4th Quarter 2009 Volume 23, Number 4 ISSN 1054-7231

POWER ELECTRONICS SOCIETY NEWSLETTER

Student Projects Promote Power Electronics

IEEE

Celebrating 125 Years
of Engineering the Future

SWITCHING POWER SUPPLIES

- Outputs to 135V; AC-DC & DC-DC
- Constant voltage/constant current
- Universal Input (90-265 VAC) & PFC
- Parallelable for higher current or N+1

HIGH PERFORMANCE LINEAR POWER SUPPLIES

- 1V to 200V Outputs
- Less than 250 microvolts rms ripple
- 100 mw to 784 watts; AC-DC
- Rack, Wall, DIN Rail Mountable

REDUNDANT POWER SYSTEMS

- Linear & Switching
- 3.3V to 125V Outputs (shipped within 9 days)
- 13 watts to 1200 watts; AC-DC
- Pluggable, Rack, Wall & DIN Rail Mountable

PROGRAMMABLE POWER SUPPLIES

- Output ranges from 0-5V to 0-135V
- 7 watts to 1200 watts; AC-DC & DC-DC
- Constant voltage/constant current
- 0-10V or 0-5V control voltage input

MINI POWER SUPPLIES

- Outputs from 1V-75V, up to 50 watts
- AC-DC & DC-DC
- Screw terminals or solder pins
- Rugged encapsulated construction

HIGH VOLTAGE POWER SUPPLIES

- Output ranges from 0-1kV to 0-30kV
- AC-DC & DC-DC; Modular and Rack Mounting
- Constant voltage/constant current
- 0-5V control voltage input

DC-DC CONVERTERS

- Inputs from 5V to 350V
- Outputs from 3.3V to 135V
- Input range ratio to 4:1
- Low Profile

The Greatest Engineers Choose Acopian.

SYSTEM BUILDER

Build Your Own System Online!

YOU CAN ADD SPECIAL FEATURES:

- Metering (analog or digital)
- Special connectors
- Function switches
- Output monitors/alarms
- LED indicators
- Ten-turn controls
- Multiple sets of output terminals
- Binding posts or banana/tip jacks

YOU CAN SPECIFY UNIQUE CHARACTERISTICS:

- Non-standard input/output voltages/ranges
- Capability to compensate large load line drops
- Modified current limiting characteristics
- Adjustable overvoltage control
- Redundancy (N+1 or diode OR-ing)
- Inhibit and Enable control
- Current regulated outputs
- Optically isolated control inputs

AND MANY MORE!

IT'S EASY!

Simply use the online System Builder at **www.acopian.com/systembuilder** *or call Acopian at* **1-800-523-9478** *and discuss your requirements with one of our expert applications engineers. We'll provide you with a detailed description of the ideal, built-to-order power system or supply to suit your needs – plus a very competitive price. Your completely assembled, wired and tested unit will be shipped within 9 working days (systems of unusual size or shape requiring non-stocked components may require a few extra days). Or visit Acopian.com for instant, easy access to thousands of individual power modules shipped within 3 working days.*

Acopian Technical Company, Easton, PA • 1-800-523-9478
Made in the USA since 1957 **acopian.com**
Purchase Factory Direct

Acopian

Table of Contents

The IEEE Power Electronics Society Newsletter (ISSN 1054-7231) is published quarterly by the IEEE Power Electronics Society of the Institute of Electrical and Electronic Engineers, Inc. Headquarters: 3 Park Avenue, 17'th Floor, NY 10016-5997. An assessment of $1.00 per member per year (included in Society fee) for each member of the Power Electronics Society is made. Postmaster: Send address changes to IEEE POWER ELECTRONICS SOCIETY NEWSLETTER, IEEE, 445 Hoes Lane, Piscataway, N.J. 0855-1331.

News Items should be sent to: Dr Arthur W. Kelley, PELS Newsletter, Editor-in-Chief, 800 Willow Run Drive, Raleigh, NC USA; TEL:+1 919 349-2580; EMAIL: pelsnews@ieee.org. Deadlines for copy are March 15, June 15, September 15 and December 15. Email submission of items in MS-Word or plain-text format are preferred. Include caption with all photos identifying event and individuals in a back-row, left to right, front-row, left to right, etc method. Full-page call for papers and announcements of PELS-supported conferences are welcome and should be sent as MS-Word files. Please indicate all trademarked items, such as INTELEC®, APEC® with the registered trademark symbol, "®".

Technical items should be sent to associate technical editors: Prof Babak Fahimi, University of Texas at Arlington, 416 S. College St., Arlington, TX 76019, USA; TEL: +1 817 272 2667; EMAIL: fahimi@uta.edu. Or, to Prof. Chris S. Edrington, Florida State University, 2000 Levy Avenue, Suite 140, Tallahassee, FL 32310, USA; TEL: +1 850 645 7213; EMAIL: edrinch@eng.fsu.edu.

Advertising queries should be sent to: Tom Flynn (West and Central USA & International) TEL: +1 770 645 2944; FAX: +1 770 993 4423; EMAIL: flynntomga@yahoo.com
Or
Walter Chalupa (Eastern USA), TEL: +1 973 835 7015; FAX: +1 973 835 1602; EMAIL: wchalupa@aol.com

Newsletter in PDF format is posted at the PELS website approximately three weeks prior to paper copies deliveries. To receive email notification when the internet version is available, go to http://www.pels.org/Mailing/MailForm.html and provide your email address. Additionally, the email notification sometimes includes timely announcements that are not in the printed newsletter.

Periodicals Postage paid at New York, NY, and at additional mailing offices.

PRINTED IN THE U.S.A.

From The Editor

Arthur Kelley

As the incoming Editor-in-Chief of the IEEE Power Electronics Newsletter, I'd like to take my first Editor's column to introduce myself to you. But before I do, I want to commend my predecessor, Dr. John M. Miller, for turning over to me a smooth running and high quality operation. I hope to live up to the standard he has set. See elsewhere in this issue Dr. Miller's receipt of the Gerald Kliman Innovator Award.

After many years of heavy involvement with PELS during my time in academia at North Carolina State University, I have been absent from the scene for a few years during a stint in the semiconductor industry. But I am no stranger to IEEE publications. Some of you may remember me from my three-year term (2000–2001–2002) as Editor-in-Chief of the PELS Transactions and as the recipient of the 2004 IEEE PELS Distinguished Service Award. I am currently an independent consultant living in Raleigh, North Carolina, USA.

In this issue we have an outstanding selection of Conference Announcements and Calls for Papers. We also have reports from two student competitions: The Future Energy Challenge 2009 and the 2009 Solar Splash competition. These contests are important in introducing power electronics to undergraduates in a hands-on and exciting manner. We also start a new series titled "Power Electronics Around the Globe" initiated by Associate Technical Editor Babak Fahimi which begins with *Power Electronics, Electrical Drives, Power Semiconductors and Electrochemical Energy Storage Systems at RWTH Aachen University*. Also in this issue is the announcement of a Special Issue of the IEEE PELS Transactions on *Robust Operation of Electrical Drives* edited by Prof. Alfio Consoli.

We note that former PELS President Dr. Thomas Habetler has been recognized with the inaugural Diagnostics Achievement Award presented by the IEEE PELS Technical Committee on Diagnostics. Finally, Dr. John Shen, our first PELS Vice President of Products describes his plans for better serving PELS members with a wider and improved range of publications and web-based and multimedia content.

As always, the PELS Newsletter solicits short articles of technical interest, reports from the field of PELS related activities and announcements of upcoming meetings. I look forward to serving as Editor and would be happy to hear from any of you how I can make the Newsletter better.

Arthur Kelley
pelsnews@ieee.org

Cover photos courtesy of Future Energy Challenge p. 10 and Solar Splash Competition p. 12

President's Message

Returning home from the brand new ECCE 2009 in San Jose, I could not help but think about the new direction that we have launched as a society and a community. I remember the concerns voiced as we announced the launch of a new conference series, and the end of two venerable institutions – the Power Electronics Specialists Conference (PESC) and the program sponsored by the Industrial Power Conversion Systems Department at the Industry Applications Society annual conference. People were concerned, and rightly so, that the merged conference would be smaller than the sum of the parts, given the overlap between the authors and the attendees. I am pleased to report that ECCE 2009, with over 800 attendees and a great technical program, was an extremely successful and well organized conference – kudos to the team that worked hard to make it happen.

