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**THE**

**SUNCOAST**

**SIGNAL**

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September 2007



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**Specification & Application Basics  
for Distribution Transformers**

Date: September 21, 2007

Time: Registration & Breakfast:  
8:30 -- 9:00AM

Seminar: 9:00AM – 3:00PM

Speaker: John Sullivan, Tim Badger,  
and Don Duckett

Location: Seminole Electric,  
16313 North Dale Mabry Hwy,  
Tampa, FL 33618

Cost: \$100 Members, \$150 Non-  
Members, \$30 Students  
Includes Breakfast, Lunch

RSVP: <http://time2meet.com/fwcs-pes4/index.html>

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Questions: Jim Howard at 863-834-8865,  
or [Jim.Howard@Lakelandelectric.com](mailto:Jim.Howard@Lakelandelectric.com)

IEEE PES/IAS Chapter is offering this seminar on Friday, September 21, 2007 at Seminole Electric. It will cover Distribution Transformer topics from their design to usage and will provide the attendees with an in-depth basic understanding of devices that everyone depends on. There will be discussion about transformer impedance vs. available fault current and voltage regulation, as well as how to correctly size transformers for residential and commercial applications. Voltage problems and the application of open-wye, open-delta banks will be presented. Also, the importance of tracking transformer failure rates by manufacturer and year will be discussed. There will be a discussion on the importance of transformer losses and how they relate to initial costs and what the future Federal energy requirements will mean to how and what type transformers your company will be required to order in the future. For more information, see **Distribution Transformers** page 5.

**MTT/AP/ED Terahertz Tech.  
in Outer and Inner Space  
Trak, Sept. 19, 2007 at 6 pm**

**Late news:** Dr. Peter H. Siegel will survey terahertz technology from its cradle applications in space science to more recent biomedical and chemical uses. Contact Ken [koconnor@trak.com](mailto:koconnor@trak.com).

## The Florida West Coast (Editor's Column)

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## Plain Talk about the Electric Power System

for the Non-Power Engineering Professional

October 17-19, 2007 at the St. Louis, Missouri Airport Hilton

IEEE PES is pleased to announce a series of courses that focus on the Electric Power System for the Non-Engineering Professional. The three areas covered are:

- Power System Basics—Understanding the Electric Utility Operation
- Delivering Power to the Customer—Today's Distribution System
- The Grid--The Interconnected Electric Bulk Power System

Register Today! See [http://www.ieee-pes.org/vfvzttv\\_zvbsvvt.html](http://www.ieee-pes.org/vfvzttv_zvbsvvt.html) for the Plain Talk Brochure and [http://www.ieee-pes.org/cagobba\\_zvbsvvt.html](http://www.ieee-pes.org/cagobba_zvbsvvt.html) to view the entire program and get registration details.

I just returned from a trip to Shanghai, China; my fourth such trip, to teach a two-day course in Entrepreneurship at Fudan University. This is part of their Executive MBA at the Center for American Studies. Here are a few observations.

Shanghai is a very large (13 million people), modern, and apparently wealthy city. Likewise the university, which is one of the top five in China. The students in this program are all business people, many with significant positions. These people are hungry for learning about business and in particular starting new, rapidly growing businesses. They are bright, well educated and are passionate about their views. Subjects such as child-care, financial planning and death planning started animated discussions.

Among the people I met, there seemed to be no constraints regarding political topics. They freely gave their thoughts about government, international economics, health and life in general. They are concerned about pollution and global warming as well as the lives of poor people in China elsewhere in the world. They want to have their economy grow and aspire to be among the world leaders. Peace is key in their thinking.

I liked the people whom I met and am encouraged for the future of the world. —PS



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## IEEE-USA Celebrates America Competes Act Signature

The IEEE-USA realized one of its major public policy priorities for the 110th Congress with the President's signature of the America COMPETES Act (H.R. 2272) (<http://thomas.loc.gov/cgi-bin/bdquery/z?d110:h.r.02272>.)

The America COMPETES Act is landmark legislation designed to enhance U.S. competitiveness and innovation by increasing funding for basic research and improving science, technology, engineering and math (STEM) education.

