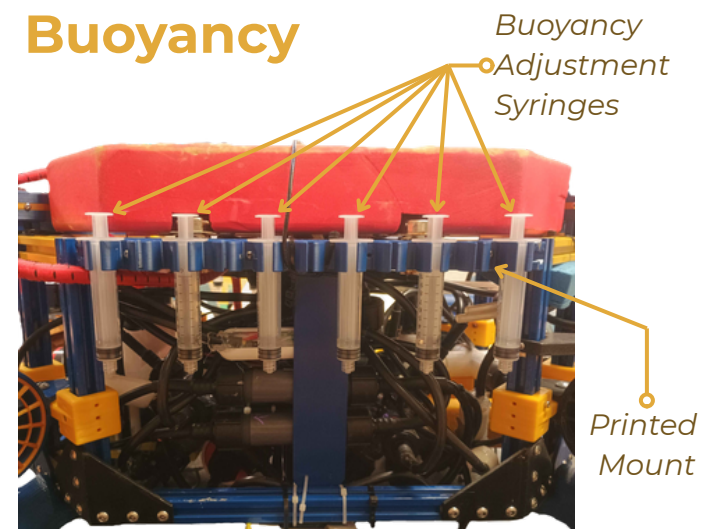


Figure 9. Buoyancy Adjustment System



New to Michelangelo is a syringe-based system for finer adjustments to buoyancy. It uses twelve 10-mL plastic syringes, allowing small adjustments that would previously have been made by adding small pieces of foam. The syringe system looks aesthetically much neater and allows such adjustments to be made much more easily. The idea was inspired by NUWave's 2024 technical document [Reference 1].

Variable Buoyancy System

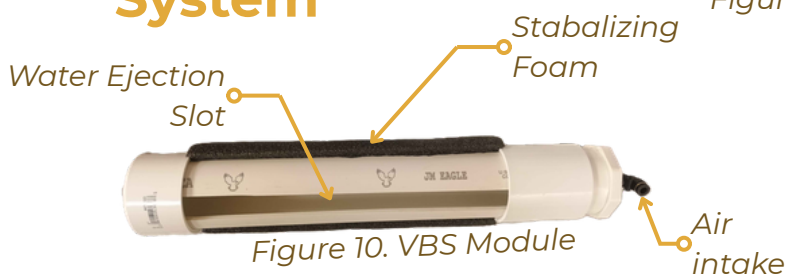


Figure 10. VBS Module

Also new to Michelangelo is a variable buoyancy system (VBS) made from two 33-cm lengths of 2-in PVC pipe mounted horizontally on each side of the vehicle, with an opening cut along the bottom of each pipe. Pressurized air from the surface

fills the pipes, forcing water out of the bottom opening to drastically increase positive buoyancy. This allows the vehicle to lift heavy items such as the lobster pot for Task 2.3. Once surfaced and the load is removed, an operator can easily empty the pipes of air by manually rotating them. The pipes are flexibly attached with rope, so this does not require flipping the entire frame.

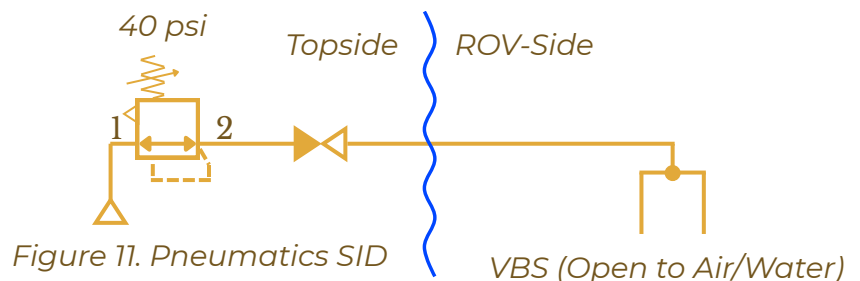


Figure 11. Pneumatics SID

Propulsion

Thruster Housing and Shrouds

Attached to Michelangelo's frame are six BlueRobotics T200 thrusters, recycled from previous vehicles for their proven reliability and to reduce cost.



We designed and 3D-printed custom mountable housings and shrouds (Figure 12) for the T200 motors. The safety shrouds attach without screws, avoiding past issues with screwing directly into 3D prints and the added bulk of heat-set inserts.

Thruster Layout

Two thrusters provide vertical thrust, while the other four are angled to the frame for stable lateral thrust, at the cost of some power. The lateral thrusters can be adjusted from 45° (best balance in all directions, See Figure 13) to 60° (increased forward/reverse power but reduced strafing power, See Figure 14). We use 45° for pool testing and expect 60° to better handle flume tank currents. The vertical thrusters enable up/down and pitch movements but not roll — a trade-off for lower cost, space, and weight using fewer thrusters.