ECCE is much more than the sum of the parts. We have simultaneously launched ECCE-Asia, a series of IEEE PELS sponsored conferences that rotate between China, Japan and Korea on an annual basis. We have also just signed a Letter of Intent with the European Power Electronics Association, and are hoping to launch EPE-ECCE as an annual European conference starting in 2011. ECCE is helping to project IEEE Power Electronics Society as the most significant global community in the area of power electronics and sustainable energy conversion.

We see ECCE as being the front-wave of a transformation sweeping what we do as a society. The successful IEEE Energy 2030 conference, organized primarily by IEEE PELS volunteers in Atlanta in November 2008, tested the concept of a conference based on sustainable energy systems. This conference is being integrated into ECCE, starting with ECCE 2010 in Atlanta. The broader conference will include our current strengths, and new tracks on sustainable energy technologies, integration of these technologies with the current energy infrastructure, carbon mitigation; technology thrusts such as energy storage, and EV/PHEV systems; and a new section on economics and policy related to sustainable energy and energy efficiency. Industry involvement with the technical program will be enhanced through a series of industry seminars, tutorials and a strong exhibition.

The world has finally caught up with us: energy efficiency and sustainable energy are now front and center in our planet's race to avert climate change. Whether we look at increased penetration of renewable energy, electric vehicles, plug-in hybrid electric vehicles, smart grids to allow this to happen, energy efficient lighting and server farms, or a new generation of all electric aircraft, we are looking at an increasingly electrified world, with power electronics as a core enabling technology. As energy becomes a mainstream concern, and societal needs drive faster technology implementation cycles – technology migration and translation into real products and solutions needs to become an important component of our activities. When we propose technology solutions, we need to understand their viability within a sustainability context, evaluating possible success within an economic and policy framework. We need to stop looking inward, and help to guide the societal debate that hinges on our area of knowledge and expertise. If we abdicate our responsibility, someone else will fill the void.

I would like to request that IEEE PELS members world-wide become more actively involved in society activities, and in making sure that our voice is heard. Please write and tells us when our members have made a difference. A revitalized website is in the process of being launched, to serve as a platform for our digital web enabled future, and to provide global visibility for our activities.

Deepak Divan

How Can We Help Our Members with Their Need for New Information Products?

In this digital age, technical information exchange will go beyond traditional paper publications (even though they are already in PDF form and can be easily searched in IEEE Xplore). Many of our members want to listen to the PowerPoint presentations from the conferences that they could not attend in person. They want to attend short course on hot topics right in front of their PCs. They want to join the virtual community with colleagues in the field of power electronics from all over the world. PELS has realized these needs from our members and recently established a new vice president position – VP of Products to be in charge of related development efforts.

I am privileged to be elected as your first VP of Products in March 2009, and hope in this new role I will serve you by revitalizing our PELS website and develop a series of multimedia products that benefit both our members and public at large. We have already developed several video stream and/or voice-over-PowerPoint recording of Energy2030 conference presentations (available free of charge on PELS' website: http://www.pels.org), and plan to expand the program into several upcoming PELS conferences.

We are also in the process of evaluating our website and trying to improve its structure, content, and presentation. We plan to streamline the information tree and make it easier for members to search for the information they need, and change the currently used centralized web content management system to a decentralized system that allows PELS officers, committee chairs, or local chapter chairs to manage the content of their own subpage and keep everything up to date. We plan to build a PELS eCommunity with interactive communication, and bring values to our members. To achieve those goals we truly need your input and suggestions. Please email me your thoughts on how we can help our members and outreach outside PELS. I can be reached at johnshen@ieee.org. Together we can get this job done!

Dr. John Shen, VP of Products, PELS

John Miller Kliman Award

John M. Miller, outgoing PELS Newsletter Editor, received the IEEE IAS Industrial Power Conversion Systems Department Gerald Kliman Innovator Award at ECCE 2009. The citation reads "For meritorious contributions to the advancement of power conversion technologies through innovations and their application to Industry". Dr. Miller is shown with his wife JoAnn.

First "Diagnostics Achievement Award" Announced

The inaugural Diagnostics Achievement Award has been announced by the IEEE PELS Technical Committee on Diagnostics. The recipient is Professor Thomas Habetler, who is currently a Professor of Electrical Engineering at Georgia Institute of Technology in Atlanta, GA. Professor Habetler has made significant technical contributions to industry in developing new algorithms and test methods for monitoring and diagnostics of rotating electric machines for the last 20 years. He has also provided strong leadership and numerous contributions in various capacities within the IEEE and Power Electronics and Industry Application Societies. He was elected an IEEE Fellow in 2002, and served as the Division II Director in 2007–2008, and President of IEEE PELS in 2001–2002.

The award, which consists of a plaque and honorarium, will be presented at the 2009 IEEE Symposium on Diagnostics of Electric Machines, Power Electronics, and Drives conference in Cargese, France in September 2009. This award has been established to honor innovators biennially for outstanding sustained technical contributions and services in the field of monitoring and diagnostics for electrical machines, power electronics, and drives.

Special Issue of the IEEE Transactions on Power Electronics

Robust Operation of Electrical Drives

Electrical drives technology is rapidly approaching the physical limits in terms of dynamic and energy performance. The challenge in the coming years will be to develop more reliable and robust drives at the lowest possible cost. Reliability and cost determine the level of penetration of electrical drives in major application fields. In this context, the aim of the Special Issue is to focus the problem of robustness of operation of electrical drives in non-standard operating conditions and in presence of faults, and to propose innovative solutions, both in terms of techniques and conversion topologies.

Special emphasis will also be given to cost and practical suitability of the solutions studied.

More detailed scopes of the issue may include:

Fault Tolerant Drives

- Failure identification of Electrical Drives
- Robust operation of electrical drives in case of failure
- New topologies for single and multi-level redundancy conversion
- Optimal reconfiguration of the converter systems

Ride-through Drives

- Identification of ride-through operation: lack of input power or excess of load power
- New control laws to adapt the drive operation to actual energy resources
- Converter systems including energy storage
- Converter systems including Grid power control

Sensorless Drives

- Robustness of sensorless techniques to failure or abnormal operations
- Multiple sensorless techniques for normal and abnormal mixed operation of drives
- Sensorless technique replacement according to drive operation
- System performance issues such as stability and dynamic aspects of robust operation of drives.

Surveys and papers with a tutorial flavor are also welcome.
All papers will be evaluated through the normal Transactions review process.
The Guest Editorial Review Board is composed of the following people:

Alfio Consoli, University of Catania, Italy, Editor – Special Issue
Thomas Habetler, Georgia Tech, USA, Associate Editor – Special Issue
Greg Asher, University of Nottingham, UK, Associate Editor – Special Issue
Robert D. Lorenz, University of Wisconsin, USA, Associate Editor – Special Issue
Kouki Matsuse, Meiji University, Japan, Associate Editor – Special Issue
Silverio Bolognani, University of Padova, Italy, Associate Editor – Special Issue
Seung-ki Sul, Seoul National University, Korea, Associate Editor – Special Issue
Thomas Jahns, University of Wisconsin, USA, Associate Editor – Special Issue
Gary L. Skibinski, Rockwell Automation, USA, Associate Editor – Special Issue
Michael Degner, Ford Motors, USA, Associate Editor – Special Issue
Annette von Jouanne, Oregon State University, USA, Associate Editor – Special Issue

The Guest Editorial Review Board, under the supervision of the Transactions Editor in Chief, will handle the review process for papers submitted for the special issue. All papers must be sent to Dr. Frede Blaabjerg, Editor in Chief, IEEE Transactions on Power Electronics, as per the instructions printed in each issue of the Transactions or as found on the www at:

http://www.pels.org/Comm/Publications/Transactions/Transactions.html

Authors must specify that their manuscripts be intended for the Special Issue.

