



Florida Tech MOTORSPORTS

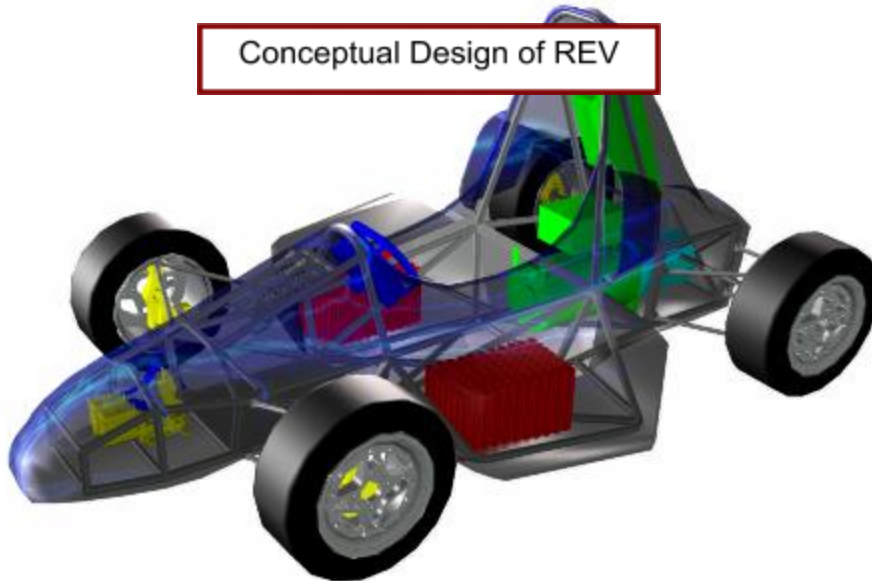
2007 • REV

Leading the development of the first Florida Tech Racing Electric Vehicle

Racing Electric Vehicle - REV

Sponsorship Package

Conceptual Design of REV





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Introduction

REV, the Racing Electric Vehicle, comes out of a tradition Motor Sports at Florida tech. For years now FIT has been competing in the Formula SAE and Mini Baja competitions. This year we hope to begin a new tradition at FIT as we introduce Florida Tech to the growing field of electric racing. From here we don't know where it will lead. To an electric SAE competition? To years of future electric Florida Tech Race Cars? We hope for both, but first we need your help to make this inaugural year a



of

reality and a shining success.

Purpose

The ability to be powered by electricity generated from all types of alternative energy sources drawn much attention towards electric vehicles. The significant efficiency advantage that electric motors have over internal combustion engines has determined their place in the future of automotive engineering. With the pervasion of electric motor systems in all design applications, an electric drive race car is exceedingly relevant.

The Racing Electric Vehicle (REV) project is a remarkable opportunity for students to become a management, design, and production team. Every student is learning in a whole new way as they must apply all their knowledge to this demanding practical challenge. Together the students will learn to manage themselves and communicate in ways much closer to the industry than any other experience during college. Invaluable experience and knowledge will be gained by every student through this challenge, and with it one more piece to the developing array of electric powered vehicle knowledge.



has

REV Team with Partially Completed Car at Batter y Beach Burnout 1-27-2007

This project will also serve to highlight electric drive technologies on and off the Florida Tech campus in a visible, personally dramatic way. The team looks to draw the public and the campus community into the excitement of the project and the potential of electric power systems



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for the future. In that they seek to further school spirit, Florida Tech's relations with the community, and public interest in electric vehicle technology.

Goals

The goals of the REV project are:

- To design and build an electric vehicle for Autocross style racing that would be capable of being competitive in the Formula SAE races.
- To diminish the challenges commonly associated with electric vehicles including Power to Weight Ratio and total cost.
- To build effective management, communication, and teamwork skills amongst the student team, mentors, sponsors, and the community.
- To allow time for thorough testing and optimization of the completed vehicle
- To further public education, interest, and support for electric vehicles.
- To build relations between FIT, business, and the community.



Design

We have decided on building an electrically driven, open wheel, single seat, purpose built, vehicle optimized for Autocross racing. In Autocross the drivers race through a flat road course that is often setup in a large parking lot. It takes only a few minutes to race through the tight, winding course in which the car must accelerate, decelerate, and corner very quickly. To keep the weight and cost down we will design the battery setup and gearing for the short, high acceleration races, where the speeds are usually between 20 and 40 mph. To decrease the cost and time of development we plan to scavenge some of the components from the 2001 Florida Tech Formula SAE car. This should significantly decrease the overall cost for the project and reduce the design and fabrication time.

