The M.E.A.N. Machine

(Multi-use, Extendable, Adaptive, Nautical Machine)

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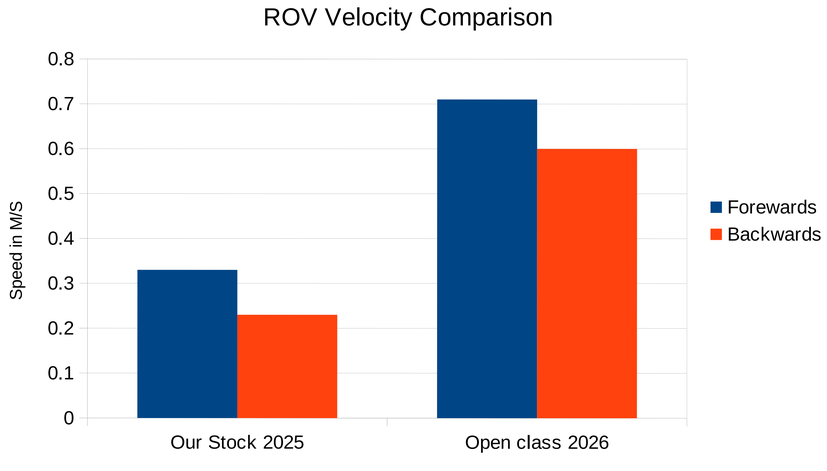
Abstract

Our goal is to design, build, and execute a light-weight, inexpensive ROV that can be adapted to multiple tasks with simple interchangeable parts.

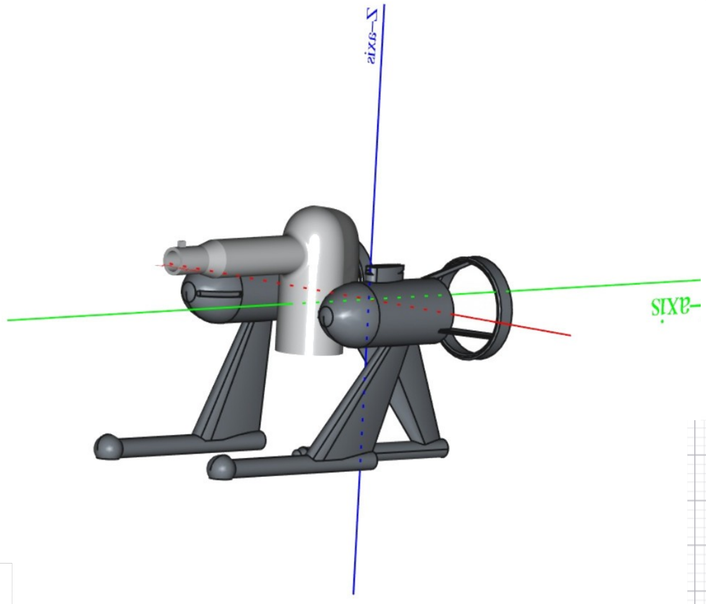
Background & Motivation

This is a fun, challenging project that requires problem solving and creative adjustments to match each new mission. This project is also a great lead into more advanced robotic projects while building practical skills.



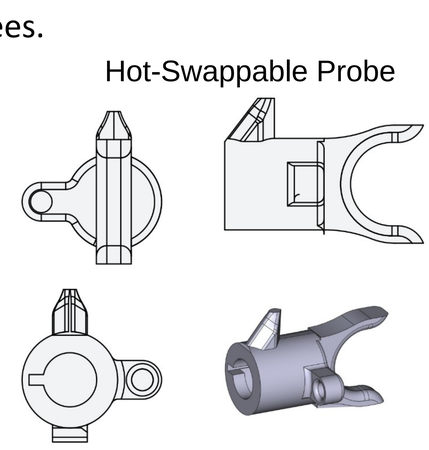
Methodology

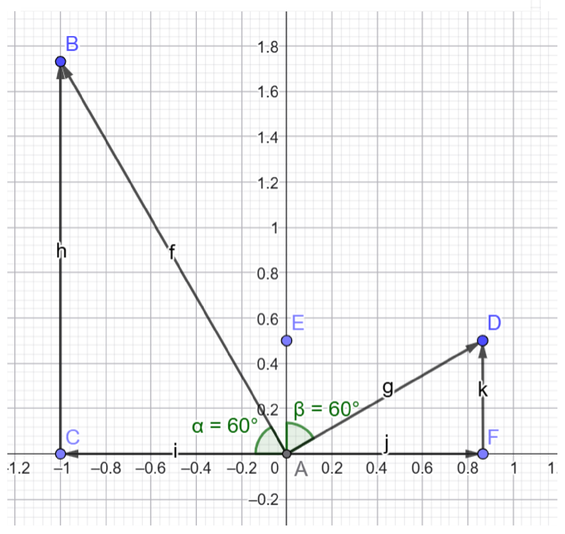
We approached this project by looking at what is absolutely necessary for the ROV. It needs to have low drag, it needs to have at least 3 motors, and it needs to have probes to pick things up with. Knowing this, we designed our ROV accordingly.



Results & Discussion

The M.E.A.N. Machine is over twice as fast as our stock SeaPerch, can go deeper with a new float design, and has a hot-swappable probe for different missions. We found out that our ROV can use trigonometry to be able to lift heavier objects, like the one in the mission course this year. The graph below shows this by rotating the ROV 60 degrees.





Conclusion

The M.E.A.N. Machine was made to discover or revive new places while keeping humans safely on land or boat.

Next Steps

The M.E.A.N. Machine will evolve into next year's ROV and we would like to try adding a microcontroller to have a self stabilizing ROV using a built-in gyroscope. We would also like to try out new propellers to see if we can reach higher speeds.

Acknowledgments

We would like to acknowledge our parents for funding, chauffeuring, and helping to brainstorm. We would also like to acknowledge Sybella Pyhala Morelli for designing our logo.