



Colorado Science and Engineering Fair

2024 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: F.A.L.L. (Falling Avionic Light Landing): Analysis of Control Surfaces Upon Atmospheric Re-entry

Finalist's Name: Emilio Martinez

School and City: Alamosa High School, Alamosa

Sponsor's Name: Matthew Relyea

Category: Engineering (ENGR)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

Due to the emergence of revolutionary technology in the field of space flight and aerospace, the opportunity of space exploration and discovery has never been more feasible. Many factors are taken into account when launching a spacecraft into outer space. Precise physics, engineering and robotics are all meticulously included in the construction of a spacecraft. These factors are paid close attention to; in order to preserve lives. The most dangerous part of space travel is re-entry. Due to this, the maneuvers a spacecraft must execute are crucial to its success. It needs proper control surfaces in order to successfully re-enter the atmosphere. SpaceX's Starship emerges as a groundbreaking masterpiece, prompting a revolution in the field of space exploration. The spacecraft's unorthodox maneuver capabilities, which are accomplished by using 4 fins that operate as airbrakes, demonstrates human ingenuity, promising to propel humanity beyond the confines of Earth.

Different variations of control surfaces could change the way this type of free-falling is done. This includes control surface area, location, and shape of the control surfaces. It is important to test these variations for the sake of executing a space mission with the utmost precision. By applying the scientific method, this project will find the most effective layout for the Starship and perfect its design.

By pushing the boundaries of what is possible, we not only pioneer the next chapter in space exploration but also inspire a generation to reach for the stars.

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:

3/4/24

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.