



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> Alon M. Sacks	<b>Project Number</b> <b>S0913</b>
<b>Project Title</b> <b>The Effects of the Operation of Passenger Electronic Equipment on Aircraft Navigation</b>	
<b>Objectives/Goals</b> My experiment seeks to answer the question whether passenger electronic equipment affects aircraft navigational instruments or not. I hypothesize that if passenger electronic equipment is on while flying, then the aircraft navigational instruments will be slightly affected, and will show inaccurate data.	
<b>Abstract</b> <b>Methods/Materials</b> In order to conduct this experiment I used various electronic equipment including laptops, iPods, cell phones, and FM radios as well as a Cessna 172 four-seater aircraft with the following navigational equipment: a magnetic compass, a directional indicator (DI), an automatic directional finder (ADF), a VHF omni-directional range (VOR) and distance measuring equipment (DME). As each instrument relies on different principles for its operation, certain instruments could be conducted while on the ground while others had to be conducted during flight.	
<b>Results</b> The only pattern present in this experiment was that the negative effects on the aircraft's navigational instruments were consistent, meaning an instrument was either always negatively affected or never negatively affected. The DI, DME and VOR all showed no deviation with any of the electronic devices and the magnetic compass and ADF showed various amounts of deviation with all of the electronic devices.	
<b>Conclusions/Discussion</b> My original hypothesis was rejected by my data, showing that the accuracy of the navigational instruments is dependant on the principles that instrument is conducted by. 3 of the 5 navigational instruments (VOR, DI and DME) showed no deviation of accuracy and the other two instruments (magnetic compass and ADF) showed large amounts of deviation. Although it is possible these conclusions may be somewhat false due to experimental error, they are conclusive enough to determine that aircraft navigational systems are indeed affected by passenger electronic equipment.	
<b>Summary Statement</b> My project is about the effects of everyday passenger electronic equipment on an aircraft's navigational devices.	
<b>Help Received</b> Father helped fly the aircraft	