



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Jonathan A. Wilde	Project Number J0237
Project Title ToughBot: The Pursuit of a Better Urban Search and Rescue Robot	
Abstract Objectives/Goals The goal of my project is to build a highly robust custom autonomous search and rescue robot platform. The design of the robot would be a major improvement on previous designs. The robot would be tested to ensure that it met design criteria such as having redundant obstacle detection systems and being made out of tough materials. Methods/Materials I first constructed the main prototype circuit board for the robot. Upon completion, I machined the body out of polycarbonate and assembled the robot. I then programmed software libraries and test programs for the robot. Finally, I tested the robot by dropping it from two feet onto the ground to test its impact resistance, having it attempt to drive over a piece of PVC tubing to see how it would drive over rough terrain, and by having it drive up a slippery slope to test the traction of the treads. Results The impact resistance test revealed a weak tread link and the rough terrain test revealed that the plastic treads were too slippery. These issues were quickly fixed by replacing the weak tread link and by coating the treads in rubber. Conclusions/Discussion A small, tough, lightweight, and easy-to-program robot is clearly feasible. This prototype can clearly survive the hardships that a current search and rescue robot goes through and climb over the same types of objects that a current one can. The prototype even meets many of the specifications set by the Center for Robot Assisted Search and Rescue. A robot like this could clearly make the search and rescue industry safer and more efficient than ever before.	
Summary Statement The focus of the project is to build a robust custom urban search and rescue robot platform and test it under simulated conditions.	
Help Received Father taught how to use oscilloscope; Used power tools under supervision of father.	