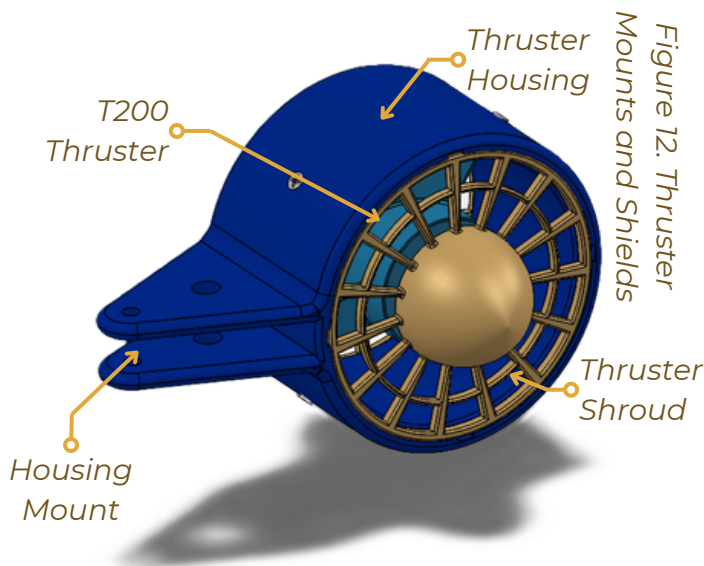


Figure 12. Thruster Mounts and Shields

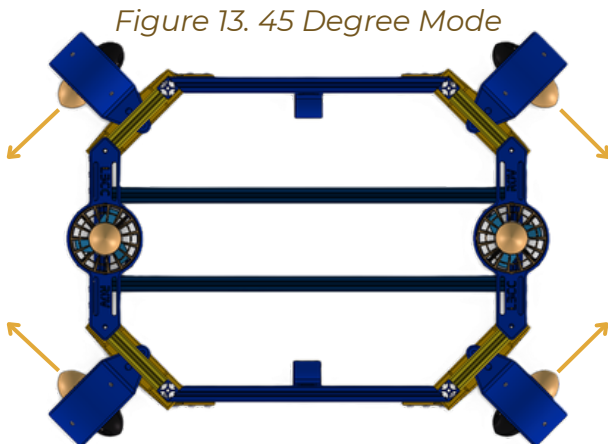


Figure 13. 45 Degree Mode

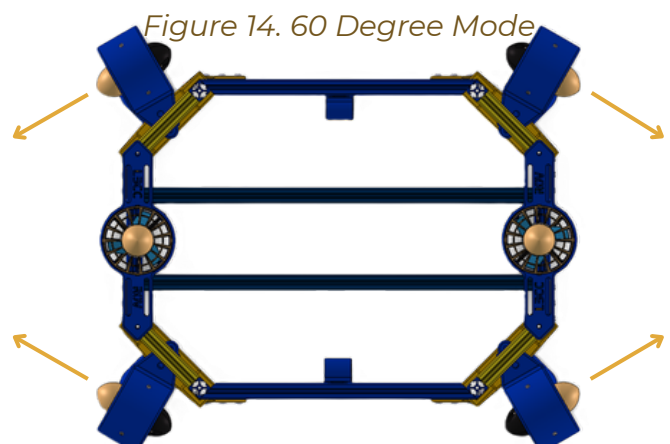


Figure 14. 60 Degree Mode



Cameras

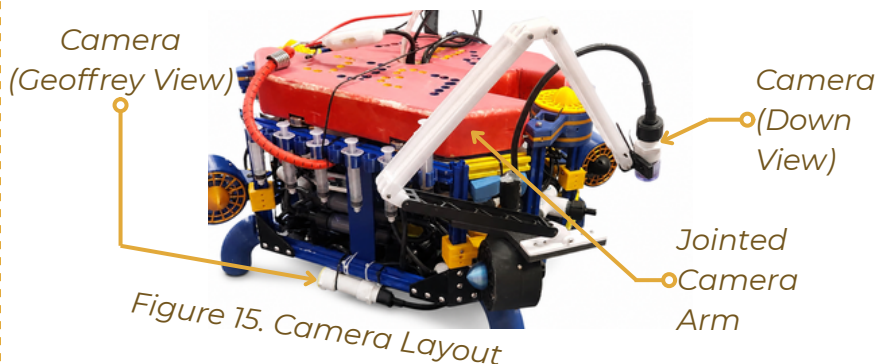
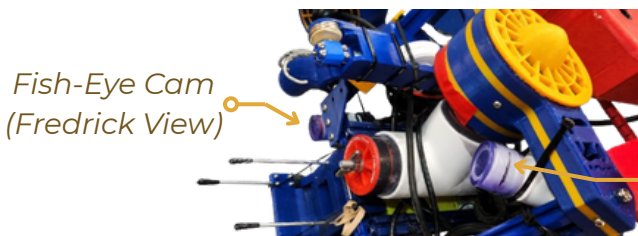
Analog vs Digital

We chose to use an analog camera system because the digital camera system was being locked into a high-quality mode that introduced unacceptable latency and bandwidth usage.

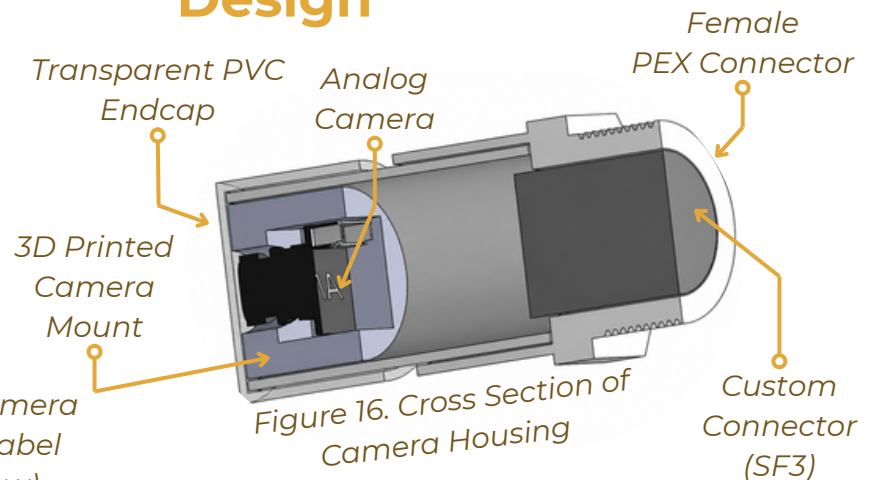
(typically angled down for the transect task and localization), and the fourth is positioned to view Mabel's measuring tape.

Design

Camera Layout



Our ROV has four cameras: one faces Geoffrey from below, one points forward at Fredrick, a third is on a movable arm



We selected Ant Cam's Caddxfpv series analog cameras for their compact size and proven reliability in past projects. Fish-eye lenses were added for a wider field of view. To prevent crosstalk, we used baluns and twisted-pair wires over a shielded Cat 8 Ethernet cable. The cameras are mounted in non-epoxied PVC air housings, allowing easy salvage or inspection while avoiding epoxy-related video distortion.

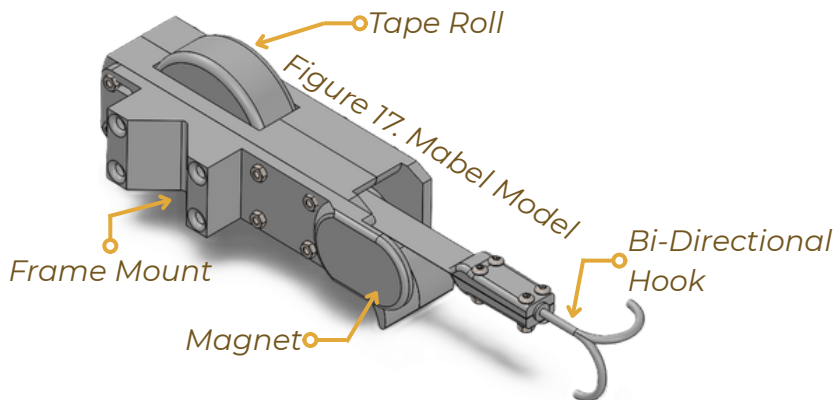


Tools

Tool Rationale

This year, as we examined the mission tasks, we realized that our six-year-old pneumatic claw, while versatile, was overkill for what we wanted to accomplish. We instead decided to explore simple static tools, taking the opportunity to get rid of a pneumatic line and re-use the other. These offer cheaper solutions, faster prototyping, fewer points of failure, and allow us to build multiple specialized tools rather than a single general tool.

Mabel



Using a bidirectional hook attached to a 2-meter-long measuring tape, Mabel will measure the keel depth of the iceberg during Task 2.2, as well as the length of the coral garden during Task 1.2. Mabel utilizes zipties as the

primary fastener between the tool and the frame. this improves ease of removal and reattachment, allowing for quick tool adjustments without compromising secure attachment.

