



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Sarah H. Kazmie	Project Number J1497
Project Title Danger, Will Robinson! Life Critical Computer User Interfaces and the Science of Safety	
Objectives/Goals As technology plays a greater role in many aspects of critical safety, the fast response to computer generated emergency signals can save lives and prevent disasters. Many systems, including interfaces used in driving, navigation, flight, health care, surgery, security, defense, and public and industrial safety, could benefit from understanding how interface design, signal type and other conditions impact user reaction time to life critical messages and alerts.	
Abstract Methods/Materials I created a computer game to test and record users response times to a variety of interface configurations, warning methods and signal combinations. Rounds are randomly selected from 14 possible configurations to prevent the order of play from affecting the results. Players are distracted by steering a car to avoid oncoming traffic.	
Results In 65 games, played by subjects ranging in age from 7 - 72, more than 1,300 rounds were recorded and analyzed. The results of each round were stored in an Xml file, and graphed in Excel, after being analyzed and sorted in my own custom results reporting window.	
Conclusions/Discussion The use of audio signals or heads up displays significantly improves reaction time. Larger alert controls also produce faster responses. Listening to a voice at the time of the alert signal impairs reaction time, but hearing any spoken message, within a few seconds before the signal, can improve response. Music playing in the background can also improve response time.	
Summary Statement I wrote a game to test interface options and signaling conditions and find the configurations that will improve response in life critical computer/user interfaces.	
Help Received My teacher, Mrs. Bartley, explained the science fair and let me set up my computer in her classroom, My mom let me put my game in her store. My mom, my grandfather and our good friend Harry offered advice, suggestion and help printing my documents. Harry also taught me to use Visual C#.	