



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Agustin Roldan, Jr.	Project Number S0220
Project Title Induced Electromagnetic Propulsion	
Abstract Objectives/Goals Is it possible to improve the efficiency of a Railgun by changing what materials are used to reduce things like friction, noise, and heat dissipation to increase the velocity of the magnets being fired? Methods/Materials Two rails made out of aluminum or copper, One Platform, 1 capacitor charging circuit board, 330v Capacitors, Magnets: {Rare earth magnets (Neodymium)}, DC adapter: 12 volts, Rubber Gloves, 2 alligator clips, 1 axle, 1 Flip Switch. Results From the data collected I was able to see that the copper rails were more efficient than the aluminum rails. Less degradation occurred with the copper rails. Welding or arcing occurred more on the aluminum rails, because of this, the magnets degraded much faster than on the copper rails. The copper rails are highly more efficient than aluminum rails. Velocity increased as voltage was increased, but when used on copper rails, the velocity was higher than with the aluminum rails. Conclusions/Discussion In conclusion, this railgun shows a lot about how forces in magnets work in conjunction with electricity. The railgun is a success because we were able to find out what made a railgun more efficient. From what I said earlier in my hypothesis, I believed that copper rails would work more efficient than aluminum rails. From what I have tested, I can conclude that my hypothesis was correct. I was able to show data that proved that copper rails were more efficient because the velocity of the magnets were faster on the copper rails, then when compared to the aluminum rails.	
Summary Statement Using the given materials at hand, is it possible to improve the efficiency of a railgun.	
Help Received My Dad helped me build the second version of the railgun,	