Leah

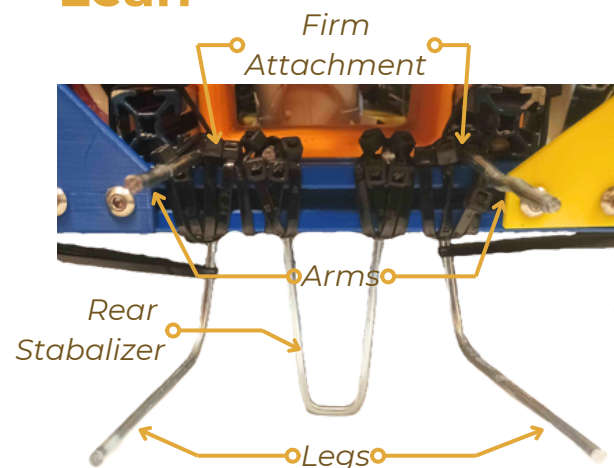


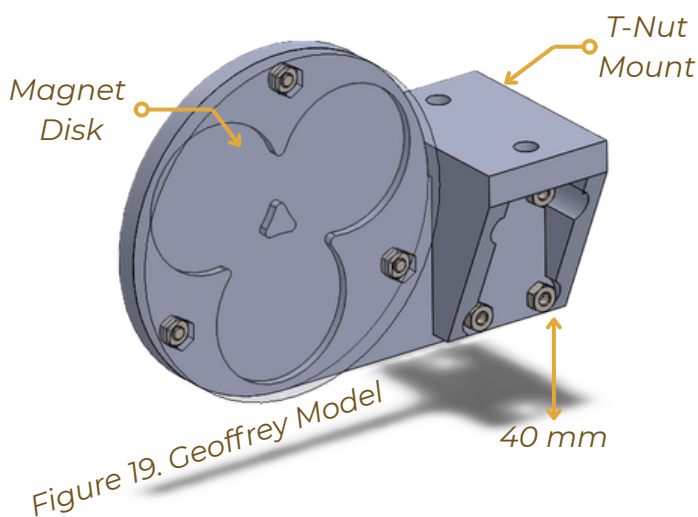
Figure 18. Leah Front View



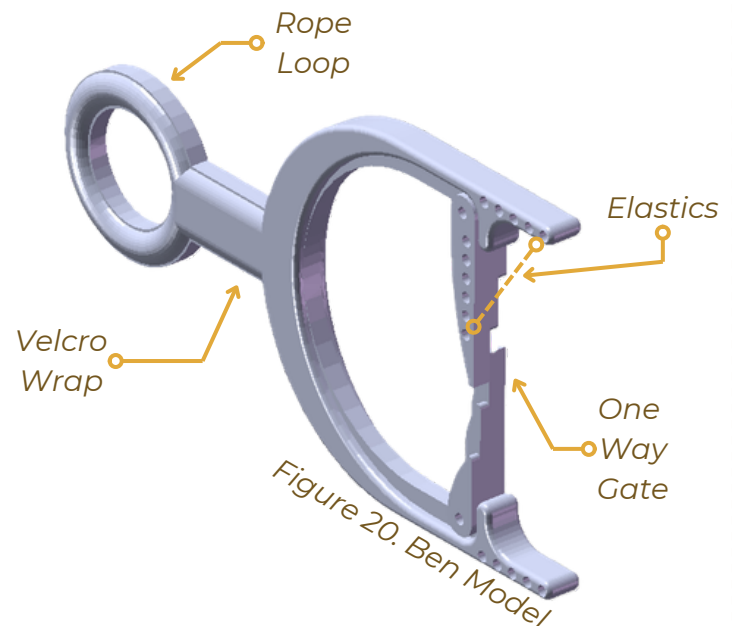
Leah is a simple solution for two tasks: moving the bubble curtain in Task 3.1 and retrieving/replacing the eDNA sensor in Task 2.5. We chose zipties to attach Leah to the ROV's frame because they would allow for more flexible mounting in the tight space where we needed it, whereas a rigid, bulky 3D-printed mount would not be practical. Leah's legs serve as a platform for props, while its arms act as a roof to ensure vertical stability.

Geoffrey is the pinnacle of the simple side of static tools. Built of only three printed parts, nine bolts, and three magnets. Sitting under the frame, with 40 millimeters of clearance from the ground, Geoffrey is tailor-made to acquire the power connector in Task 3.2 by magnetizing to the metal hook on top of the connector.

Geoffrey



Ben

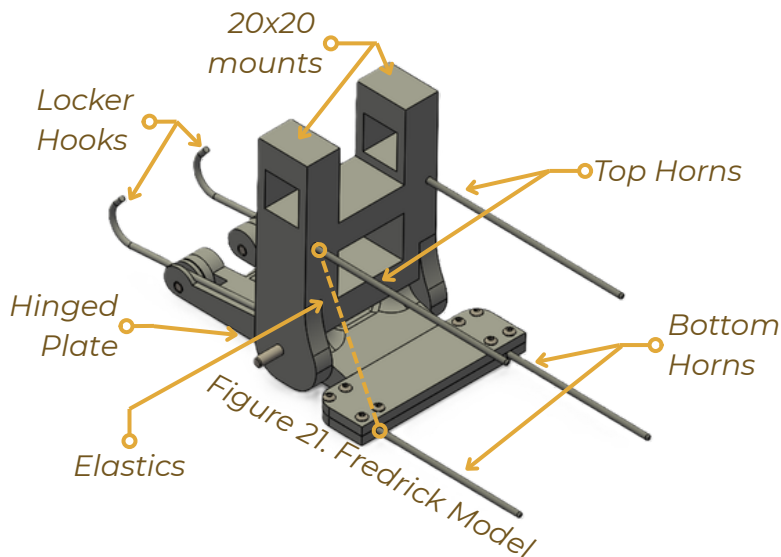


Ben is how we have chosen to recover the buoy anchor in Task 2.4. It is designed to be velcroed



to the frame of the ROV, tied to via the back loop, and easily slot onto the U-bolt by use of a one way gate. Ben will use simple fabric elastics to work the action.

