



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Calvin H. Witt</b>	<b>Project Number</b> <b>J0124</b>
<b>Project Title</b> <b>Breaking the Splash Barrier: Developing an Economical Underwater ROV</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My goal is to design, create and develop an Underwater ROV (Remotely Operated Vehicle) that will function and be maneuverable in and under water. It will be built from parts commonly available at hardware and surplus stores (this is NOT an Internet "kit" project). The ROV must descend to the bottom of a pool and ascend to the surface, move in both forward and backwards directions, and turn sharply in and under the water using power interruption to one of the motors. The controller I design and build will have two functions: one for "cruise" and the other for "finite" control.</p> <p><b>Methods/Materials</b> 1. Decided on size, hexagonal shape. 2. Tested propellers with various motors, designed and constructed watertight PVC "power pod" to contain motors. 3. Designed, created, and tested various seals for motor shaft. 4. Designed and constructed multifunction ROV power controller for propulsion and steering. 5. Performed preliminary tests, Ascend/Descend, Forward/Reverse, Turning tests and made changes. 6. Performed final testing (10 tests each).</p> <p><b>Results</b> Testing proved the ROV to descend, ascend and be quite maneuverable (steer) on the surface and underwater. It performed every function I had designed it to.</p> <p><b>Conclusions/Discussion</b> Yes, I was able to design, create and develop an ROV that functioned and maneuvered in and under water using common and surplus materials. This was confirmed with consistent test results. The total cost was \$35.24 which is far less than a manufactured ROV. I found the low RPM, high torque motors and small propellers to efficiently move the ROV on the surface and underwater. I found it interesting that the ascend time was shorter than the descend time. Also interesting was, though the motors ran slightly slower in forward than reverse, the ROV was faster moving forward. This appears to be because the propeller force is hitting the power pod housing. Though the seals did prevent the motor power pods from quickly flooding, small amounts of water did leak past.</p>	
<b>Summary Statement</b> I designed, created, and developed an Underwater ROV (Remotely Operated Vehicle) at a very reasonable cost that functions and is maneuverable in and under water after extensive testing and modifications.	
<b>Help Received</b> The Elhardt#s for using their pool for testing; Peter Elhardt and Audrey Witt (my sister) for being my "third hand" as the stop watch operator during timing tests; my dad who supervised my work on this project and made me think problems through.	