

“The Rocket Trike: A Dramatic Outreach Demonstration”

2005-2006 Marsh W. White Award Report

Society of Physics Students

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Proposal Abstract:

The CSU Chico chapter of the Society of Physics Students would like to resurrect our once-renowned “Rocket Trike”. We propose demonstrating the Rocket Trike at multiple upcoming K-12 outreach events. We believe the Rocket Trike’s dramatic illustration of Newton’s Laws is a highly entertaining and effective tool for increasing student interest in science.

Introduction:

In the late 1980’s, the CSU Chico chapter of the Society of Physics Students designed and built an adult-size tricycle known as the “Rocket Trike.” Propelled by a set of pressurized CO2 canisters, the Rocket Trike and its pilot can accelerate from standstill to a maximum speed of nearly 12mph in just a few seconds. This dramatic acceleration can be simply explained to audiences using basic concepts and Newton’s Laws of Motion. The Rocket Trike was a prominent feature of our chapter’s outreach activities for approximately ten years (1989 to 1999). During that period, it was displayed at a series of local public events such as town parades and football half-time shows. Due to its popularity, the Rocket Trike was even taken on a “Rocket Trike World Tour” that involved visiting K-12 schools in Northern California. Sadly, the Rocket Trike has been in storage since 1999, collecting cobwebs instead of cheers. At that time, our CO2 supplier began refusing to fill the pressurized canisters because of a corporate policy change.

In the last several months, we have established new relationships with CO2 equipment suppliers and restored the Rocket Trike for use in outreach demonstrations. This project was supported by a Marsh W. White Award from the Society of Physics Students national organization.

Expenses:

Item	Item Cost	Quantity	Item Subtotal
Fire Extinguishers	\$194.40	4	\$777.58
Cable Housing	\$6.99	2	\$13.98
Brake Cables	\$4.99	2	\$9.98
Bike Repairs	\$46.49	N/A	\$46.49
Subtotal			\$848.03
(Marsh W. White)			(\$265.00)
<i>Total Expenses</i>			\$583.03

Report:

The Rocket Trike is propelled by two CO₂ fire extinguishers, securely fastened to the trike's rear carriage with lock-down latches and triggered through the modified shifter cable system. The tricycle configuration is stable and safe, with full pilot control of CO₂ release and braking. To restore the Trike to working condition, new CO₂ fire extinguishers were purchased and modified for our use, cabling and tires were replaced, and standard repairs were made to the "bicycle" portions of the Trike. Additionally, we established a relationship with a new CO₂ supplier that enables us to easily refill the Trike's extinguishers on a regular and cost-effective basis.

After thorough testing, the Trike debuted at a campus event hosted by the University Honors Program. On May 14th, 2006, Honors Program students gathered for an afternoon luncheon and recognition ceremony, which included a launch of the Trike. The launch was met with great enthusiasm, applause, and interest from the attending students. The event was a positive experience and our chapter received very encouraging feedback from the other students and staff.

We have several upcoming outreach events where the Trike will be a featured demonstration. In particular, the local student section of the Society of Women Engineers is hosting its second annual Girl Scout outreach event, titled "Making It Matter." The event presents an engineering based curriculum to approximately one hundred Girl Scouts from the local community. For their participation in the event, the Girl Scouts earn their "Making It Matter" badge and "Society of Women Engineers" patch. In collaboration with the SWE organizers, we are supporting their efforts by volunteering to provide various demonstrations and explanations during portions of the event. Specifically, we will be talking about the Rocket Trike and how its propulsion system works, ending with a launch in front of the entire group of Girl Scouts during the event's lunch break.

We feel the Trike will inspire students young and old to find science interesting and exciting, through its dramatic nature and straightforward illustration of basic Physics concepts. With the support of the national SPS organization, we have been able to resurrect a valuable outreach demonstration and contribute to our chapter's sense of community and pride. We look forward to many more years of science outreach with the Rocket Trike!



Figure 1: Chico SPS Members Justin Stimatze (Left) and Joel Amato (Right)



Figure 2: Chico SPS Member Andrew Fisher, during launch.