The deadline for submission of the full papers for the special issue is August 15, 2010. The special issue will appear in May 2011. Please contact the Guest Editor of the Special Issue for further information:

Prof. Alfio Consoli
Department of Electrical Electronic and Systems Engineering
University of Catania
Viale Andrea Doria, 6
95125 Catania, Italy
Phone: +39-095-738-2319, +39-095-755-7063, Fax: +39-095-755-7064
Email: aconsoli@diees.unict.it

POWER YOUR WORLD!

The Global Source For All Planar & Conventional Magnetics

EFFICIENCY

SIZE

CUSTOM

Whether you need one or one million, Payton Planar Magnetics can deliver!

PAYTON PLANAR MAGNETICS

www.paytongroup.com

Let PAYTON PLANAR MAGNETICS *"Power Your World"* with our state-of-the-art planar and conventional magnetics. Our cost is affordable and similar to wound magnetics. Full engineering design capabilities allow you to specify 10 to 20,000 watts, from industrial / telecom / automotive to space applications.

PAYTON PLANAR MAGNETICS
1805 S. Powerline Road, Suite 109
Deerfield Beach FL, 33442 USA
Tel: 954-428-3326 x203
Fax: 954-428-3308
jim@paytongroup.com
www.paytongroup.com

APEC® 2010

February 21 - 25, 2010 **Palm Springs, California**

Important Item for Your 2010 Budget: APEC 2010, February 21–25

Palm Springs in February – A Warm Location to Cover Hot Topics in Power Electronics.

Palm Springs, California in February! While most of the country is bearing up under winter's coldest month, Palm Springs is sitting comfortably with sunny days and the temperature in the mid-70s. The only snow you'll see is capping the mountains that surround this winter paradise.

Greg Evans, P.E.
Publicity Chair, APEC2010

From February 21–25, 2010, the annual Applied Power Electronics Conference gathering will be held in this most perfect of places. So there is no time like the present to mark your calendars and make your plans to attend. For many of us, APEC happens in the new fiscal year, so it is especially important in these tight economic times to get this conference in your budget proposal. This is, without question, the most important conference you will attend in the year ahead. So don't find out after the budget's been finalized that no money was allocated for your participation.

As **The Premier Event in Applied Power Electronics**™, APEC focuses on the practical and applied aspects of the power electronics business. This is not just a designer's conference. APEC has something of interest for anyone involved in power electronics:

- Equipment OEMs that use power supplies and dc-dc converters in their equipment
- Designers of power supplies, dc-dc converters, motor drives, uninterruptable power supplies, inverters and any other power electronic circuits, equipments and systems
- Manufacturers and suppliers of components and assemblies used in power electronics
- Manufacturing, quality and test engineers involved with power electronics equipment
- Marketing, sales and anyone involved in the business of power electronics
- Compliance engineers testing and qualifying power electronics equipment or equipment that uses power electronics

In this time of special focus on renewable and sustainable energy, Palm Springs stands out as a major center for wind power with literally hundreds of multi-megawatt wind turbines covering the hills to north and east of the city. This is the perfect place to convene our conference this year.

Go to www.apec-conf.org. Take a look at the Palm Springs promotional video and bookmark this site.

Registration for the conference will open on November 6th, 2009.

See you in Palm Springs!

DEADLINES

October 15, 2009
Special Session Proposals

December 1, 2009
Tutorial Proposals

January 15, 2010
Abstract and digest of proposed papers (must be submitted via ECCE website)

For notification deadlines please visit the ECCE website.

SECOND ANNUAL ENERGY CONVERSION CONGRESS, September 12-16, 2010

This conference combines the former IEEE Power Electronics Specialist Conference (PESC) with the technical sessions of the Industrial Power Conversion Systems Department (Electrical Machines Committee, Industrial Devices and Components Committee) previously presented at the IEEE Industry Applications Society Annual Meeting. Papers are solicited on any subject pertaining to the scope of the the conference that includes, but is not limited to, the following.

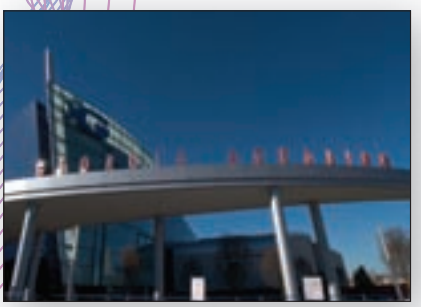
Energy Conversion Systems

RENEWABLE AND ALTERNATIVE ENERGY SYSTEMS Solar and photovoltaic energy systems and interface, wind energy systems and interface, water energy systems and interface, energy harvesting, fuel cells and conversion, solid state generation and interface (e.g. thermoelectric, thermophotovoltiac, thermionic), and energy storage and interface (e.g. battery, flywheel, SMES, thermal).

CONTROL ISSUES Power converter and motor control algorithms, real-time control implementation, digital control techniques, sensors and sensor elimination techniques for power electronics, machines and drives, and measurements and instrumentation.

THERMAL MANAGEMENT AND EFFICIENCY Thermal managementf of electrical machines, power converters, and drives; energy efficiency of power electronics, electric machines, and drive systems.

ELECTRICAL POWER SYSTEMS Electrical power system architectures and management, distributed resources and microgrid power systems.



POWER QUALITY, GRID INTERFACE, AND EMI EMI-EMC, power quality including harmonics and active filters, and power factor correction.

RELIABILITY AND DIAGNOSTICS Reliability, fault management, protectin and fault tolerance; power converter and machine diagnostics and prognostics.

MODELING, ANALYSIS, AND SIMULATION Modeling, analysis and simulation methods for power electronics and motor drives, optimization techniques for electric machines and power electronics.

OTHER TOPICS Education methodology and tools for power electronics, electric machines, and drives, development and harmonization of standards for electric machines, power converters, and drives.

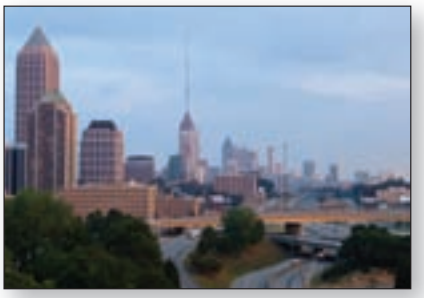
Components, Subsystems, and Applications

POWER CONVERTERS DC-DC; DC-AC; AC-AC; AC-DC; soft switching and resonant converters; inverters and converters for motor drives, and multilevel converters.

ELECTRIC MACHINES AND ACTUATORS Permanent magnet machines, induction machines, reluctance machines, linear electric machines, electromechanical energy storage systems (flywheels), special machines, actuators and transducers, new materials utilization in electric machines and actuators.

ELECTRIC DRIVES Drive configurations for all types of electric machines and actuators; all issues related to the performance, control, reliability, and cost of electric drives; drives of all performance levels ranging from general-purpose to high-performance servos; system interactions between drives, machines, and sources; machine drive integration issues.

APPLICATIONS Transportation applications for automotive, rail, aerospace, and marine, including hybrid-electric drivetrains and accessories; lighting and displays; uninterruptible power supply (UPS) industrial, residential, and commercial systems; utility applications in transmission and distribution including HVDC; biomedical applications; other applications of power electronics, electric machines, and drives.



Call for Papers and Tutorials

ECCE 2010.org

2009 IEEE International Future Energy Challenge: A Tradition of Excellence

As the chairman of the fifth international future energy challenge (IFEC), I am pleased to report that the 2009 competition was yet another remarkable success story. Twenty teams of undergraduate students, from five different continents, competed in this biannual power electronics tournament. Development of a bench scale starter/alternator system (topic-A) and a low cost wind energy maximizer (topic-B) were chosen as the topics of the 2009 competition. The final round of competitions was held at Illinois Institute of Technology in Chicago, IL and at Monash University, Australia respectively. During the two days of final competitions, three finalists for topic-A and seven finalists for topic-B presented their engineering solutions to the panel of judges. Just like any sporting event, we witnessed moments of glory, disappointment, struggle, and celebration but the biggest outcome of this event has to be the spirit of teamwork, new friendships, and gaining insight for upcoming energy-related challenges and opportunities among our future industrial and academic leaders. On behalf of the IEEE Power Electronics Society, I would like to take this opportunity and thank all of the local organizers, judges, and faculty advisors without whom this event would have been impossible. What follows is a summary of the events and the final ranking of the participants.