This act authorizes \$43.3 billion in federal spending over FY 2008-2010 for science, engineering, mathematics and technology research, and in education programs. Key provisions include:

- Doubling the National Science Foundation budget.
- Doubling the Department of Energy's Office of Science budget.
- Doubling of the National Institutes of Standards and Technology laboratory budget.
- Significant expansion of NSF funding for the Noyce Teacher Scholarship Program, and its Math and Science Partnerships.
- Creation of a new Technology Innovation Program at the Department of Commerce, replacing the Advanced Technology Program.
- Doubling of funding for the Department of Commerce Manufacturing Extension Partnership.
- Increased funding for young researchers.
- Establishment of the Advanced Research Projects Agency for Energy at the Department of Energy.

Two particular provisions that IEEE-USA helped directly champion were reauthorization of the Noyce Scholarships and inclusion of a title strengthening the federal focus on high-performance computer research and development.

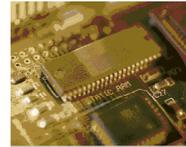
The legislation drew on the recommendations of the National Academies report *Rising Above the Gathering Storm*. Commissioned by Congress in 2004, the report examines ways to prevent erosion of the U.S. competitive edge in the face of technology advances by emerging countries, such as China and India.

There is still plenty of work to be done in convincing the President and congressional appropriators to fund the priorities identified in the America COMPETES Act at the levels now authorized. But for now, we'll celebrate.

Excerpted from a message to IEEE-USA Board of Directors

—C. Brantley

IEEE-USA advances the public good and promotes the careers and public policy interests of more than 215,000 engineers, scientists and allied professionals who are U.S. members of the IEEE. IEEE-USA is part of the IEEE, the world's largest technical professional society with 370,000 members in 160 countries. See <http://www.ieeeusa.org>.



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## Region 3 Growth Awards

The Regional Activities Board approved the following award recipients at the RAB June Series meeting—2006 Section Membership Growth Award, 2006 Sustained Membership Growth Award, and 2006 Student Branch Growth Award.

### **2006 Section Membership Growth Award**

Each year one Section in each Region is recognized as having achieved the highest rate of growth. The greatest level of growth is based on a composite rating, considering the highest percentage of increase in membership and highest increase in new elections relative to other Sections in good standing within each Region.

#### **Region 3; Tallahassee Area**

### **2006 Student Branch Membership Growth Award**

Each year a Student Branch in each Region is recognized as having achieved the highest rate of growth. The greatest level of growth is based on a composite rating, considering the highest percentage of increase in membership and highest increase in new elections relative to other Student Branches within each Region.

#### **Region 3; Columbia Section; University of South Carolina, Student Branch.**

—George McClure, Region 3 Director



## *Seminar on IEEE 450 & 485 Standards on Sizing, Operation, Maintenance, and Replacement of Batteries for Stationary Applications*

Date: October 19, 2007

Time: Registration & Breakfast: 8:00AM - 8:30AM

Seminar: 8:30AM – 3:30PM (Lunch Included)

Speaker: Marco W. Migliaro – IEEE Fellow, President and CEO of IEEE Industry Standards & Technology Organization, Piscataway, NJ.

Sponsor: Nolan Power Group,  
<http://www.nolanpower.com/>

Location: USF, Lakeland Campus, LTB1105 in the new Technology Building  
3433 Winter Lake Road, Lakeland, FL 33803

PDH Credits: 6 professional development hours will be awarded. Enter your name and PE number on the signup website as it appears on your license. IEEE is Florida exempt provider #00015.