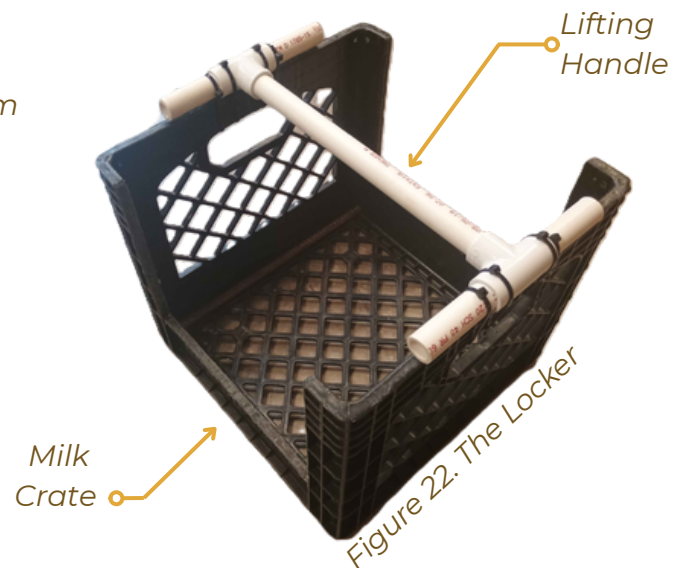
Fredrick



Fredrick is our flagship tool; his creation inspired the entire lineup. He collects coral samples in Task 1.1 with the help of The Locker (more on that soon). His design also lets him lift the lobster pot in Task 2.3 and grab The Locker. He does this using six bent tent stakes mounted on as horns and hooks, plus a hinged plate. When the ROV is

flat on the ground, the plate lies flat, keeping the horns apart and the hooks stowed. When the ROV lifts off, the plate flips up at an angle, closing the horns to grasp and lift anything between them. In the raised position, the hooks are fully deployed and ready to grab The Locker.

The Locker



The Locker is a time-saving tool for Task 1.1. We will use it to store multiple coral samples before we lift it to the surface via the Locker hooks on Fredrick.



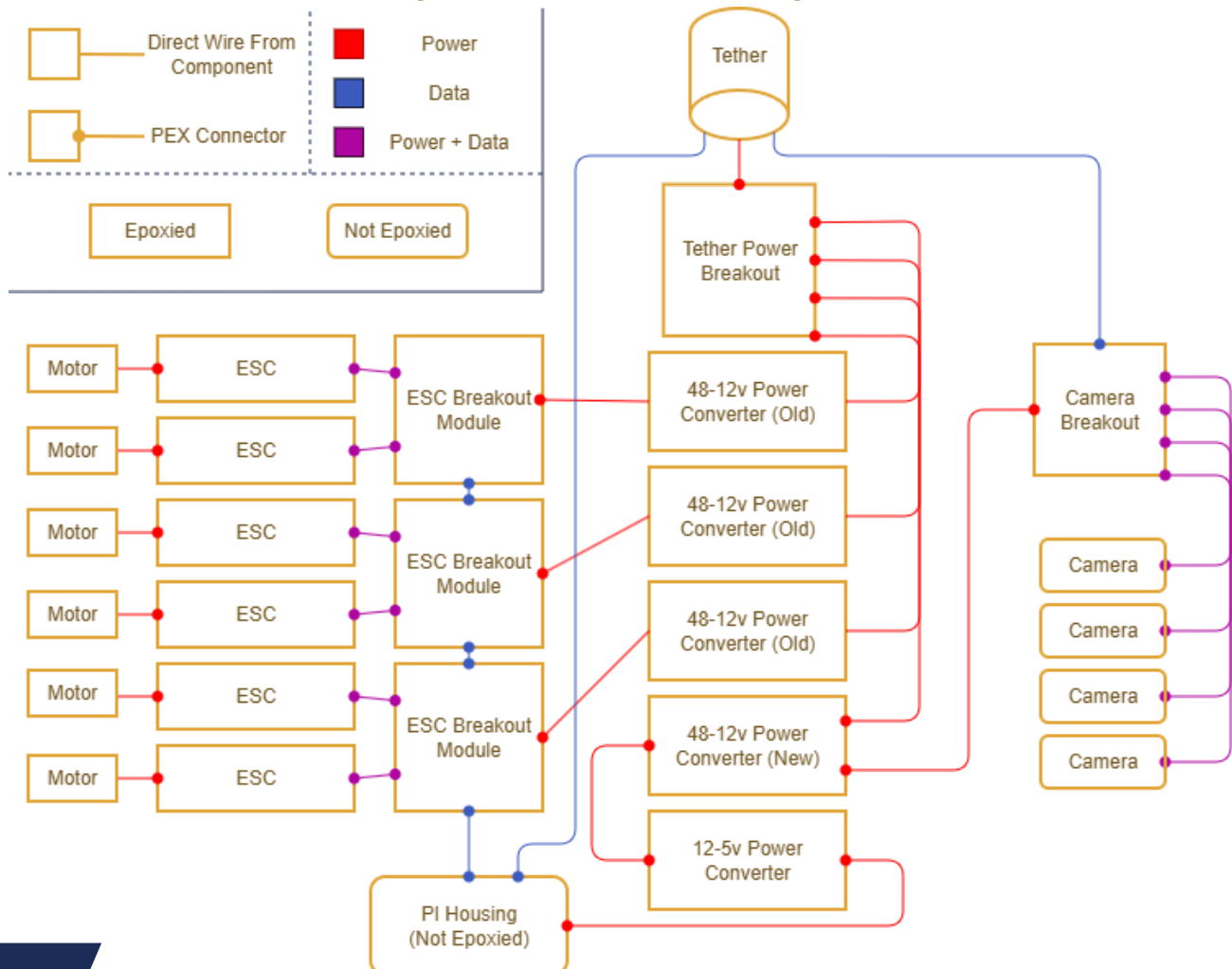
Electronics Housing

Housing Rationale

This year, we moved away from single-enclosure designs, since repairs and changes were risky and time-consuming. The new housing consists of 20 epoxied modules, which can be easily replaced for quick repairs. Because they are epoxied, sealing surfaces are not a concern, which improves waterproofing and make manufacturing simpler. Multiple separate modules also ensure that only the failed part needs replacement.

Overview

Figure 23. Electronics Housing SID



Housings

While most of the housings are epoxy potted, we decided that the Raspberry Pi housing would need to not be epoxied to give access to its SD card and, because of a lack of integrated circuit protection, it needed to be replaceable. Originally silicone RTV was used to form a semi-permanent PVC seal, however we found it unreliable at sealing smaller diameter PVC and very difficult to open on larger diameters. After testing the strength of a variety of different RTV compounds, we determined the silicone RTV was not an effective method of non-permanently sealing PVC. We eventually reverted to using PVC Test Drain Plugs, which had worked well for us in the past.