Babak Fahimi
September 29, 2009, Arlington, TX

2009 IEEE International Future Energy Challenge, Topic-A

Competitions for Topic-A of the IEEE International Future Energy Challenge took place on July 17th AND July 18th in the power electronics laboratory of the Illinois Institute of Technology, Chicago, IL. Teams from University of Colorado-Boulder (in collaboration with Tokushima University in Japan, Federal University of Mato Grosso do sul, Brazil, and United International University, Bangladesh) participated in the final round of competitions during this two days event. The technical challenge was defined to develop an integrated starter/alternator system which can generate 30 N-m of torque at standstill, operate as a motor from standstill up to 350 r.p.m. in constant torque region (30 N-m), continue to operate in constant power region up to 3000 r.p.m. (1kW), and finally switch from motoring to generating mode of operation at 3000 r.p.m. Additional requirements included durability test as a generator for an extended period of time, bump-free transition from motoring to generating mode, high power density, and low cost density.

Participating teams presented their solutions using induction, interior permanent magnet, and brushed-dc motor drive technologies. At the end of the second day it was clear that satisfying all the requirements is impossible in this round of competitions. Notably, the panel of judges were impressed by the depth of knowledge, enthusiasm, and innovation of the participating undergraduate students in this event.

Although we did not have a grand prize winner, the panel of judges formed by two members from industry and two from the academia recommended the following award categories and winners:

- Outstanding Engineering Award, Federal University of Mato Grosso do sul
- Outstanding Educational Impact Award, University of Colorado-Boulder/University of Tokushima
- Outstanding Technical Report/Presentation Award, Federal University of Mato Grosso do sul
- Outstanding Teamwork Award, University of Colorado-Boulder/University of Tokushima.

Students from Federal University of Mato Grosso do sul testing their setup

Participating teams and judges at IIT campus

Thanks

Special thanks goes to MPC products corporation, the department of electrical and computer engineering at Illinois Institute of Technology, IEEE Power Electronics Society, and our judges for their support and diligence.

Respectfully yours
Babak Fahimi
Chairman, IEEE International Future Energy Challenge

IEEE International Future Energy Challenge 2009 Results of Topic B: Wind Turbine Power Maximiser

Perter Freere and Grahame Holmes

Monash University was delighted to host seven finalist teams from Brazil., China, Germany and the USA, who came to Australia for 15-17 July to compete in the IEEE Future Energy Challenge competition. The project was to design and construct a wind turbine power output maximiser for a 200W wind turbine, charging into a 12V battery. Their wind turbine controllers had to maximise the power taken from the wind turbine, regulate the battery charging process, and simultaneously protect the wind turbine from overspeeding and potentially destroying itself. All teams presented magnificent designs, but the punishing test regime of wind speeds up to 13m/s, 4 minutes of dynamic wind speed variation, disconnecting from the load at rated wind speed, and an output short circuit, pushed their systems to their limits.

University of Central Florida receiving their 1st Prize certificate from Associate Professor Grahame Holmes

With lazy smoke from some systems, jets of smoke and flames from others, building a robust maximum power point tracker for a real wind turbine that operates in many regimes proved very challenging for all teams. Even for those that worked well under steady state wind conditions, effective operation under dynamic wind variation was clearly much harder to achieve.

Challenge members learning the didgeridoo at the Award dinner.

The Award Dinner at the end of the competition began with entre aboard the Puffing Billy steam train, and continued with the main dinner in the restaurant at the end of the train ride. A highlight of the evening was lessons on how to play a traditional Australian didgeridoo, with the competitors enthusiastically attempting to learn this difficult skill.

Overall First Prize for the competition went to the team from the University of Central Florida, who were also awarded the wind turbine maximiser prize of a brand new 200W wind turbine, complete with a 4 metre tower. The IES Outstanding Power Electronics Innovation Prize went to the University of Cologne team whose maximiser was the only one to survive the testing intact. The complete prize summary is listed below.

Overall First Place:	University of Central Florida
I.E.S. Outstanding Power Electronics Innovation Prize:	Cologne University of Applied Sciences
Suzlon Outstanding Engineering Award:	Cologne University of Applied Sciences
Garrad Hassan Dynamic Performance Award:	Huazhong University of Science and Technology
Roaring 40s Outstanding Teamwork Award:	Universitaet Karlsruhe
Monash Wind Turbine Maximiser Award:	University of Central Florida
Outstanding Technical Report Award:	University of Texas Arlington
Innovative Technical Approach Award:	Federal University of Ceara

Thanks

We would particularly like to thank the sponsors that made this Future Energy Challenge both possible and so much fun. The sponsors include:

IEEE, Power Electronics Society, Industrial Electronics Society, Power Sources Manufacturers Association. Sustainability Victoria, Suzlon Australia, Garrad Hassan Pacific, Roaring 40s, Fastron, Century Batteries, Plasmatronics. Monash University ,Wind Tunnel, Faculty of Engineering, Dept. Electrical and Computer Systems Engineering, Power Electronics Group.

IEEE Power Electronics Society Sponsors 2009 Solar Splash Competition

H. Alan Mantooth, Fellow, IEEE

IEEE PELS Liaison to Solar Splash

The IEEE Power Electronics Society and the American Society of Mechanical Engineers (ASME) co-sponsored the 2009 Solar Splash™ competition held in Fayetteville, Arkansas this past May. The Solar Splash competition (www.solarsplash.com) is an international intercollegiate solar electric boat competition held each year in May or June. The competition lasts for five days and showcases the interdisciplinary work of undergraduate and graduate students in electrical and mechanical engineering. Each team typically spends the previous two semesters designing and constructing a boat according to the constraints defined by the event's organizers. Some of the key design specifications include maximum boat length (6 meters), maximum solar power output (480 W), use of commercial battery technology (no battery doping), minimum ballast inclusive of skipper's weight (70 kg) and a variety of safety and seaworthiness specifications. Fig. 1 shows a two single-hull designs successfully used by many teams in the competition. Fig. 2 shows a unique design that won the competition in 2003 from Ecole Technologie Supérieure, Montreal, Canada. Fig. 3 shows a catamaran design used by several teams through the years. Fig. 4 shows the hydrofoil of the University of New Orleans.

Each boat must be designed to accommodate a single passenger/driver and perform under two primary configurations: one powered solely by the batteries (referred to as the sprint configuration) and another powered by both solar panels and batteries (referred to as the endurance configuration). The competition is held Wednesday-Sunday and proceeds as follows. On Day 1 (Wed.), the teams arrive at the venue, are assigned a covered paddock area and their boats are inspected for safety. Each team must have submitted a technical report in advance of the competition and now must erect a visual display chronicling their past year's efforts for the public to see. Each of these items is scored as part of the competition. Also, the team skippers, or drivers, must pass a swim test on that day. The teams are treated to a massive dinner and speaker on renewable energy or related topic that evening.

On Day 2 (Thurs.), teams begin to go through two events on the water categorized as qualifying events. Failure to pass these events prevents a team from competing in the later, more highly scored events. The first event is a simple 70 meter sprint with no solar panels. The second is a maneuverability course in the endurance configuration. Often teams use different gearing, propellers, batteries and weight distribution in each of these configurations, so changing between them takes time. If a problem occurs in one of these events, then a team must try again and their time is multiplied by two if they succeed on the second run, three if it takes three attempts and so on.