Questions: Tom Blair at 813-228-1111, ext 34407 or [thblair@tecoenergy.com](mailto:thblair@tecoenergy.com)

### **OBJECTIVE**

The objective of the Stationary Battery Seminar is to provide the participants with a basic knowledge of lead-acid and nickel-cadmium stationary batteries used in different applications. It will also provide the participants with the information necessary to select and size stationary batteries, as well as, discuss the recommendations for maintenance and testing of the batteries. In addition to terminology used, the participants will learn the basis for rating stationary batteries, the various positive plate types available, the characteristics of vented and valve regulated stationary batteries, float effect (nickel-cadmium) and charging methods. The instruction on sizing will address the development of the battery duty cycle, discrete modeling of momentary loads, factors applied for temperature correction, aging and design margin, sizing batteries using constant current or constant power and sizing a battery charger. Problem identification and the urgency of corrective actions will be discussed during the maintenance presentation. Photographs will be used throughout the seminar to enable the participant to have a more in-depth understanding of the subjects discussed. Each participant will be provided with a handout and reference materials for the seminar. Each participant will be provided with a handout and reference materials for the seminar. For those participants that are more experienced with stationary

Cost: \$100 Members, \$200 Non-Members. Includes Breakfast, Lunch, associated training handouts, and battery sizing calculation software. (Life members & Students with ID, \$25)

*NOTE: DUE TO MULTIPLE REQUESTS, THE FEE FOR THIS SEMINAR HAS BEEN REDUCED AND THE IEEE STANDARDS ARE NO LONGER INCLUDED IN THE SEMINAR COST.*

RSVP: <http://www.ewh.ieee.org/r3/floridawc/>

Make checks payable to: IEEE FWCS and send checks to: FWCS, 648 Timber Pond Drive, Brandon, FL 33510-2937

Space limited to the first 50 registrants!!!

Directions: Take I-4 to the Polk Parkway to US-98, go South approx. 3/4 mile to USF/PCC entrance on left. Drive down entrance road, Technology Building is first building on the right and you can park in the parking lot on the left.

batteries, the course provides an opportunity for gaining a greater depth of knowledge of stationary battery selection, sizing and maintenance. It also provides the experienced user an opportunity to learn about battery problems that he/she may have never encountered in the field.

**Marco W Migliaro** has more than 38 years of experience in the design of electrical auxiliary systems for power generating stations and industrial facilities. Additionally, he has been responsible for the installation, pre-operational testing, startup and maintenance of these systems and their components. He is an acknowledged industry expert in the areas of emergency power systems, dc systems, batteries and uninterruptible power supply systems.

Mr. Migliaro's credentials are too extensive to relate here. However, throughout his career, he has conceived and implemented new and innovative methods in the areas of electrical design, installation, maintenance and testing. He has been recognized for this innovation by his employers and peers. Many of his innovations have been firsts in the industry.

Your local IEEE FWCS Joint PES/IAS Chapter is offering this 6 hour seminar on Battery Sizing, Maintenance, and Replacement for Stationary Applications and references IEEE Standards. Applications will include vented lead-acid, valve regulated, and nickel-cadmium batteries. Many thanks to Nolan Power for sponsoring this seminar.

## *IEEE Technology-Related News Stories Aired In More Than Two-Dozen U.S. TV Markets*

Beginning in 2005, in collaboration with the American Institute of Physics (AIP) and other technical professional organizations, IEEE-USA has helped to underwrite almost 300 local television news stories on engineering and science.

Since January 2006, stories about IEEE-related technologies aired in more than two-dozen U.S. TV markets, including New York, Chicago, Philadelphia, San Francisco, Tampa-St. Petersburg, Phoenix and Miami -- broadcast on ABC, CBS, NBC, Fox, Univision, cable and independent TV affiliates. The average number of household views for these markets is estimated at more than 70 million.

Recent IEEE technology-related stories included: "Preparing for Disaster"; "Movie Magic"; "Engineers Invent Doppler-Based Stethoscope"; "RFID-based Recycling Technology Makes Philadelphia Greener"; and "Automotive Engineers Team Up to Improve Energy-Saving Technology." The stories are aired as part of AIP's "Discoveries & Breakthroughs" news service that delivers a dozen vetted 90-second spots (in English and Spanish) to the top 66 television markets in the United States -- with a potential reach of 75 million viewers.

A limited number of DVDs of the IEEE technology-related TV spots can be obtained by sending an e-mail to [p.mccarter@ieee.org](mailto:p.mccarter@ieee.org).