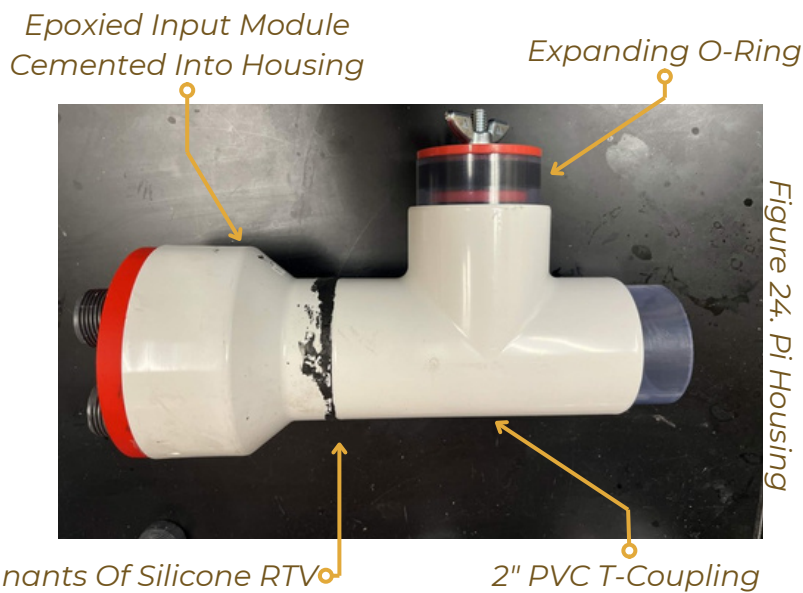


Figure 24. Pi Housing

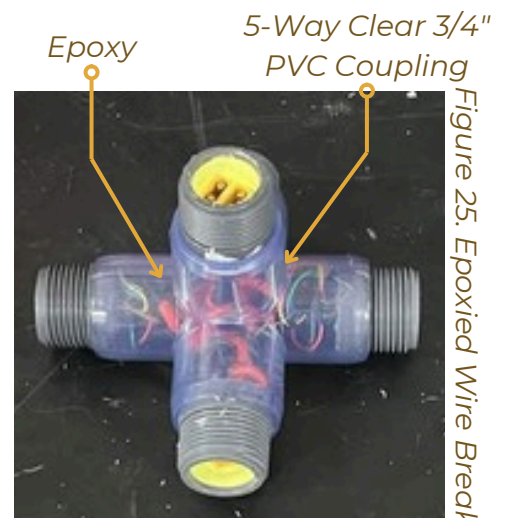


Figure 25. Epoxied Wire Breakout

Tether

Figure 26. Tether Cross-section

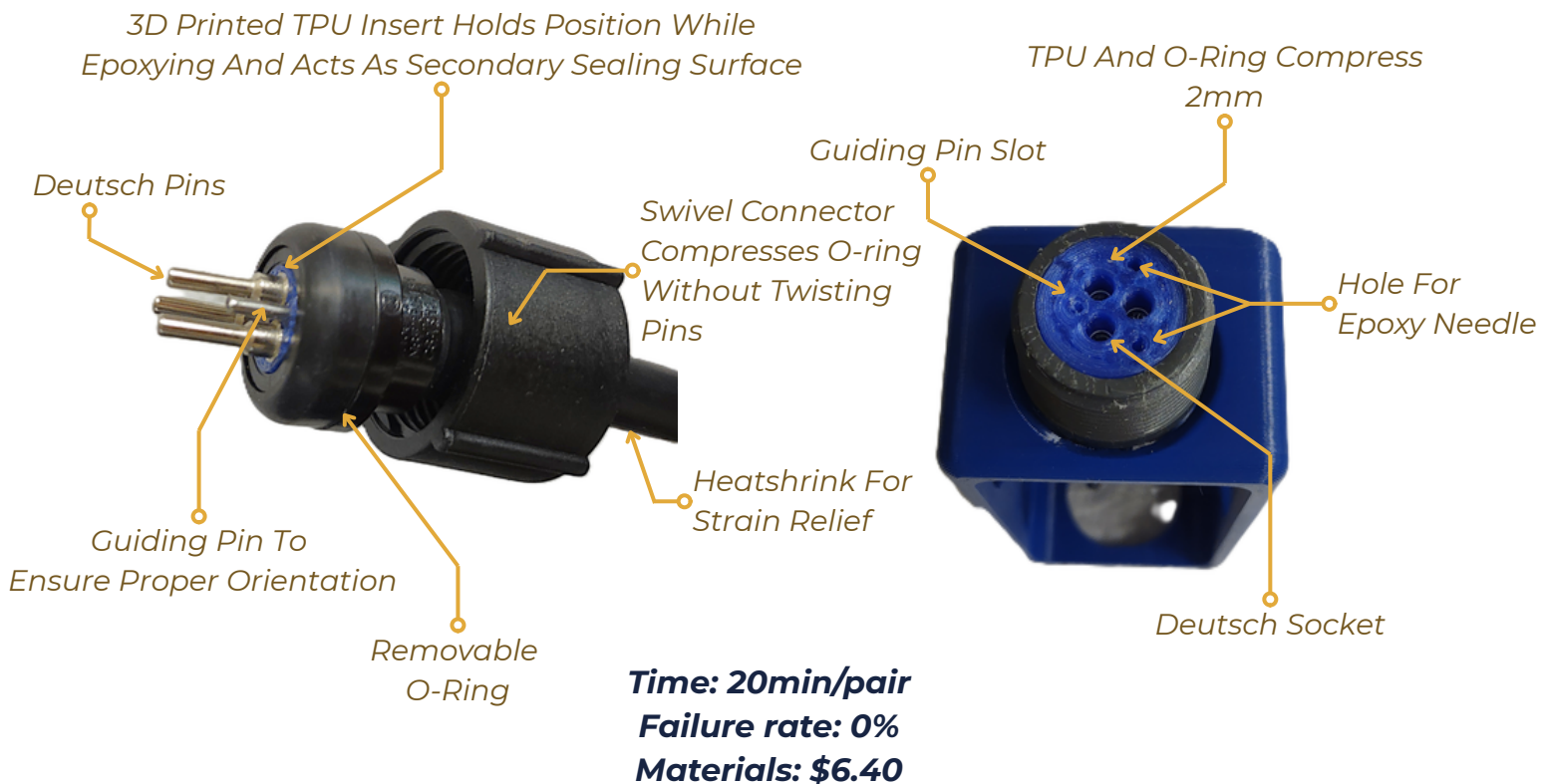


Connectors

To mitigate wire strain and reduce the risk of damage to epoxied components, we decided not to run wires directly into the epoxy. To achieve this, we used connectors rather than penetrators for the housing. Because of the large number of individual housings, a total of sixty connectors would be needed. To make the housing affordable and stay true to our design philosophy of making as much in-house as possible, we designed and manufactured our own waterproof connector system.

The connectors and housings are built from 3D-printed components and parts you can easily find at any hardware store. The modules use two standardized connector designs: 3-pin and 9-pin dubbed SF3s and SF9s respectively. By keeping a consistent standard, our manufacturing and repairs can be simplified.