Day 3 (Fri.) continues with more qualifying, but also adds in the first higher scored event – the Solar Slalom. The Solar Slalom is run in the endurance configuration and is much like running a slalom course in automobile car testing where the boat must dip in and out of buoys. During the afternoon of Day 3 the competition becomes more directly head-to-head with other teams. Based on the results of qualifying, the teams are seeded and a tournament-like bracket is constructed for racing two or three teams against one another in the 300 meter sprint. This is a fantastically exciting event where the winning boats are approaching 40 mph! Two to three rounds, depending on the number of competitors, are run on Friday and the final two rounds are on the final day (Sunday).

Day 4 (Sat.) of the competition consists of two, two-hour endurance heats. The endurance course is roughly 2–3 km in a loop around the lake. Each boat must make as many laps as possible (rounded to the nearest quarter lap) in the morning two hour heat. At the end of this heat, the teams are re-seeded for the afternoon heat, pitting the fastest boats against one another in the second of two groupings that are begun in a staggered start ½ hour apart. The winner of the endurance event is the team with the most total laps from both heats. A special prize is given to the team that actually wins the afternoon championship group however.

Figure 1. Single hull designs used by Cedarville University and the University of Arkansas.

Figure 2. 2003 Champion ETS from Canada

Figure 3. Catamaran design by the Univ. of Arkansas

Figure 4. University of New Orleans with their perfected hydrofoil system in the sprint

Table 1 Scoring for Solar Splash.

Event	Points Available
Technical Report	90
Visual Display	40
Workmanship	20
Qualifying	100
Solar Slalom	100
300 meter Sprint	250
Endurance Event	400
Totals	**1000**

Table 2 Overall Results from 2009 Solar Splash.

Place	Team
1	Cedarville University
2	University of New Orleans
3	University of Northern Iowa
4	College of New Jersey
5	University of Arkansas (Team A)
6	University of Arkansas (Team B)
7	Washington State University
8	Kansas State University
9	Geneva College
10	University of Southampton, England
11	Middle Tennessee State University
12	Carnegie Mellon University
13	Elizabethtown College
14	University of North Florida
15	State University of New York, Stoneybrook
16	Tecnologico de Monterrey

Finally, the overall competition concludes on Day 5 (Sun.) with the last rounds of the 300 meter sprint event. The overall winner is the team that accumulates the most points out of a possible 1000. The breakdown of the scoring is shown in Table 1. The Solar Splash website has all the results of the past 16 years along with pictures and videos of the event. Over 100 schools have participated in the history of the event with a typical showing of 15 to 20 schools each year. Schools from the U.S., Japan, Canada, Mexico, Puerto Rico, Turkey, and England have participated.

Table 3 Overall Winners of the Solar Splash Event.

Year	Overall Winning Team
2009	Cedarville University, USA
2008	Cedarville University, USA
2007	Cedarville University, USA
2006	University of Arkansas, USA
2005	Cedarville University, USA
2004	Cedarville University, USA
2003	Ecole Technologie Supérieure, Montreal, Canada
2002	University of Arkansas, USA
2001	University of South Carolina, USA
2000	University of South Carolina, USA
1999	Kanazawa Institute of Technology, Japan
1998	University of South Carolina, USA
1997	University of Massachusetts – Dartmouth, USA
1996	Kanazawa Institute of Technology, Japan
1995	No overall winner
1994	No overall winner

The results of the 2009 competition are given in Table 2. Table 3 shows the teams that have won the overall event through the years. The 2010 competition dates are June 9–13. The competition will be held in Fayetteville, Arkansas. The University of Arkansas has hosted the competition since 2006. Prior to that, the event was held in Buffalo, New York, New Orleans, LA, Columbia, SC, and Milwaukee, WI.

PELS has served as a co-sponsor for the past two years and will serve as the sole sponsor in 2010. The society is encouraging its members and chapters to participate in this event either through volunteering to judge various aspects of the competition or through entering the competition. If you are interested in becoming involved, please contact Prof. Alan Mantooth (mantooth@ieee.org) or Prof. Jeff Morehouse (more@cec.sc.edu). Professor Morehouse is the coordinator of the overall event and Prof. Mantooth is the local event chair while the competition is in Arkansas. Mantooth also serves on the steering committee for the event as the PELS liaison.

Power Electronics Around the Globe

Power electronics has turned into a key enabling technology for addressing the outstanding energy related challenges. Our colleagues around the world develop new technologies and engineering solutions that aim towards a more sustainable production, transmission, storage, and consumption of electric energy. Starting with this issue, we are going to introduce a prominent power electronics research and teaching center in this section. I hope this will help us in getting familiar with the latest accomplishments, areas of emphasis, and research capability within our community. Hopefully this will lead to future scientific collaborations, exchange of ideas, and potential international partnerships.

Babak Fahimi
October 14, 2009, Arlington, TX

Power Electronics, Electrical Drives, Power Semiconductors and Electrochemical Energy Storage Systems at RWTH Aachen University

Ever since the Institute for Power Electronics and Electrical Drives (ISEA) was founded in 1965, research on power electronics, electrical drives, power semiconductors and electrochemical energy storage systems has been a trust area in Germany at RWTH Aachen University. The institute, together with its more than 100 alumni and cooperation partners, can look back now on 44 years of experience. In 2006, research on high-power medium-voltage converters and storage systems was spun out to form the Institute for Power Generation and Storage Systems (PGS) at the E.ON Energy Research Center at RWTH Aachen University. E.ON ERC is a public private partnership between E.ON AG and RWTH. Both institutes and the Center are headed by Prof. Rik W. De Doncker. Associate Prof. Dirk Uwe Sauer heads all research and teaching activities at ISEA and PGS related to electrochemical energy conversion and storage systems. Currently over 42 PhD assistants are working on projects. They are fully funded by industry, or by public grants, e.g. funded by EU or DFG (the German National Science Foundation) projects. Each PhD assistant is supported by a team of student interns (mostly Bachelor), as well as diploma and master students working on their final theses. At RWTH Aachen, all engineering faculties promote leadership and project management skills as part of the learning experience during the course of a PhD program.

About 20 years ago, under the leadership of Prof. H.-C. Skudelny, four research groups were established at ISEA, i.e. Power Converters, Electrical Drives, Power Semiconductors and Electrochemical Energy Storage Systems. Clearly, when combining these competences, the main application area was and still is electro-mobility, in particular electric vehicles. Currently, ISEA participates in the RWTH StreetScooter demonstrator project, in which an electric vehicle current is actually designed and built. Together with mechanical engineers and machine specialists from RWTH, a conceptual study on the vehicle was conducted, and currently the development phase is carried out. Specifically, ISAE is developing production technologies to produce low-cost electric propulsion systems (converters, chargers and storage systems).

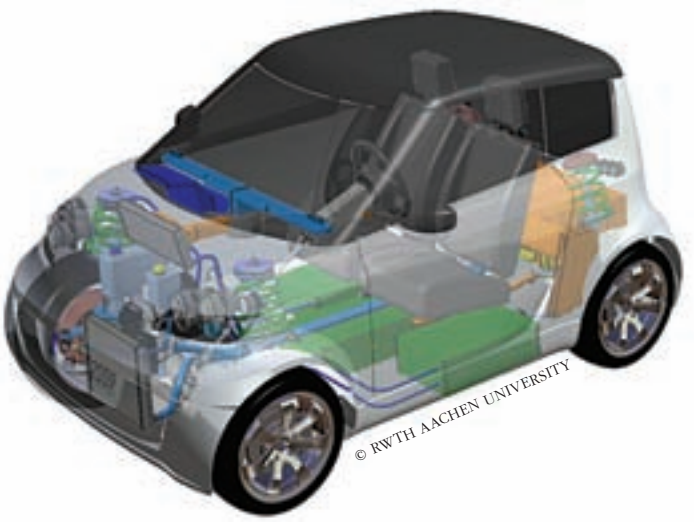


Figure 1. Concept of the project StreetScooter at RWTH Aachen University

All ISEA research groups are involved in the project, collaborating with many other disciplines. Hence, many facets are included and many interdependencies are investigated in the current work on electro-mobility.