To view the latest 90-second stories as well as almost 100 archived spots—all on IEEE-related technologies, go to <http://www.aip.org/dbis/IEEE/>. —Pender M. McCarter, Senior Public Relations Counselor, IEEE-USA, +1 202 530 8353

## *From the Chair—Who Is the Best Engineer That You Know?*

We all work hard at being the best engineer that we can be. We go to school, study, take many tests and, with a little luck, we graduate and become engineers. At that point, it becomes more difficult to measure an engineer's skill level. We all work for different companies and on different projects. However, as we go about doing our daily work, we are aware that there are some of us who have the ability to do amazing things.

I'm not talking about those who invent the next Google or who figure out how to get a man to Mars. Rather, those engineers that we work with who just consistently do a good job. Perhaps they are just a bit brighter than the rest of us. Maybe they work just a bit harder. Or even perhaps maybe they just refuse to give up when any sane adult would have thrown in the towel and moved on.

As a breed, we engineers like nothing better than to be recognized for our work. More money is nice and it is always appreciated; however, recognition by our peers is what makes all of those long days and even longer nights worthwhile. Now is the time of the year for us to recognize the best engineers among us. To be recognized, these engineers only need to meet two criteria: they have to belong to the IEEE (doesn't everyone?), and they have to be alive. So my question to you is, among the engineers that you know that meet these two criteria, who is the best? Do them a favor and send their name and just a few words about why you think they should be recognized to Richard Beatie at [rbeatie@lightningmaster.com](mailto:rbeatie@lightningmaster.com) and let him know. If you wish to remain anonymous, this can be arranged.

This awards season, give the gift of recognition that will always be remembered. —Jim Anderson, Section Chair

### **Distribution Transformers cont.**

**Tim Badger** is a graduate of Mississippi State University with a BS in Electrical Engineering, and spent the majority of his career at Tampa Electric Company with 10 years in Power Production, 5 years as Meter Engineer, 7 years in Standards and 11 years in Distribution Engineering. After his retirement from TECO, Tim is working as a contract engineer for Synergetic Design Inc. at Lee County Coop. He is a Senior Member of the IEEE and a Registered Professional Engineer in the State of Florida. Tim is married with two children and two grandchildren, and his hobbies include golfing and spending time on the computer.

**John Sullivan** is a graduate of Georgia Institute of Technology with a Bachelor of Electrical Engineering, and spent the majority of his 37 year career at Tampa Electric Company, in Underground Engineering Design & Field Applications, Voltage Regulation & Power Factor Correction, Protection and Coordination, Distribution Planning and Standards, where he

spent 15 years with transformer product responsibility. John is a Senior Member of the IEEE and a Registered Professional Engineer in the State of Florida. He is an active member of the IEEE Power Engineering Society (PES), IEEE Standards (SA), PES Transformers Committee, where he Chairs an IEEE Working Groups.

**Don Duckett** is a graduate of the University of Texas at El Paso with a BS in Electrical Engineering. He spent 12 years with RTE, mostly in Waukesha WI, in Design and Development Engineering, then 18 years in Design and Technical Marketing with GE in Hickory NC. He then spent 8 years with Florida Power Corp/Progress Energy in Distribution Standards with a primary focus on Transformers. He is currently working as a Technical Resource for HD Supply Utilities in Orlando FL. Don has been a member of the IEEE for 36 plus years, the PES, and has worked on the Transformers Committee since the early 1970's. He is a Registered Engineer in the State of Wisconsin. His hobbies include developing Transformer Application tools on the computer.

## ***PES General Meeting Thanks Host & Sponsors.***

The Florida West Coast Section and its Power Engineering and Industry Applications Chapter warmly thank the following companies for their outstanding support of our recent IEEE PES Annual Meeting. With almost 1,800 attendees it truly was an outstanding event for the area for the PES.

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## ***Graduates of the Last Decade (GOLD) Meeting***

Our FWCS GOLD committee and Chair, Tim Doolittle, invite you and a companion to come join us for this Meeting and Planning session for the FWCS GOLD group. We will be sharing experiences and discussing our plans for future meetings, tours and topics. Possible future meetings to be discussed include the Aquarium, MOSI, Tampa Stadium, and more.

