Thesis Project Portfolio

Hypersonic ReEntry Deployable Glider Experiment (HEDGE)

(Technical Report)

Implementing an Automated Strike Zone in Major League Baseball

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science in Mechanical Engineering

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Sociotechnical Synthesis

System success depends upon performance, cost efficacy, and social acceptance.

What is the optimal structural design of a CubeSat to function at hypersonic speed? The U.S. has fallen behind other nations in development of hypersonic weapons, which the Department of Defense has declared as a top priority. The Hypersonic ReEntry Deployable Glider Experiment (HEDGE) evaluates CubeSats as low-budget hypersonic test vehicles. The project team collaboratively pursued iterative design and analysis. The design of HEDGE remains incomplete. A successful hypersonic test by HEDGE would promote more accessible hypersonics.

In the U.S., how have social groups divided over the problem of how best to implement an automated ball-strike system (ABS) in Major League Baseball? Baseball insiders disagree about which value takes precedence: the accuracy of umpired calls or deference to the judgment of the human umpire. Fans, players, coaches, umpires, and the MLB Association disagree about whether and how to automate umpired calls.