However, ISEA activities are not limited to projects related to EVs. The power electronics group is working on photovoltaic converter systems (a patent on a highly efficient converter topology is to be licensed), resonant converters, high bandwidth control, PCB integrated power electronics, PV and grid emulators and high temperature electronics. The drives group has strongest experience in the field of switched reluctance machines (SRM), including torque control, position sensorless control and acoustic optimization. Being not limited to the SRM, high-speed drives for compressors and railway applications, as well as drives for consumer applications (e.g. vacuum cleaner) are researched. Researchers on electrochemical energy storage systems deal with all battery system aspects, such as electrical and thermal modeling, diagnosis, characterization, special measurement devices, optimized operating strategies, lifetime testing and lifetime prediction tools. The group has major expertise in lithium-ion, lead-acid, and NiMH batteries, as well as on double-layer capcitors and fuel cells.

Research at PGS is situated in the same areas as ISEA, but focuses on medium-voltage (above 1 kV), high-power applications. The activities cover power electronic conversion and energy storage technologies to improve the performance of generation, storage, medium-voltage distribution and DC transmission systems in terms of efficiency and life cycle cost. Particular interest is directed towards decentralized power generation and DC medium-voltage distribution from renewable energy sources. Here, new power electronic systems for wind power and biogas-fired turbines in the power range between 1 and 10 MW are being investigated.

A project of specific importance with regard to the technical infrastructure of PGS is the construction of a 5 MW test bench for high-speed electrical machines and power electronic converters, including high-power (dual-active bridge) dc-dc converters. With a total area of 250 m^2, a new and nearly completed test hall will provide sufficient space for experiments on any kind of medium-voltage equipment. The high-power test bench has been designed in such a way that

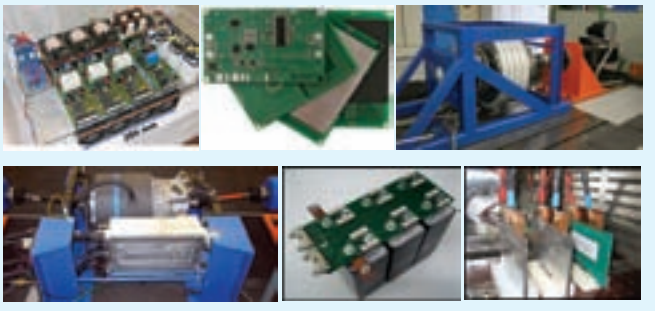


Figure 2. Research activities at ISEA (from top-left): Highly efficient PV converter, PCB-integrated active and passive components, 120 kW railway-drive test bench, 100 kW, 15,000 rpm automotive-drive test bench, charge balancing circuit for batteries, characterization of Li-Ion battery cells in thermal chamber

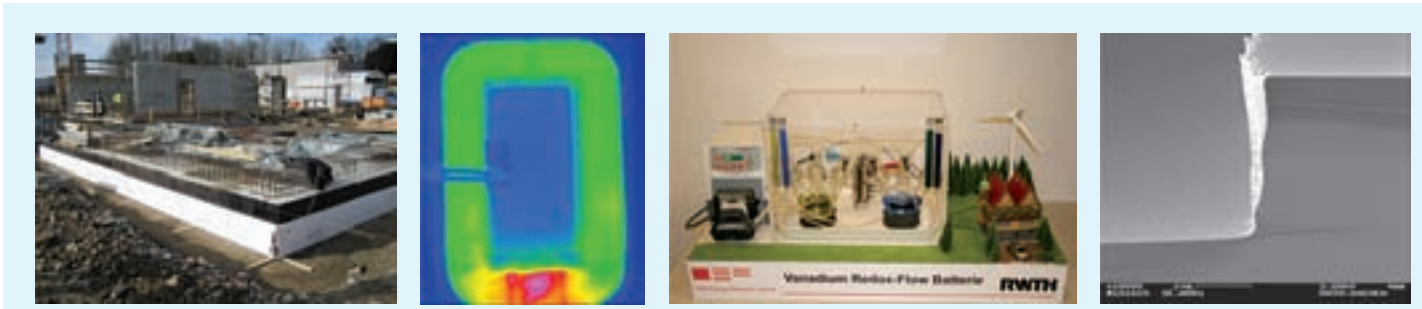


Figure 3. Activities at PGS (from left): 5 MW machine bed foundation, characterization of amorphous iron 5 MVA transformer core in the kilohertz range, demonstrator of redox-flow battery, SEM micrograph after etching step within GCT processing

during operation only the electric power losses of all components have to be supplied by the grid. Projects that utilize the test bench will focus on high-speed drives for compressor applications, dc-dc converters for offshore wind farms, future dc grids and smart grids with power rating up to 5 MW and voltages up to 5 kV. Moreover, converters for wind turbines are subject of research activities.

In addition, in cooperation with the Micro-Systems Institute, research on high-power semiconductor devices is conducted in a 1500 m^2 clean room. Recent developments were ICT and MTO devices. A student laboratory has been developed to teach design, fabrication and testing of power thyristors.

At RWTH we live the Humbold ethos, i.e. "Excellent teaching can only be derived from excellent research". Hence, all research activities directly support lectures and laboratory sessions of bachelor and master students. For example, the PV laboratory in which students have a chance to built PV cells at Research Center Jülich and subsequently test and build a PV converter at ISEA.

Several spin-off companies have been formed, most recently Aix-Control and Picolas. About 4 to 5 invention disclosures are filed every year. The institute publishes over 25 technical papers in renowned journals, such as IEEE Transactions on Power Electronics. Major original contributions to the power electronics and drives community have been Space Vector Modulation, Modified Steinmetz Equations, DITC for SRMs, Si-Si bonded MTOs and ICT, new DC-DC converter ultra-efficient topologies, hybrid DC breakers, etc.

The strong activities of ISEA and PGS illustrate two important necessities to be successful in this area: a variety of component and material level demonstration projects within the disciplines of power electronics, drives, devices and storage systems are needed to continuously drive innovation, while also system aspects for customized solutions in different applications must be analyzed and assessed. The latter is realized by close cooperation of the different research groups, industry and public partners, thus realizing the holistic optimization of all components within complex systems.

2010 ORLANDO
intelec®

June 6 -10, 2010

Join us on June 6 - 10, 2010
in Orlando, FL for Intelec 2010®.
This year's theme is Energy doesn't just mean telephony anymore!
The conference will take place at the
Hilton® Orlando Bonnet Creek
located in Orlando, Florida, USA.

INTELEC® 2010 features a comprehensive program for the telecommunications professional, including:

- Technical Papers and presentations covering the latest telecom power developments
- Tutorials for continuing education
- An exhibition of the latest products to support telecom power systems
- Meet and exchange ideas with the leading professionals in the industry

Conference topics include:

- Power systems for enhanced services for wireless communications
- Energy storage systems - electochemical and alternative systems
- Smart Grid applications
- Challenges of powering large ICT facilities and networks
- Distributed generation: renewable and alternative power generation and energy storage
- Energy efficiency & carbon footprint
- Integrating the diverse power requirements of cable, wireless and the Internet

Hilton® Orlando Bonnet Creek

Brand new hotel in the heart of 482 acres of mature woodlands and natural waterways, surrounded on three sides by Walt Disney World® Resort.