Design Objectives

- Acceleration from 0 to 60 mph in under 5 seconds
- Top speed of 60 mph
- Maximum power available between 20 and 40 mph.
- Lightweight (under 650lb)
- 15 minute battery life

Milestones and Deadlines

March 15, 2006 –

Team Organization
Define all Design Objectives

May 10, 2006 –

Finish Research (include pricing)

October 23, 2006 –

Team Conceptual Design Review

November 1, 2006 –

Fundraising
Finalize Conceptual Design



NetGain Technologies – Warp 9" Motor



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Ordering Major Electronic Components
Setup Facilities for building and testing

December 6, 2006 –
PDR

January 8, 2007 –
Beginning Manufacturing

February 12, 2007 –
Complete Vehicle
Complete Controller programming

March 15, 2007 –
Complete Testing

April 20, 2007 –
Complete Preparation for Competitions
Finish and Distribute Sponsor Plaques

Rear wheel
upright

About the Team

A mixture of mechanical, aerospace, electrical, and computer engineers have come together to face the challenge of this project as a team. Mechanical and Aerospace Engineering students will handle the design, construction, and structural analysis, while the Electrical Engineering students will focus on the power and instrumentation. The Computer Engineering students will tackle the controller programming and other tasks relating to the computerized systems. In addition to these traditional roles, students have stepped into roles as managers and Systems Engineers to organize the team and integrate their creative efforts.



Team Picture: Elizabeth Diaz, Jason Miner, Jared Doescher, Josh Wales, Kathleen Murray, AJ Nick, Dave Wickers, and Oliver Zimmerman. Not Pictured: Matt Reedy, Kristi Harrell, Val Bastien, Audrey Moyers.



Benefits of Sponsorship

The R.E.V. team's goal is to create an electric vehicle to showcase in the college of engineering. To reach this goal, we need support from businesses and the community.

Florida Tech will be providing the team with facilities suitable for the fabrication and construction of this project. One of our major challenges is raising the funds and acquiring the materials needed to complete the project. Monetary donations, materials, parts, discounts, machining, or any other form of assistance would be greatly appreciated. Every sponsor will receive a placard featuring a photo of the vehicle with a company specific certificate of gratuity. Furthermore, any sponsorship is tax deductible to the extent allowable by law, as are donations to any educational program.

You can become an integral part of our team and be recognized along with us everywhere the team goes. If you donate parts the beauty and strength of your components will be seen in the beauty and strength of our car.

Potential benefits for sponsoring our project include:

- Having the vehicle displayed at the sponsor's business
- Having the sponsor's logo placed on the vehicle
- Having the sponsor's logo placed on the team uniforms
- Having the sponsor's website link placed in the Sponsorship section of the website
- Having the sponsor's support listed in the team reports





Sponsorship Categories

Lightning ⚡ \$10,000 and above

- Large company banner displayed at events
- Car can be displayed at company place of business
- Large company logo displayed on vehicle
- Company logo on team uniforms
- Company logo and link to company website on team website
- Sponsor listed in team reports

Surge ⚡ \$5,000 – \$9,999

REV at the Battery Beach Burnout 1-27-2007

- Car can be displayed at company place of business
- Medium company logo displayed on vehicle
- Company logo on team uniforms
- Company logo and link to company website on team website
- Sponsor listed in team reports

Jolt ⚡ \$1,000 to \$4,999

- Small company logo displayed on vehicle
- Company logo on team uniforms
- Listed in Sponsors section of webpage with link
- Sponsor listed in team reports

Spark ⚡ \$500 to \$999

- Company logo on team uniforms
- Listed in Sponsors section of webpage with link
- Sponsor listed in team reports

Static ⚡ Up to \$499



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- Sponsor listed in team reports

Any support, advice, parts donation, or price discount is greatly appreciated.

Contact Information

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Matthew Reedy

Electrical Lead

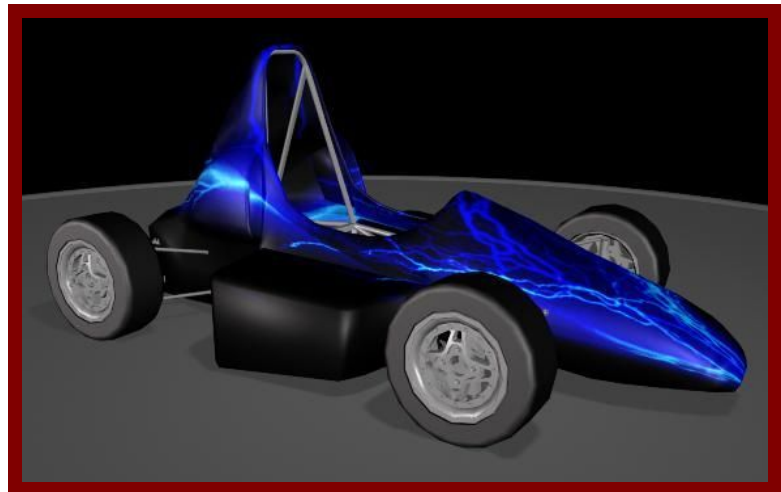
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Conceptual Paint Job overlaying Pro-E Model

If you have any questions or comments, please feel free to call or email us.