It will occur on Friday, September 28th, 2007 between 6:30pm – 8:30pm. The place: Bennigans on Fowler by the University Mall.

Cost: NONE – Come, join the group for FREE refreshments for the meeting and planning session. RSVP: A MUST – we need to know who is coming so we can plan plenty of food and refreshments. Do it online at: <http://time2meet.com/fwcs-pes1/index.html>

Questions? Tim Doolittle at [tdoolittle@tmdvault.fastmail.fm](mailto:tdoolittle@tmdvault.fastmail.fm)



## ***Symposium on Plug-in Hybrid Electric Vehicles***

WASHINGTON (8 August 2007) -- Plug-in hybrid electric vehicles could greatly reduce U.S. gasoline consumption and carbon emissions if adopted on a large scale.

IEEE-USA is co-sponsoring a symposium on the technology and policy challenges of commercializing plug-in hybrid electric vehicles at the Omni Shoreham Hotel in Washington on 19 September. “Plug-in Hybrids: Accelerating Progress 2007” will bring together leaders in the manufacturing industry, electric utilities, universities, national laboratories and non-profits to explore what is needed to accelerate commercial use of plug-in vehicle technology.

Demonstration vehicles will be on display.

“Advances in power electronics, controls, computer systems, sensors, high-performance permanent-magnet electric motors and new battery technology are converging to create the opportunity to make the plug-in vehicle practical,” said Tom Schneider, general chair of the symposium and past chair of the IEEE-USA Energy Policy Committee. “If not today, then in the immediate future.”

Unlike gasoline-electric hybrids on the road now, which charge their batteries from an on-board engine while the vehicle is running, plug-in hybrid batteries can charge from an ordinary electric outlet. By getting power from the electric grid, plug-in hybrids can increase the security of the United States by reducing dependence of foreign oil. And there are other benefits.

The symposium’s four panel sessions will explore: Electrification, Fuel Economy and the Environment; Plug-in Vehicles and the Electric Grid; New Technology Challenges and Opportunities; and the Need for Federal Action Now.

The registration fee is \$200 for industry and \$100 for government employees and students. Continental breakfast, lunch and coffee breaks are included. After 2 September, the fees jump to \$250 and \$125, respectively. For more information and to register, see <http://www.ieeeusa.org/policy/phev/default.asp>. Go to <http://www.ieeeusa.org/policy/positions/PHEV0607.pdf> for more on plug-in hybrid vehicles.

IEEE-USA advances the public good and promotes the careers and public policy interests of more than 215,000 engineers, scientists and allied professionals who are U.S. members of the IEEE. IEEE-USA is part of the IEEE, the world’s largest technical professional society with 370,000 members in 160 countries. See <http://www.ieeeusa.org>.



Contact: Chris McManes IEEE-USA Senior Public Relations Coordinator E-Mail: [c.mcmanes@ieee.org](mailto:c.mcmanes@ieee.org). Phone: + 1 202 530-8356

# Brain Teaser Challenge Column

—By Butch Shadwell

**August BTC** In the last installment I talked about students wanting to build something. They had "... an idea that required the transmission of a varying analog signal between two circuits at different ground potentials. The obvious solution was to use an opto-isolator IC. I happened to have an extra Fairchild MCT9001 and some op-amps. Can you draw a circuit configuration that will offer (approximately) the same delta V on both sides of the optical barrier? I say approximately, but if you do it right, you can probably get linearity and accuracy of the delta V better than 1%. No digital ICs are available and you can have whatever passive components you think you need. How simple can you make this design?"

I tried to make this easy by identifying a dual channel opto-isolator. In these devices the LEDs are usually from the same die and are matched pretty well as are the two photo-transistors. Of course this match may not be perfect, so you may have to sort through a few to meet the spec you need for your application. For audio information, almost anything will do. Another key fact is that these components are all well coupled thermally.

