Advanced Electric Vehicle Concepts for Designing Electric Bicycles

WHEN Thursday, October 2, 2008
WHERE Rock Valley College, Woodward Technology Center, Rooms 117/119. I-90 to Riverside Blvd., exit and go west to Mulford Rd. Go south to 2nd light, turn east into RVC. Follow road to left to last building on right.

AGENDA
4:00 PM Bike test ride-open to public
6:00 PM Networking
6:30 PM Dinner
7:30 PM Presentation

PROGRAM
A team of 15 engineers spent almost 3 years using the most advanced electric vehicle concepts in developing E+, a state of the art electric bicycle consisting of a hub mounted electric motor, a hub mounted battery pack and an advanced electric vehicle controller, all mounted on a sleek frame which emphasizes the traditional bicycle look.

The 3-phase brushless motor is world's first bicycle hub motor to produce 1000W of output power and 85Nm of torque in package weighing just 8 Kilograms. The motor has embedded power electronics and digital controller in the stator of the motor. The overall efficiency of the motor and controller is 85% is highest in the industry. The motor employs Texas Instrument's TMS320F2801, 32-bit, 100MHz DSP with state of the art field oriented control. The 36V, 10 Ahr, NiMH E+ hub pack is made of 30 D-Cells connected in series. This first of its kind pack in the world is capable of sourcing and sinking 50 Amps of motor/regeneration current with an advanced Battery Management System. The Battery Management System protects the cells against a number of hostile conditions such as localized over temperature, undervoltage, and short circuit conditions. The E+ pack learns fuel gauging based on charge and discharge patterns of the user. The whole pack is subdivided into 6 modules to ensure rapid reparationility in the field.

The E+ vehicle controller consists of an LCD screen and four push buttons. It displays regular bicycle data such as Speed, Odometer etc. in addition to information specific to electric bicycles such as Battery Gauge, Ahr remaining, and Time Remaining etc. The E+ vehicle controller also acts as a security key once removed from the vehicle. It acts as master on a RS485 network to control the motor and the battery.

The E+ system has been designed to be scalable to accommodate auxiliary battery packs and other accessories such as iPod, USB interface, etc. The presentation will discuss design, development and production of E+ motor, battery pack and vehicle controller. The presentation will also discuss engineering challenges related to motor design, battery pack design, cell performance variance, packaging, thermal performance, repeatability and manufacturability during development in addition to system integration issues and future enhancements of E+.

SPEAKER
Mr. Rakesh Dhawan, president of Electric Motion Systems LLC, received his BTech in EE from the Indian Institute of Technology, the MSEE from Univ of Minnesota-Twin Cities, and the MBA from Old Dominion University. Mr. Dhawan has held a number of engineering management and executive management positions with a number of companies.

MEAL INFORMATION
Dinner will feature Grilled Chicken Breast and Vegetable Lasagna. The costs are: member: $5, non-member: $10, student members: $2, student non-members: $5. Please make dinner reservations by calling Ginger at 815-394-5696 or sending her an email (ginger.spinasantapaciolla@hs.utc.com) by Monday, September 29, at 5pm. Please include the following: your name, phone number, email address, IEEE member number, and choice of entree. Unemployed members may call the treasurer for special arrangements.

NOTE
The meeting is open to the general public. You need not be an IEEE member to attend. Guests are welcome. Please call Ginger at 815-394-5696 for questions.
IEEE Chicago/Rockford Consultants’ Network Meeting

** A joint Affinity Group of the IEEE Chicago and Rock River Valley Sections **

The next meeting will be on Monday, September 29, 2008. The optional informal dinner is at 5:30 PM at Bakers’ Square, 270 E. Northwest Highway (corner of North Court), just south of the library, and the meeting at 6:45 PM at the Palatine Public Library, 700 North Court, Palatine, IL 847-358-1216. Please go to http://ewh.ieee.org/r4/chicago/cn/ for more info. The subject is “Wind Power Generation Industry in Illinois” and the speaker is Kevin Borgia, Executive Director of Wind for Illinois (WFI), a state-based trade association for the wind energy industry.

Kevin will discuss the basics of wind energy technology, provide a short history of the wind power industry and where it is today, and prognosticate the future for the sector. He will also discuss the wind resource potential in Illinois and other states, and the roles of state and federal policy in expansion. This growth industry will provide many engineering opportunities.

May RRVS Meeting Recap — Annual Election/Picnic

The slate of candidates put forth in the April 2008 RRVS newsletters was approved unanimously by voice vote: Chair — Alkesh Patel, Vice Chair — Paul Hofmann, Treasurer — Adrian Vandergrift, Secretary — Larry Wachowiak, Computer/Control Systems Chapter Chair — Don Zinger, PELS Chapter Chair — Neal Clements, IAS Chapter Chair — Joe Etminan, EMC Chapter Chair — Jamal Shafii. All enjoyed the picnic!

October RRVS Meeting Preview

Roy Leventhal, co-owner of Leventhal Design & Communications, will speak on how signal integrity, power integrity and EMI/EMC performances affect each other and how computer-aided analysis facilitates better designs in a talk entitled “Modeling and Simulation for Signal Integrity & EMI”.
The Rock River Valley Section gratefully acknowledges the following companies and colleges for supporting Section Officers:

Hamilton Sundstrand • Northern Illinois University • Rock Valley College • River North Solutions
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Time-Sensitive Material