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2.007 Design and Manufacturing I
Spring 2009

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MIT Electric Vehicle Team:

Charging into the Future

Irene Berry, EVT Graduate Team Leader

EVT designs, builds, tests, and demonstrates advanced EV technologies

The Mission of EVT is to:

- **Research & demonstrate** electric vehicle technologies using full-size EVs as test platforms
- Provide **educational opportunities** for MIT students through **project-based learning**,
- **Inform the public** about electric and other advanced vehicle technologies.



EVT is a multidisciplinary group of undergraduate and graduate students

- Roughly 20 students from all majors
- Based out of Sloan Automotive and Electrochemical Energy Laboratories
- Advised by Prof. Yang Shao-Horn

Current Sponsors

- Valence Technology
- Exponent, Inc
- Maniv Energy Capital, LLC
- National Instruments
- MIT Electrochemical Energy Laboratory
- MIT Sloan Automotive Laboratory



The Porsche 914 EV demonstrates advance Li-ion battery technology



Key Components

- 18- Valence Technology Lithium-ion batteries (230 Volts, 100 Amp-hours)
- Azure Dynamics AC motor (50 kW)
- Original 5-speed manual transmission

Performance Specifications

- 100 mile range
- < 20 sec 0-60 time
- 8 hour charge time

Milestones

- March 2008: First test drive
- Summer 2009: Endurance test/demonstration

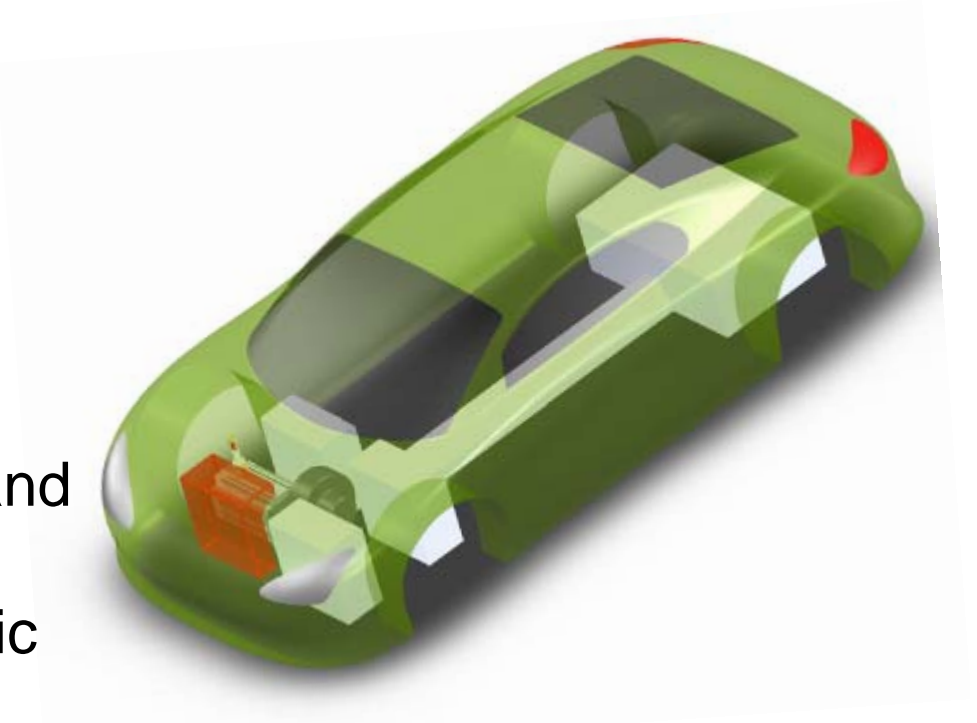
“No-Compromise” EV will demonstrate rapid-charging capabilities

Vehicle Goals

- 10 minute charge time
- 200 mile range
- < 9 sec, 0-60 time
- mainstream vehicle styling

Additional Project Goals

- Research electricity storage and charging infrastructure
- Education and outreach, public demonstration



Potential 2.007-EVT Projects are important for both vehicles

- **Driver Information Center** (*Porsche 914*)
 - Utilize sensors and data buses to display vehicle-level and consumer information to the driver
 - Design and implement the display center into the vehicle console
- **Waterproof and Cooling System** (*Porsche 914*)
 - Waterproof the Porsche 914: identify, design, implement
 - Identify cooling system requirements; design and implement system to cool batteries, motor, and motor controller/inverter
- **Charging systems** (*Porsche 914 and No-Compromise EV*)
 - Select and implement a 4-hour charging system for the Porsche
 - Research and design a 10-minute charging system

Potential 2.007-EVT Projects are important for both vehicles

- **Efficiency** (*Porsche 914 and No-Compromise EV*)
 - Use vehicle modeling to identify areas for efficiency improvement
 - Design vehicle changes to increase efficiency by ~10 percent
- **Outreach and Hands-on Demonstration**
 - Design and build a hands-on demonstration of EV technologies for use at poster sessions and other outreach events
 - Lead and organized outreach events throughout the semester; plan for summer events
- **Bring Your Ideas to Us**

We will expect from you...

- **Work with ~5 other 2.007 students under the supervision of an EVT graduate student**
- **Work out project details with us**
- **Be part of our team for the semester**
 - team meetings: Monday, 8:00
 - contribute to team discussions; report on the status of your project; ask questions, get answers
- **Be safe and professional; respect EVT and Sloan lab rules**
 - Attend an EVT electrical safety training next week
 - Represent EVT well

You can expect from us...

- **Access to our team**
 - Anything we know about EVs, you know about EVs (and we know a lot)
- **Access to team resources**
 - Lab (restrictions will apply); our tools, equipment, and supplies; an awesome EV that works; books and manuals on EVs and vehicles; vehicle modeling tools
- **Appreciation and respect for your contributions, opinions, and ideas**