For more information, visit us online at:
www.intelec.org

《CALL FOR PAPERS》

INTERNATIONAL POWER ELECTRONICS CONFERENCE -ECCE ASIA-

IPEC-Sapporo2010

● June 21-24, 2010, Sapporo Convention Center, Sapporo Japan

Organizing Committee
Chair Prof. Hirofumi AKAGI
Co-chair Prof. Rik W. De DONCKER
Steering Committee
Chair Prof. Atsuo KAWAMURA
Co-chair Prof. Deepak DIVAN
Co-chair Prof. Young-Cheol LIM
Co-chair Prof. Zhaoming QIAN
Vice-chair Dr. Teruo YOSHINO
Vice-co-chair Prof. Ralph KENNEL
Technical Program Committee
Chair Prof. Yukihiko SATO
Chair Prof. Hiroyuki OHSAKI
Co-chair Prof. Frede BLAABJERG
Co-chair Prof. Heung-Geun KIM
Co-chair Prof. Jinjun LIU
General Affairs Committee
Chair Prof. Akira CHIBA
Sec. Prof. Kan AKATSU
Finance Committee
Chair Prof. Hideaki FUJITA
Sec. Prof. Nobukazu HOSHI
Publicity Committee
Chair Prof. Hisao KUBOTA
Sec. Prof. Tomoki YOKOYAMA
Publication Committee
Chair Prof. Mikihiko MATSUI
Local Arrangement Committee
Chair Prof. Satoshi OGASAWARA
Hospitality Committee
Chair Prof. Toshihisa SHIMIZU
Public Relations Committee
Chair Prof. Hirohito FUNATO
Exposition Committee
Chair Dr. Tadahito AOKI
Chair Dr. Yoshiharu MIZUTANI
Secretaries
Prof. Yasutaka FUJIMOTO
Prof. Hiroshi FUJIMOTO

Power Electronics for Sustainable Society

http://www.ipec2010.org

CALL FOR PAPERS

The Industry Applications Society of the Institute of Electrical Engineers of Japan is pleased to announce that the International Power Electronics Conference -ECCE Asia- (IPEC-Sapporo 2010) will meet June 21st through 24th, 2010 at Sapporo Convention Center in Sapporo, Japan. This international conference is technically co-sponsored by IEEE Industry Applications Society and IEEE Power Electronics Society. As the sixth IPEC since 1983, the Sapporo Conference will provide a unique opportunity for engineers, researchers and academicians to assemble in a beautiful northern city in Hokkaido and exchange the latest information on power electronics, motor drives, motion control and related subjects. All papers presented will be published in the IEEE Xplore.

IMPORTANT DATES

Submission of Extended Summary
November 16, 2009
Notification of Acceptance
February 5, 2010
Submission of Final Manuscripts
April 12, 2010

Contributions of technical papers in the following areas are invited.

1. Static Power Converters
2. Power Semiconductor Devices and Packaging
3. Modeling, Simulation, EMI and Reliability
4. Electric Machines, Actuators and Sensors
5. Motor Control and Drives
6. Motion Control and Robotics
7. Renewable Energy and Energy Saving
8. Power Electronics Applied to Power Systems
9. Power Electronics and Drives Applied to Railway Systems
10. Power Electronics and Drives Applied to Electric and Hybrid Vehicles
11. Power Supply for Information and Communication Technologies
12. Power Electronics and Drives Applied to Home Appliance
13. Education in Power Electronics and Electrical Engineering
14. Other Related Topics

IPEC-Sapporo 2010

INTERNATIONAL POWER ELECTRONICS CONFERENCE -ECCE ASIA-

DEADLINE for EXTENDED SUMMARY: November 16, 2009

An extended summary describing work not previously published or presented must be electronically submitted in a PDF file through the conference website no later than November 16, 2009.

The extended summary should be 4 pages long on either A4 or 8.5 by 11 inch (letter size) format with supporting figures, tables and references, headed by title of paper and choice of topic category. Please do not indicate any author names.
The submitted extended summary will be reviewed via a peer review process in order to ensure the highest technical quality of the conference. The extended summary should clearly define the salient concepts and novel features of the work. Be sure to mention past or previous works to distinguish your originality from them. Detailed instructions will be shown on the IPEC-Sapporo website,
http://www.ipec2010.org

NOTIFICATION of ACCEPTANCE: February 5, 2010

Authors will receive notification of acceptance by e-mail on or before February 5, 2010.

DEADLINE for FINAL MANUSCRIPTS: April 12, 2010

Authors of accepted papers will be required to submit a final manuscript not exceeding eight pages in length for publication in the CD-ROM Conference Proceedings and the printed Session Papers by April 12, 2010, together with the application for registration and the required fee. Authors whose extended summaries are accepted will receive detailed authors' instruction by e-mail.

PRESENTATION

Accepted authors must present their papers either orally or as a poster. Several rooms will be reserved for both styles. Each speaker will have 20-30 minutes for oral presentation or about two hours for a poster. The authors' instructions will include details for presentation styles.

LANGUAGE

The working language of the conference will be English. All submissions and presentations must be in English.

SPECIAL SEMINAR

The technical program committee will provide a special seminar for those who wish to know the state-of- the-art of Japanese Industries related to Power Electronics. All IPEC-Sapporo 2010 Conference registrants are admitted free.

ONLINE DATA LINK & EXHIBITION

The IPEC-Sapporo Steering Committee plans to open ONLINE DATA LINK of Power Electronics, featuring diverse power electronics products and systems, which will link with the conference website. Organizations wishing to link information regarding their products and/or systems to the conference website should contact the secretariat. Also it will be possible to stage a small tabletop exhibition of products and catalogs on the same floor as the main session rooms during the conference. Those wishing tabletop space should contact the secretariat.

REGISTRATION

Persons intending to present a paper or wishing to participate in the conference may register online via the conference website:
http://www.ipec2010.org

SOCIAL ACTIVITIES

A social program comprising sundry functions will be provided for participants and accompanying persons as an opportunity to get better acquainted. A full program of daytime activities is in planning for accompanying persons.

TECHNICAL VISITS

The conference program will include technical visits in the Hokkaido area. Participants will be required to pay an extra fee.

ACCESS to SAPPORO

New Chitose Airport regularly services ten international routes to ten major cities: Seoul, Pusan, Shanghai, Hong Kong, Taipei, Shenyang, Yuzhnosakhalinsk, Guam, Honolulu and Melbourne. It also services ten domestic routes to eight cities: Tokyo(Haneda), Tokyo(Narita), Osaka(Kansai), Osaka(Itami), Kobe, Nagoya, Aomori, Niigata, Sendai and Fukuoka. It takes about one hour by train to reach Sapporo Convention Center from New Chitose Airport.

PUBLICATION in TRANSACTIONS

Every author who presents a paper at IPEC-Sapporo 2010 has the right to submit his/her manuscript for publication either in the IEE of Japan Transactions on Industry Applications or the IEEE Transactions on Industry Applications, or the IEEE Transactions on Power Electronics. After the conference, the manuscript should go to the IEE of Japan or the IEEE IAS or the IEEE PELS, respectively. Detailed instructions for this will be presented on the IPEC-Sapporo 2010 website:
http://www.ipec2010.org

INFORMATION

For further information or questions regarding IPEC-Sapporo 2010 please contact:
Secretariat of IPEC-Sapporo 2010
c/o ICS Convention Design., Inc.
Sumitomo Corporation Jinbocho Building
3-24, Kanda-Nishikicho, Chiyoda-ku,
Tokyo, 101-8449, Japan
Phone: +81-3-3219-3541 Fax: +81-3-3219-3626
e-mail: ipec2010@ics-inc.co.jp
Website: http://www.ipec2010.org

For Information about Hokkaido
http://www.pref.hokkaido.lg.jp/foreign/english.htm

For Information about Sapporo Convention Center
http://www.sora-scc.jp/english.php

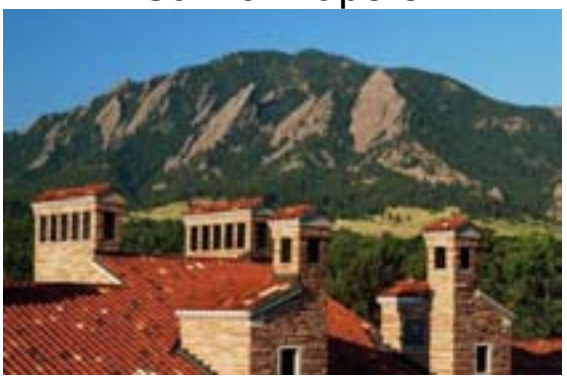
COMPEL 2010

University of Colorado, Boulder, Colorado, USA

June 28-30, 2010

http://ecee.colorado.edu/compel10/

Call for Papers



The IEEE Power Electronics Society announces the Twelfth IEEE COMPEL Workshop (COMPEL'10). This workshop brings together practicing engineers and researchers for interactive discussions on the latest advances in analysis, modeling and control of power electronics. Special emphasis in COMPEL'10 will be on advanced controls of switched-mode power converters, integrated circuits for smart power control and power management, as well as analysis, modeling and control of power electronics in energy efficiency and renewable energy applications.

