

ELECTRIC VEHICLE TEAM

ROCHESTER INSTITUTE OF TECHNOLOGY



2018 SPONSORSHIP PACKET

+EVT-

ELECTRIC VEHICLE TEAM



ABOUT US

Now in the team's eighth year, the team has grown to over fifty full-time student members focusing on the design and development of many projects. Each of these students are apart of one of five subteams: electrical, mechanical, firmware, software, and industrial design.

OUR MISSION **FAST. CLEAN. ELECTRIC**

Among its many principles, the Rochester Institute of Technology's Electric Vehicle Team (EVT) is dedicated to the design of custom electric race motorcycles, the continuous provision of industry-comparable experiences, and maintaining an environment that encourages interdisciplinary collaboration among its members.

OUR VISION **BECOME FASTER. BECOME CLEANER. REMAIN COMPETITIVE.**

2018 will prove to be our biggest year to date: we will be completing the final upgrades to REV1, our first electric race motorcycle, while beginning the design of our next generation motorcycle, REV2. This motorcycle will produce twice the horsepower as REV1 and is slated to compete at Pikes Peak International Hill Climb (PPIHC) in June of 2019. Along with our core vehicle development, we will continue the design of our own custom motorcycle frame, the improvement of thermal management technologies, the integration of advanced control systems, and the refinement of real-time data collection techniques.

RACING EVENTS

FUTURE COMPETITIONS

eMotoRacing Varsity Challenge:
Barber Motorsports Park
Barber, Alabama

Pikes Peak International Hill Climb:
Pikes Peak Summit
Cascade, Colorado

PREVIOUS COMPETITIONS

eMotoRacing Varsity Challenge:
New Jersey Motorsports Park (NJMP)
Milieville, New Jersey

AUG

"Hellboy" motor bike
prototyping platform

2011

AUG

"Hobbes" Go-kart
prototyping platform

2013

JUL

2nd place at NJMP

APR

Custom rear subframe
completed

MAR

New revisions of IMU and
BMS hardware

2016

MAR

Ergonomic upgrades
to HIVE and tail farring

JAN

New Subframe built

JAN

Start designing REV 2

2018

2010

SEPT

Club
Formation

2012

AUG

REV 1 (RIT Electric Vehicle 1)
Conception

2015

JUL

NJMP 1st place first race

JUN

REV 1 build complete

APR

XALT 12 cell LI+ pack complete

JAN

REV 1 design complete

2017

APR

New battery pack using
900 18650 LI+ cells

JUL

3rd place at NJMP

SEPT

Updated microcontroller to
ARM architecture

2019

JUN

Pikes Peak

ELECTRICAL CIRCUIT DESIGNERS

Electrical engineers support the hardware for our data acquisition and powertrain control systems. All designs are made in-house with mentorship from industry professionals. The team cover topics such as battery charging and cell management, power conversion, thermal regulation and vehicle networking.

MECHANICAL FRAME DESIGNERS AND COMPOSITE EXPERTS

The mechanical team's primary focus is integrating the powertrain of the electric motorcycle within a custom chassis. The heart of the system, the battery pack, is developed and manufactured by this team. In addition, the team also improves the aerodynamics of the motorcycle with customized composite fairings.

FIRMWARE / SOFTWARE PROGRAMMERS AND TELEMETRISTS

Composed of electrical engineers, computer engineers, and computer scientists, the firmware team brings EVT's hardware to life. Using the power of ARM microcontrollers and modern C++, the team generates and processes data on vehicle performance metrics. Using EVT's real-time architecture, the team develops algorithms to control our state-of-the-art electric vehicle and gain insight into the future of electric vehicles at RIT.

INTEGRATION SYSTEMS ENGINEERS

The integration team ensures that all motorcycle systems seamlessly work together. The team is responsible for working with the mechanical, electrical, and firmware teams to determine and document the overall layout of components on the bike. They are also responsible for the design, simulation, test, and implementation of water and debris resistant housings for motorcycle electrical components.

DESIGN INDUSTRIAL DESIGNERS

Our designers bring our ideas to reality by combining aesthetic and ergonomic decisions to ensure our bike looks, feels, and rides competitively. Additionally, our designers also develop marketing materials for our team which includes posters, t-shirts, and other means of advertising.

REV 1

GATEWAY

- Retrieves and sends real-time CAN data to control systems
- Makes performance decisions based on the environment

BATTERIES

- 900 Lithium-Ion cells
- 125 VDC
- Continuous Output Power: 75kW (600A)
- Thermal Management: Phase-Change Material

SUBFRAME

- Supports the rider
- Carbon-fiber composite fairings
- Houses custom control systems
- Custom design

BMS

- Custom control board to guarantee the safety of our battery cells
- Collects individual cell voltages and temperatures
- Implements proprietary cell balancing algorithm
- Assists in providing long-term health insights

IMU

- Custom PCB that collects acceleration, rotation rates, and altitude data
- IMU allows us to optimize lap times based upon previously collected data
- Provides our rider with performance feedback

MOTOR ZERO MOTORS 75-7R

- Permanent Magnet Motor
- Horsepower: 70hp (52kW)
- Torque: 157Nm
- MAX RPM: 7000
- Sevcon Motor Controller: Allows for precise control over the Z-force Motor



REV 2 CONCEPT

Render by
Daniel Shapiro

MOTOR CONTROLLER RIENHART PM100

- System Voltage: 400 VDC
- Continuous Current: 300 A_{rms}
- 10.7 kg

FRAME KTM SUPERDUKE 990

- One of the largest limitations of REV1 is the frame: it restrains the customization of the motorcycle. REV2 will incorporate a KTM Superduke 990 to provide the frame structure, but will be significantly enhanced to allow design optimization
- Off the shelf frame restrains the customizability of design
- Modified to allow system efficiency and weight distribution



MOTOR EMRAX 268 MEDIUM VOLTAGE

- Peak Torque: 500Nm
- Continuous Torque 250Nm
- Efficiency 98%

BATTERIES

- 1200 Lithium-Ion cells
- 420 Volts (VDC)
- Thermal Management: Liquid-cooled pack
- Continuous Output Power: 86 kW (240A)

SPONSORSHIP

WAYS TO INVEST



MATERIALS



SERVICES



MONEY

SPONSORSHIP TIERS

WATT	KILOWATT	MEGAWATT	GIGAWATT	TERAWATT	
\$1 - 499	\$500 - 900	\$1000 - 3499	\$3500 - 5999	\$6000+	
					Logo on motorcycle (Megawatt-small, Gigawatt-medium, Terawatt-large)
					T-shirt logo (Megawatt-small, Gigawatt-medium, Terawatt-large)
					Access to our team resume book and EVT room tour
					Feature on website and social media shout outs
					Feature in our newsletter and an invite to Sponsor Day

All contributions are 100% 501(c)(3) tax deductible

CONTACT US

Thank you for your time and for considering sponsorship of the Electric Vehicle Team. If you have any questions, would like to know more about what we do, or are interested in becoming a sponsor, please feel free to reach out to the contacts listed below.

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