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Appendix

of the first Florida Tech Racing Electric Vehicle



Background Information

ABOUT THE UNIVERSITY

Florida Institute of Technology was founded in 1958 by NASA Scientists and Engineers as a means of offering advanced studies to the Space Coast. The school has grown quickly into a major scientific and technological university with both undergraduate and graduate degree programs. The school's leading-edge research facilities and world class teaching talent ensure that the students will enjoy outstanding hands-on opportunities to complement the theories and design principles learned in the classroom.

Florida Tech is a fully accredited, coeducational, independent, and privately supported university that offers more than 145 degree programs in science, engineering, aviation, business, humanities, psychology, education, and communication. Master's degrees are offered in more than 65 areas of study, while doctoral degrees are offered in 20 disciplines.

The university continues to earn praise in the academic community for its performance as a quality educational institution.

- Florida Tech is the only independent scientific and technological university in the Southeast.
- U.S. News and World Report ranked Florida Tech among the top seven percent of America's colleges and universities.
- Ranked among the highest SAT I scores of any private university in Florida.
- Named one of the top 14 technological institutions for engineering in the Fiske Guide to Colleges 2002.
- According to the latest survey of Florida Tech graduates, 96% are working in their major or are in graduate school within six months of graduation.
- The Princeton Review named Florida Institute of Technology a Best Southeastern College for 2006.

ABOUT SENIOR DESIGN



Senior Design is a benchmark at Florida Tech's College of Engineering that gives students hands-on experience in real world engineering. Required for an undergraduate degree, the experience affords junior and senior students the opportunity to work together in multidisciplinary teams to complete a common engineering goal. Throughout the course of the projects, the teams conceive, design, fundraise, and fabricate an engineering project in a competitive real-world environment. Florida Tech's future engineers have built formula cars, remote-tracking systems, motion monitoring devices, rockets, and a variety of other projects. The projects are displayed, graded, and judged in the annual Student Design Showcase, which annually attracts hundreds of interested visitors, prospective students, investors, and industry professionals.



Employers appreciate the difference in new engineers who know, on "day one," how to work successfully on multidisciplinary teams, evaluate cost considerations and effectively present design proposals in a competitive environment. Engineering seniors do "hands-on engineering" which helps them gain an understanding of new projects at a level far beyond the usual expectations for undergraduate engineers.

In addition to knowledge and enthusiasm, successful execution of a project requires funding and materials. Student knowledge of basic fundraising practices is an essential element of each project. These factors drive the process and program through which future engineers learn how to incorporate dollar realities into their designs and how to identify, approach and acknowledge funding sources.



The quality of a Senior Design experience depends directly on the level of community and corporate support. All donations are appreciated, but a significant gift received early in the year provides significant support for the students. More importantly, it ensures that they will have an opportunity to "learn by doing" which we think will



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prepare them well for the professional practice of engineering in the 21st century.



BUDGET

Drive System

Motor, DC	\$1,450
Controller	\$2,950
Pot Box with throttle control	\$100
Lead Acid Batteries – 12x \$85/ea	\$1,020
Charger	\$300
Differential	\$500

Vehicle Dynamics

Chromoly Tubing	\$250
Misc. Aluminum	\$500
Misc. Mechanical Components (Aluminum, hardware, etc.)	\$500

Chassis and Body

Chromoly Tubing	\$600
Fiberglass	\$200
Epoxy Resin Kit	\$100
Misc. Mechanical Components (Aluminum, hardware, etc.)	\$500

Driver Interface and Ergonomics

Seat	\$90
Steering Wheel	\$80
Seat Belt	\$90
Driver Accessories (helmet, gloves, suit, etc)	\$200
Misc. Electrical Components (Wire, connectors, etc.)	\$200
Misc. Mechanical Components (Aluminum, hardware, etc.)	\$200

Electrical System

Speed Sensor	Wireless Devices
PLC	Misc. Electrical Components (Wire, connectors, etc.)
Fuses	



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\$50	\$500
\$1,000	\$300
\$200	

Other

Registration Fees, travel expenses, shirts,
business cards, etc.

\$1,500

Grand Total

\$13,400

Preferred Lithium Ion Battery System

A123 High Power Lithium Ion cells
Battery Management and Charging System

\$6000

\$3000

Preferred Total

\$19,400