Team 525: Assisting Paraplegics While Scuba Diving

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AQUASIST

Project Scope

The objective of this project is to create a device that offers paraplegic scuba divers greater independence while in the water.

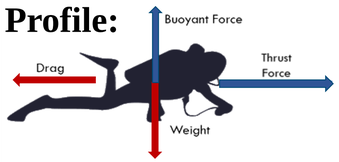
Motivating Problem

- With the development in technology, paraplegics can participate in many activities
- Inspired by witnessing Veterans struggle

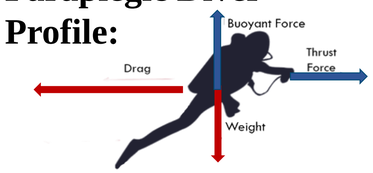
Design Considerations

- Heat Loss
- Trim Control
- Body Compositions
- Increased Oxygen Consumption
- Difficulty Suiting-up
- Susceptible to Injury
- Increased Drag
- Compatibility With Scuba Gear

Fully Abled Diver Profile:



Paraplegic Diver Profile:

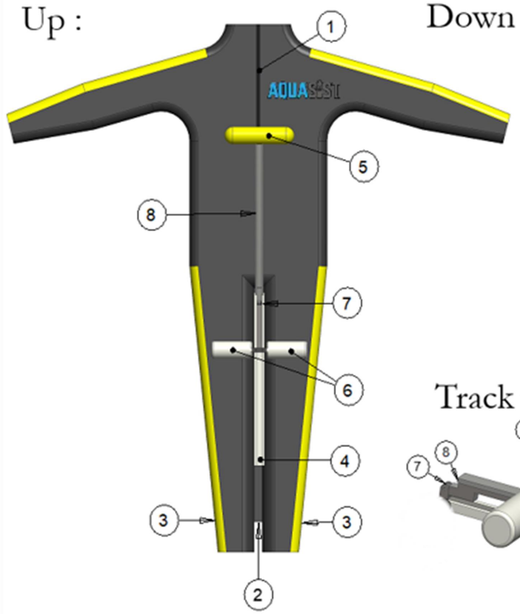


Acknowledgements

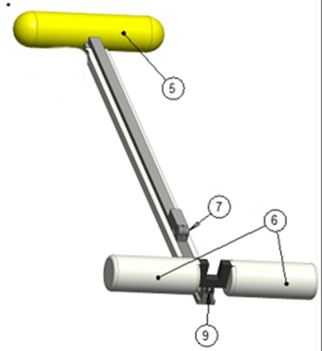
Team 525 would like to thank the College of Engineering and Dr. Devine for sponsoring our project. We would also like to thank to Dr. McConomy for advising us throughout the year.

Design

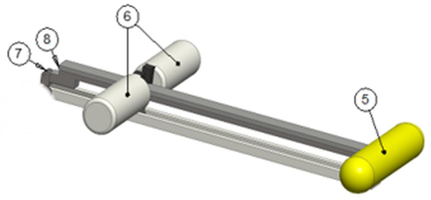
Front View with Float Up :



Track with Float Down :



Track with Handle Folded:

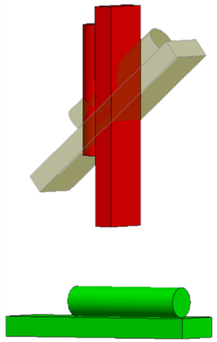


Design Reasoning

1. **Front Zipper**: Provides Easy Accessibility For Diver
2. **Secures Legs Together**: Controls Location Of Diver's Legs
3. **Zipper Along Legs**: Allows Diver To Dress Themselves
4. **Float Track**: Limits Float To One Degree Of Freedom
5. **Handle**: Moves The Float's Location With Handle
6. **Float**: Adjusts Trim And Two-piece Design Allows Handle To Fold Flat
7. **Handles Pivot**: Allows Diver To Store Handle Along Legs
8. **Hand Key-way**: Locks Handle Into Float Track

Fabrication Process

Testing & Validating Metrics



$$F_B = g\,\rho\,V_{sub}$$

$$F_D = \frac{1}{2} C_D A \rho V^2$$

$$P_{in} = \frac{\rho A C_d U^3}{2\eta}$$

$$O_2(used) = BMR + \frac{2.83}{1000} P_{in}$$

Achievements & Awards

- Competed in the InNOLEvation Challenge and won Most Viable Prize
- Patent pending
- Represented FSU at Governor's Cup
- Participated in Digitech 2019
- Finalists in the Engineering Shark Tank

Stay Limitless