As you can see in the schematic (below), I have described a Side A as the input side, and Side B as the output side, one electrically isolated from the other. If we determine that the current transfer ratio for both channels is tracking well, it is a simple matter to put the same current through both LEDs and generate analog feedback to the unity gain non-inverting, input amplifier from either one of the two output channels. Then we know that the second output transistor will produce the same voltage with the same load and supply voltage. So  $(V_{outb} - V_{gndb})$  will be equal to  $(V_{ina} - V_{gnda})$  if  $R_2 = R_1$  and  $(V_b - V_{gndb}) = (V_a - V_{gnda})$ .  $R_3$  only serves to protect the LEDs from over current if the input op-amp should see a signal beyond the dynamic range of the system. But I bet you already knew that.

**September BTC** Through a remarkably clever deception, I have succeeded in convincing a number of folks that I am pretty smart. Of course it is not true, actually I do it with smoke and mirrors. But never-the-less people are often trying to challenge me with little brain teasers. What they

don't know is that we brain teaser writers have a union, SWEET (Science Writers of Electrical and Electronic Technology). Our weekly newsletter features all of the latest brain teasers and the answers. So it's pretty hard to stump a dues paying SWEET member.

Here is one that was presented to me recently. It is really very easy. If it takes you more than 15 seconds to do this in your head, you need to go back to 10th grade geometry. Two cars are together on an east-west highway, facing opposite directions. One has a maximum speed of 60 MPH and the other 120 MPH. They both take off in their respective directions at the same time, at max speed. After 6 minutes they both make a left turn, then 8 minutes later, they both stop. How far apart are they? Assume they both made the turn instantly without slowing down. They have really good tires.

**For the BTC:** Reply to Butch Shadwell at [b.shadwell@ieee.org](mailto:b.shadwell@ieee.org) (email), 904-223-4510 (fax), 904-223-4465 (v), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328.



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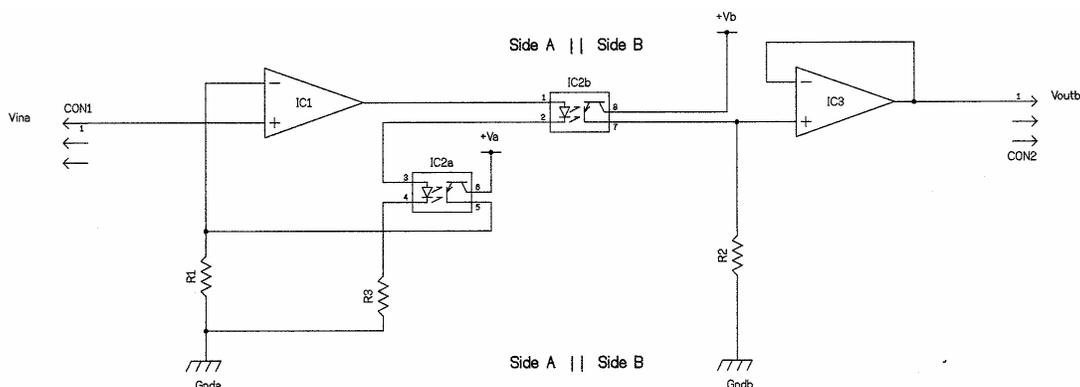
john.todora@nolanpower.com  
Phone: 954-333-3040

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Authorized EnerSys Representative

## Notices

- **Coming event:** The PES/IAS will have an electrical safety meeting this fall concerning Arc Flash Analysis and methods to minimize incident energy levels. Watch for further news.
- **Coming event:** The Life Members meeting planned for September has been postponed until October. Please watch for meeting notice in the October Issue.



**September 2007 Calendar of Events (For more information see P. 1 *Inside this Signal...*)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	<b>3 Labor Day</b>	<b>4 <u>5:30 pm</u> IEEE FWCS ExCom TECO Tampa</b>	5	6	7	8
2						
9	10	11	12	13	14	15
16	17	18	<b>19 <u>6 pm</u> Terahertz Tech. Trak Microwave Tampa, p. 1</b>	20	<b>21 <u>8:30 am</u> Distribution Transformers Tampa, p. 1</b>	22
23	24	25	26	27	<b>28 <u>6:30 pm</u> GOLD p. 6</b>	29
30	31	1	2	2	4	5

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