Figure 27. SF3 Connector Male and Female Ends



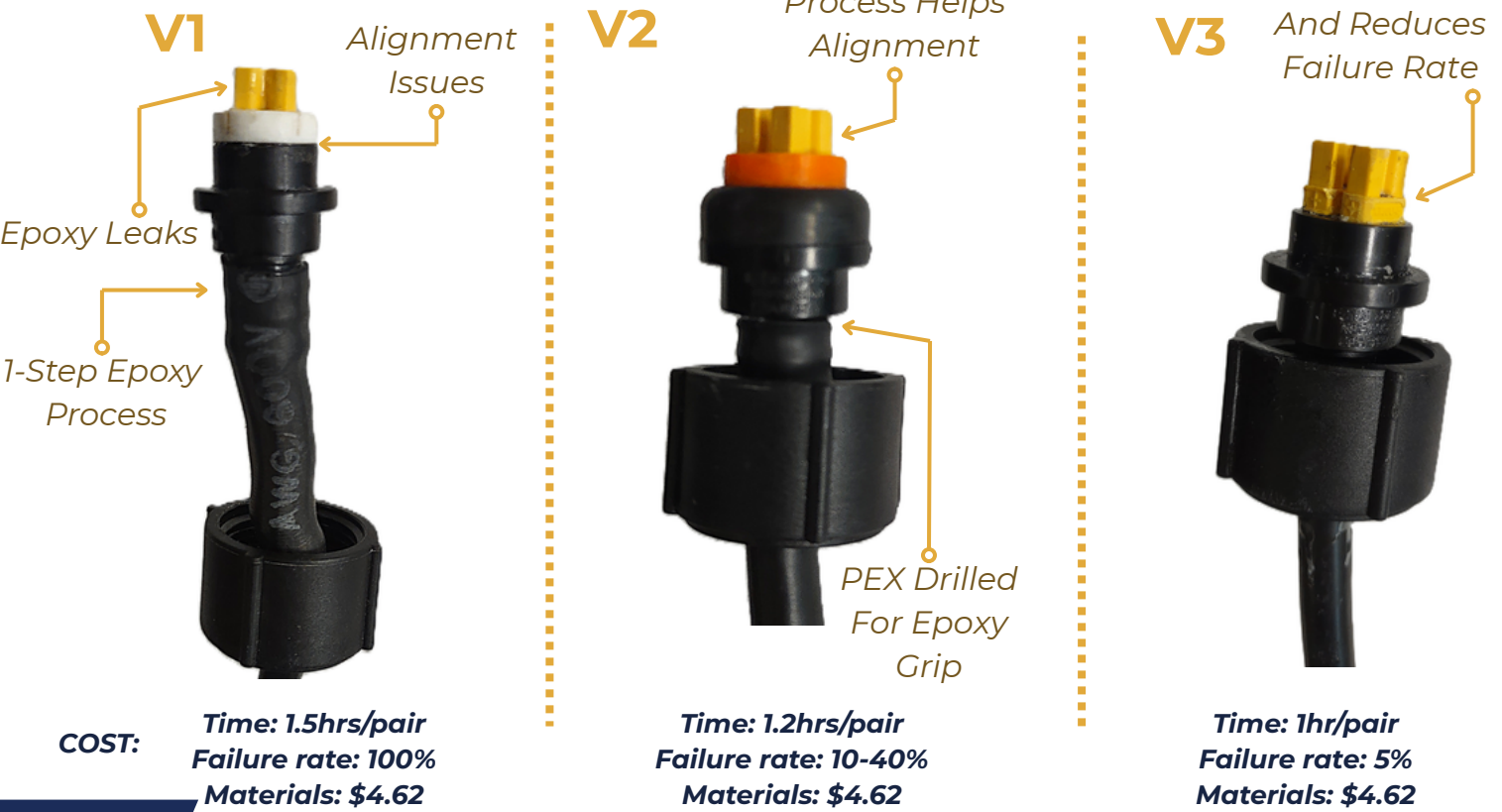
Connector Evolution

Designing a connector that could be efficiently produced at the necessary scale and quality proved to be difficult. Originally, the connectors used XT30 connectors, due to their low price and common availability. The primary issue we encountered with the XT30 connectors was ensuring they stayed aligned during epoxying. This proved to be a recurring issue, leading to a high failure rate (10-40% depending on batch) and reducing their sealing effectiveness.

After making over sixty pairs, we knew how to eliminate the issues with the XT30 connectors and significantly speed up their manufacturing. While the process used to make the connectors improved dramatically over their production run, the effort required to produce them meant that few spares could be made. Because the SF series connectors were significantly easier to make, we could make spares, so it was deemed worth starting to make future housings with the SF series, since the benefits of a consistent standard would be largely lost without spares.

XT30 Connector Evolution

Figure 28. XT30 V1, V2, and V3



Controls

Software

We have opted to continue using our open-source custom ROV control code from last year. Due to its modular design, we simply needed to create a new ROV config file.

Because our system is so easy to modify on the top-side, we don't need to open housings to modify the bottom-side code.

The code is also entirely written in Python, and is thus not compiled and unencrypted. This means it's extremely easy to modify the code on-the-fly without any external tools if tweaks need to be made. It's designed to make it as easy as possible to integrate custom sensors, PID loops, control systems, and thruster configs without needing to write any new code on the bottom-side.

Another benefit is that the topside code does not care what type of device is used to receive the commands, so long as it communicates via ethernet, and thus we can swap out the Pi for an Arduino as long as we make sure not to use any invalid pins!

Hardware

Our control hardware consists of a top-side and a bottom-side.

The top-side computer takes in inputs from an Xbox controller and handles any calculations, such as balancing the thruster outputs and running PID loops.

The bottom-side is a breakout module used to output PWM/digital signals whilst talking to the sensors on the ROV and reporting back.

Early this year, we chose to move to a Raspberry Pi Zero 2 W for compactness and to reduce housing volume because of the excessive buoyancy it produced.

It works well, but we learned that it has no internal circuit protections against GPIO pins shorting to ground, causing our first attempts to result in needing to replace the Pi when we had a faulty ESC breakout or cable.

Due to the above issues, we've been working on developing an Arduino version of our bottom-side code so we can use an Adafruit M0 Feather with an Ethernet Featherwing instead.



Critical Analysis

Testing - Cameras

Thanks to the cost savings of our systems, we can use empirical testing methods. We quickly build prototypes, test them in real-world environments, and get rapid feedback. Our cameras are a great example of this.

Figure 29. Camera Feed Testing



Troubleshooting - Connectors

When determining the root cause of faults, we start by isolating the problem. Our modular housing makes this easier, allowing us to work backwards and quickly disconnect entire systems until we identify the faulty module. Once isolated, we test the individual component to pinpoint the root cause and resolve the issue.

