



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Zachary J. Haupt</b>	<b>Project Number</b> <b>J1408</b>
<b>Project Title</b> <b>Does Cosmic Dust Have an Effect on Space Travel?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The goal of my project was to determine whether or not cosmic dust in space will slow a spacecraft down, and if so, how long it would take. <b>Methods/Materials</b> Since real-world experiments were not practical, a way of simulating outer space was sought. A mathematical model was tested using air-drag formulas to create a computer program simulation. The simulation was run with different starting conditions approximating the density of the medium in which the test object was "flown". Sea-level conditions were used to calibrate the model's output with published values. Additional runs were made testing thinner atmospheres such as the top of Mount Everest and the orbit of the International Space Station (ISS). Each simulation was run until either the object slowed to a preset velocity or a fixed number of iterations had been reached. <b>Results</b> The simulation illustrated that the less dense the material through which the object traveled, the longer it would take to slow down. The simulation run using values similar to those at the altitude of the ISS ran a very long time and while the object slowed down, it would not be noticeable to an observer. <b>Conclusions/Discussion</b> Cosmic dust, air molecules, and even small bits of rock can influence the flight of an object in space, but other factors (like gravity) are likely to have a larger effect. Learning more advanced math and physics techniques will allow greater accuracy and ability to calculate these relationships.	
<b>Summary Statement</b> A computer simulation is used to determine the effects of cosmic dust on objects traveling in space.	
<b>Help Received</b> Father helped with computer program, learning math and physics	