



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Sam R. Galli	Science Fair Use Only
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Moving in 3-D Space: Does Positioning of Thrusters Affect Maneuverability of a Remotely Operated Vehicle?	J0908
Preferred Category (See page 5 for descriptions.) 9 - Fluid Mechanics/ Aerodynamics/ Thermophysics	Division <input checked="" type="checkbox"/> Junior (6-8) <input type="checkbox"/> Senior (9-12)
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Remotely operated vehicles are important in ocean core and water sampling, undersea salvage work and exploration. In order to replace a diver, a remotely operated vehicle (R.O.V.) must be highly maneuverable. Maneuverability is the primary limiting factor in R.O.V. work. I hoped to see that I could improve maneuverability in the working model R.O.V. by changing the positioning of the thrusters.</p> <p>For this experiment, I designed and built an R.O.V. with interchangeable thruster positions so I could easily modify the layout. To perform My experiment, I set up a course of vertical and horizontal obstacles in a pool. I timed runs as I piloted it through the course. After each run, I reconfigured the thruster layout and ran the course again until I had tested all four layouts. In order to reduce a contaminating variable, I re-tested each configuration in reverse order to balance out my piloting skill.</p> <p>According to my experiment data, maneuverability of the R.O.V. is affected by the position of the thrusters. I recorded a 25 second time difference between the most maneuverable and least maneuverable configuration.</p> <p>If I could retest this project, I would not change the vehicle, but would change the control box. I would put all four thruster switches in a row to enable me to operate them all at the same time. This would give me more control than the current layout.</p>	
Summary Statement (In one sentence, state what your project is about.) I designed and built a working Remotely Operated Vehicle to see if I could improve maneuverability by changing the position of the thrusters.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. I would like to acknowledge the help of Chris Myers, for his guidance with wiring and supervision, Laurel Galli for typing and proofreading, and Harry Bohm and Vicke Jensen for their book, "Build your own Underwater Robot and other Wet Projects", Westcoast Words, British Columbia, Canada, 1999.	