Colorado Science and Engineering Fair

2025 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Shooting for the Stars

Finalist's Name: James M Little

School and City: Monte Vista High School

Sponsor's Name: Loree' Harvey

Category: Engineering

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

Each time a rocket is launched into the Earth's atmosphere it uses several thousands of gallons of chemical fuel per second. These chemical fuels, when being used in such large quantities, could impact the earth's environment negatively and eventually grow into a large problem due to the increasing amount of attempted rocket launches every year. This is why I decided to make a small scale model of a mass driver, an electromagnetic cannon, which will assist the launching of rockets by using kinetic energy rather than chemical energy. When creating my mass driver, I utilized multiple hall effect sensors that were able to detect the projectile inside the mass driver when it passes through a magnet. Once the sensor detected the projectile my code would deactivate the magnet it passed and activate the next magnet in the mass driver, accelerating the projectile even further each time. I was able to obtain the speeds of the projectile by using the sensors to give me an exact time of when it activated and the distances between these sensors. In my results, I had noticed that the speeds of my projectile were much more heavily influenced by the amount of voltage running through the electromagnets compared to the number of magnets placed on the mass driver. As a result, I believe that if I were to increase the voltage on the mass driver to an incredibly high amount I would be able to achieve much higher speeds than I have previously achieved.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. **A signed copy of this form must be included in your notebook.**