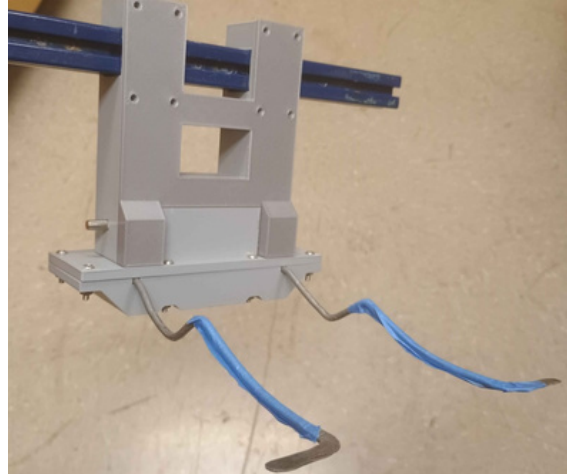
Figure 30. Eric Troubleshooting



Prototyping - Tools

The tools team prioritized practical solutions, designing static tools to be replicable and inexpensive. Many tool prototypes were made from popsicle sticks or tent stakes, making them affordable to test and adjust quickly. The team first tested tool interactions with props out of water before pool testing.

Figure 31. Early Fredrick Prototype



Safety

ROV Safety

The ROV has several safety features: smooth exterior edges to reduce cuts or entanglement, shrouded propellers to prevent contact with moving parts, securely waterproofed components, properly rated waterproof connectors, fused power converters, a fused tether connection, and a single emergency disconnect switch on the surface.

Team Safety

Team members are trained to follow strict safety procedures during operation and testing. They maintain safe distances from moving propellers, disconnect power before maintenance, use proper lifting techniques when transporting equipment, and complete safety checks before powering the vehicle and placing it in the water.



Lab Safety

Work areas are kept clean and organized to prevent trips and equipment damage. Electrical equipment is inspected before use and prior to returning to storage. All vehicles undergo bench testing for leaks before any water or depth testing. Soldering and tool use follow established lab safety procedures, while batteries and power supplies are handled and stored according to manufacturer guidelines. Additionally, at least two team members are present in the lab at all times.

Figure 32. Eric Drilling Safely



Table 2. Pool Test Precheck

- Verify all connectors are properly attached to the ROV
- Plug in the Raspberry Pi to the Pi housing
- Visually confirm all power cables are correctly routed, and ESCs are oriented properly (arrow toward motor)
- Check the Pi thruster PWM ground pin continuity using a multimeter on an ESC breakout module
- Connect the ROV to the topside computer, SSH into the Pi, and run bottomside code until ESCs make happy noises (3 beeps = power, 2 beeps = standby signal)
- Power down the ROV, insert Pi and components into the housing, and seal with 2" drain test plugs
- Hand-tighten drain plugs fully and confirm a clear seal around the pipe
- Reconnect to the bottomside and verify ESC happy noises again
- Ensure all swivel connectors are fully hand-tight
- Attach the tether strain relief and test that the ROV can be lifted by the tether without stressing wires
- Confirm no cables are hanging outside the frame
- Verify camera angles are acceptable



Accounting

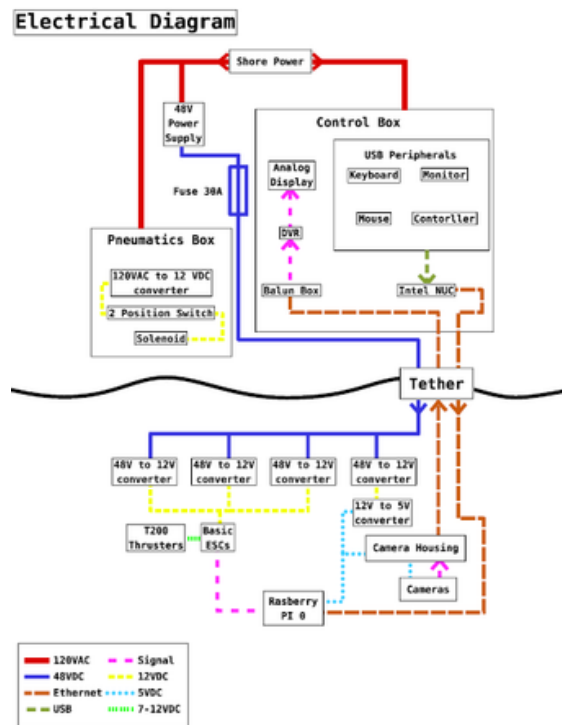
Budget Category	Budget amount	Sources		
ROV (total)	\$4,207	Oregon Space Grant Consortium (\$2,390.18) Student life and Leadership co-curriculars (\$186.82)		
Vertical profiler		Student life and Leadership co-curriculars (\$3,936) Student life and Leadership co-curriculars (\$7,000)		
Travel	\$14,713.81	Student life and Leadership co-curriculars (\$247.87)		
General	\$247.87			
General	qty	Cost of Single Item	Total cost of items	Shipping
White Label Replacement for Label Maker	1	\$19.99	\$19.99	\$0.00
99% Alcohol	1	\$7.38	\$7.38	\$0.00
Lab books (comp book)	2	\$18.00	\$36.00	\$0.00
pushpins	1	\$7.99	\$7.99	\$0.00
Fans	2	\$14.24	\$28.48	\$0.00
Greenmade 12-Gallon Flip-Top Box	6	\$17.97	\$107.82	\$0.00
Carbon Filter	1	\$9.28	\$9.28	\$0.00
strip poster holders	1	\$14.97	\$14.97	\$0.00
Vinyl Gloves	1	\$6.28	\$6.28	\$0.00
Strap Wrenches	1	\$4.99	\$4.99	\$0.00
Pick Set	1	\$4.49	\$4.49	\$0.00
		Total + Shipping	\$247.87	
		General Total	\$247.87	
Control Station	qty	Cost of Single Item	Total cost of items	Shipping
10 inch small monitor (reused)	1	\$71.99	\$71.99	\$0.00
mini DVR (reused)	1	\$59.99	\$59.99	\$0.00
Intel NUCB06BX Mini (reused)	1	\$438.99	\$438.99	\$0.00
Pelican 1550 Case (reused)	1	\$194.95	\$194.95	\$0.00
Display Driver (reused)	1	\$26.99	\$26.99	\$0.00
		Total + Shipping	\$792.91	
ROV Rousing	qty	Cost of Single Item	Total cost of items	Shipping
Frame (Reused-Material)	1	\$200.00	\$200.00	\$0.00
BUOYANCY FOAM-R-3318 (Reused)	1	\$304.00	\$304.00	\$0.00
2pc 135 degree plate bracket (Reused)	2	\$25.98	\$51.96	\$0.00
Spine 6" O-Rings From BR FORMUFIT 3/4" 5-Way Cross	2	\$39.98	\$79.96	\$0.00
PVC White FORMUFIT 3/4 in. 5-Way Cross	1	\$17.89	\$17.89	\$0.00
PVC Clear	7	\$8.29	\$58.03	\$8.10
3/4" furniture grade pvc pipe	1	\$1.65	\$1.65	\$0.00
3/4" furniture grade PVC end Caps	4	\$1.65	\$6.60	\$11.05
3/4" clear PVC endcaps	12	\$2.39	\$28.68	\$11.05
2 inch Diameter Clear PVC Schedule 40	1	\$24.25	\$24.25	\$0.00
2 in. Tee PVC Fitting	1	\$5.29	\$5.29	\$0.00
2" 4-way pvc tee	1	\$8.09	\$8.09	\$0.00
Oatey 2 in drain caps	3	\$6.71	\$20.13	\$0.00
Lowe's PVC Trip	1	\$23.46	\$23.46	\$0.00
Home Depot PVC Trip	1	\$32.82	\$32.82	\$0.00
ultra grey gasket maker	1	\$6.79	\$6.79	\$0.00
Epox	1	\$49.98	\$49.98	\$0.00
Syringe (Donate)	1	\$20.00	\$20.00	\$0.00
		Total + Shipping	\$969.78	
ROV Power/Electrical	qty	Cost of Single Item	Total cost of items	Shipping
Raspberry Pi 2 W	1	\$19.05	\$19.05	\$5.99
waveshare Ethernet/USB HUB HAT	1	\$20.99	\$20.99	\$0.00
6 Blue robotics thrusters (Reused)	1	\$480.00	\$480.00	\$0.00
16 AWG 3 wire cable	1	\$22.98	\$18.88	\$0.00
16 AWG 2 wires 25ft	1	\$18.88	\$18.88	\$0.00
14 Gauge Electrical Wire, 3 Conductor	1	\$54.13	\$54.13	\$0.00
14 Gauge Electrical Wire, 2 Conductor	1	\$37.98	\$37.98	\$0.00
Heat shrink	2	\$5.00	\$10.00	\$7.50
30A XT30 connectors	8	\$4.99	\$39.92	\$5.42
XT-30 Connectors	1	\$11.69	\$11.69	\$0.00
5 pair AMASS MT30 2mm 3-pin	3	\$6.50	\$19.50	\$0.00
10pairs Amass MT30 2mm 3-pin	1	\$10.66	\$10.66	\$0.00
jet SH connector kit	2	\$14.97	\$29.94	\$0.00
female jet SH connector kit	1	\$6.79	\$6.79	\$0.00
4 pin jet sh connectors	3	\$8.29	\$24.87	\$0.00
3 pin jet sh connectors	1	\$7.89	\$7.89	\$0.00
2 pin jet sh connectors	1	\$7.69	\$7.69	\$0.00
2 pin jet sh connectors	3	\$7.30	\$21.90	\$0.00
Waterproof DC 48V to 12V Converter	2	\$17.99	\$35.98	\$0.00

48V to 12V Step-Down Transformer DC to DC	3	\$39.99	\$119.97	\$0.00
DC to DC High Efficiency Voltage Converter 24V to 12V 40A 480W	3	\$31.99	\$95.97	\$0.00
Voltage Regulator Truck Golf Cart Power Supply (13.8V 100A)	1	\$68.60	\$68.60	\$0.00
ESCs	4	\$40.00	\$160.00	\$25.70
		Total + Shipping	\$1,365.89	
ROV Cameras	qty	Cost of Single Item	Total cost of items	Shipping
Camera 1.7mm	1	\$37.29	\$37.29	\$0.00
Camera 3.6mm	3	\$31.79	\$95.37	\$0.00
Ethernet Switch	1	\$99.00	\$99.00	\$0.00
Ethernet to USB	1	\$11.96	\$11.96	\$0.00
Multi color Ethernet	1	\$16.69	\$16.69	\$0.00
Dash Cam	1	\$24.99	\$24.99	\$0.00
		Total + Shipping	\$285.30	
ROV Claw	qty	Cost of Single Item	Total cost of items	Shipping
Magnets	1	\$15.99	\$15.99	\$0.00
30-Piece Galvanized Steel Tent Pegs (reused)	1	\$9.79	\$9.79	\$0.00
		Total + Shipping	\$25.78	
ROV Tether	qty	Cost of Single Item	Total cost of items	Shipping
Strain Relief (reused)	2	\$23.82	\$47.64	
Tether Sheathing - Black, 1" 100 ft (reused)	1	\$22.99	\$22.99	
8 cat ethernet 100 ft shielded (reused)	2	\$39.99	\$79.98	
		Total + Shipping	\$150.61	
		ROV Total	\$3,598.27	
Vertical profiler	qty	Cost of Single Item	Total cost of items	Shipping
Syringe	1	\$9.99	\$9.99	
1.75mm Pink Filemet	1	\$19.99	\$19.99	
Battery Holder	1	\$5.98	\$5.98	
Batteries	1	\$8.99	\$8.99	
JST Connectors	1	\$7.97	\$7.97	
Gaffey Rope	1	\$5.70	\$5.70	\$3.90
Linear Actuator	2	\$140.00	\$280.00	\$28.68
Simple Penetrator	2	\$15.00	\$30.00	\$10.00
Buck Converter	2	\$6.95	\$13.90	\$6.17
LED Jewel	2	\$5.95	\$11.90	
RTC	2	\$8.50	\$17.00	\$8.31
Level Shifter	2	\$3.95	\$7.90	
Pro Micro	2	\$10.25	\$20.50	
PVC Tube	1	\$34.00	\$34.00	\$7.99
Aluminum sheet	1	\$11.99	\$11.99	
Bore Orings	1	\$5.48	\$5.48	
Face Seal Orings	1	\$9.98	\$9.98	
PVC stock	1	\$34.27	\$34.27	\$16.31
		Total + Shipping	\$616.50	
		Vertical Profiler Total	\$616.50	
Travel	Total cost			
OSU Motor Pool for Newport 05/09/2026	\$138.60			
9 Amtrak tickets	\$2,703.00			
10 Flight tickets	\$7,254.40			
Airbnb in newfoundland	\$2,352.81			
Food in newfoundland	\$1,000.00			
Vehicle rent in Newport newfoundland	\$600.00			
MATE Fluid Power Quiz	\$15.00			
LBCC Registration Newport Regionals	\$650.00			
MATE Fluid Power Quiz	\$15.00			
		Travel Total	\$14,713.81	
		Overall Total	\$19,169	
		Reused Total	\$1,988.27	
		Total Spent	\$23,882.66	



Conclusion

Electrical SID



Acknowledgements

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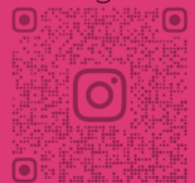


For the ROVs who say "Beep Beep!"

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