The workshop includes presentation and poster sessions, as well as hands-on software and hardware demonstrations presented by participants. Topics include, but are not limited to:

- ***Controls of Power Electronics***: advances in smart power control and power management techniques; control algorithms, design methods, implementation techniques (DSP, microcontroller, FPGA, hardware-in-loop, custom ICs).
- ***Power Control and Power Management ICs***: application-driven features and benefits, designs for high performance, low power, or low cost; analog, digital or mixed-signal realizations; system integration and applications.
- ***System Power Management***: analysis, modeling and control of power electronics in energy efficiency and renewable energy systems: energy harvesting, processors, lighting, data centers, hybrid/electric vehicles, micro grids, renewable sources.
- ***Design and Simulation Tools***: synthesis, visualization, and verification tools; monitoring, built-in test, diagnosis, adaptation, virtual prototyping.
- ***Education***: laboratories, multimedia tools, simulation and design tools.

Deadlines

Digest submissions: **March 20, 2010**
Author notifications by **April 20, 2010**
Final papers due: **June 26, 2010**

Workshop Schedule

June 28-30: technical, poster and demo sessions
Social events include two poster/demo session receptions and a banquet

Preparation of Submissions

Prospective authors should submit a cover page and a separate digest not exceeding five double-spaced pages for their intended submission. On-line submission and other Workshop details will be posted on the Workshop website: ***http://ecee.colorado.edu/compel10***

Venue: the Workshop will be held on the campus of the University of Colorado in Boulder. Boulder hosts a wide range of high-tech industry and several national labs (NIST, NCAR, NOAA), while National Renewable Energy Lab (NREL) is less than 20 miles away. Recreational opportunities abound, including state and national mountain parks.

General Chair: Dragan Maksimovic, Univ. of Colorado, maksimov@colorado.edu, 303-492-4863

Program Chairs: Regan Zane and Bob Erickson (University of Colorado), and Aleksandar Prodic (University of Toronto).

VPPC 2010

Vehicle Power and Propulsion Conference

September 1-3, 2010 - Lille, France

Clean Tech for Transportation

IEEE

MEGEVH French network on HEVs

CONFERENCE TRACKS

- Vehicular Electric Power Systems and Loads
- Vehicular Power Electronics and Motor Drives
- Advanced Vehicles
- Energy Storage Components / Systems
- Vehicular Electronics
- Modeling, Analysis, Dynamics and Control

KEY DATES

Deadline for submission of abstracts:
1st March 2010
Notice of acceptance:
15th April 2010
Deadline for submission of full papers:
15th June 2010
Deadline for registration:
30th June 2010

Call for Papers

The 2010 IEEE Vehicle Power and Propulsion Conference (VPPC) will be held in Lille, Northern France, in the framework of MEGEVH, French network on Hybrid Electric Vehicles (HEVs). The conference aims to provide a forum for sharing knowledge, experience and creative ideas in vehicle power and propulsion in order to develop and promote clean technology for future transportation systems. It will include keynote papers by authoritative speakers, technical sessions, tutorial sessions, poster sessions, special and invited sessions, exhibitions. Moreover, VPPC 2010 will be in a carbon care philosophy. We will try to reduce the conference ecological footprint. The CO2 emissions associated with the travel of attendees will be compensated by funding carbon reduction projects.

❑ Paper submission guidelines

Authors are invited to submit their paper through the conference website. Each paper proposal must include:

- Technical track number and name, paper title, name(s) of author(s), affiliation(s), mailing address(es), phone and fax numbers and e-mail address(es).
- An abstract of 50-100 words and a digest of 3-5 pages (including figures and tables).
- Preference for oral or poster presentation. Full papers should be submitted before June 15th 2010. The length of the paper shall be less than 6 pages.

A **special issue** will be organized with the best papers in **IEEE transactions on Vehicular Technology**.

❑ Conference committee

Honorary Chair: Prof. C.C CHAN, University of Honk Kong and Harbin Institute of Technology, China

General Chair: Prof. Alain BOUSCAYROL, University of Lille 1, L2EP, MEGEVH network, France

Co-Chairs: Prof. Daniel HISSEL, University of Franche-Comté, FEMTO-ST, MEGEVH network, France
Dr. Rochdi TRIGUI, LTE-INRETS, MEGEVH network, France

Organizing Committee: A. L. Allègre (University of Lille 1, MEGEVH), Dr. L. Boulon (University of Franche-Comté, MEGEVH), K. Chen (University of Lille 1, MEGEVH), Dr. Y. Cheng (Harbin Institue of Technology), Dr. S. Delprat (University of Valenciennes, MEGEVH), Prof. A. Emadi (Illinois Institute of Technology, VPPC'11 Chair) Prof. C. Espanet (University of Franche-Comté, MEGEVH), Dr. F. Giraud (University of Lille 1), Prof. T . M. Guerra (University of Valenciennes, MEGEVH), Prof. N. Idir (University of Lille 1), B. Jeanneret (INRETS, MEGEVH), Prof. B. Lemaire-Semail (University of Lille 1), T. Letrouvé (University of Lille 1, MEGEVH), Dr. W. Lhomme (University of Lille 1, MEGEVH), Dr. C. Mi (University of Michigan-Dearborn, VPPC'09 Chair), E. Pageau (University of Lille 1), O. Pape (Nexter System, MEGEVH), Prof. M. C. Pera (University of Franche-Comté, MEGEVH), Dr. E. Semail (Arts & Métier Paris Tech), Dr. E. Vinot (INRETS, MEGEVH), Z. Wu (University of Franche-Comté, MEGEVH).

❑ Exhibition

An exhibition will be featured at the conference. Companies which wish to display their products and sponsor the conference should contact the sponsorship/exhibition chair.

❑ Website

www.vppc2010.org

VTS pels Université Lille1 UFC INRETS

VPPC 2010

Vehicle Power and Propulsion Conference

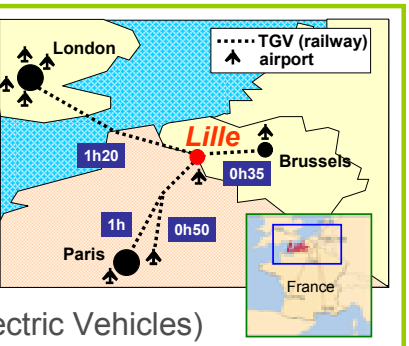
September 1-3, 2010 — Lille, France

Clean Tech for Transportation

IEEE

MEGEVH
French network on HEVs

IEEE-VPPC 2010 will be held in Lille, Northern France, at the crossroad of Paris, London and Brussels, to provide a forum in vehicle power and propulsion in order to develop and promote **clean technologies for future transportation systems** like EVs (Electric Vehicles), HEVs (Hybrid Electric Vehicles) and so on.



Scientific topics

- Advanced Vehicles
- Vehicular Electric Systems and Loads
- Vehicular Power Electronics
- Vehicular Motor Drives
- Energy Storage Components, Systems
- Modeling, Simulation, Dynamics and Control

Applications

- Electric Vehicles
- Hybrid Electric Vehicles
- Fuel Cell Vehicles

But also

- More efficient subways, trains, etc
- More electric aircrafts and propulsion ships, etc

- ▶ Tutorials on the bases of future technologies
- ▶ Keynotes by worldwide well-known specialists
- ▶ Technical sessions on new developments and applications
- ▶ Exhibitions with future vehicles and components

VPPC 2010 will be organized in a **carbon care philosophy**. We will try to reduce the conference ecological footprint. The CO_2 emissions associated with the travel of attendees will be compensated by funding carbon reduction projects.

Register and become a partner!

www.vppc2010.org

VTS pels Université Lille1 UFC INRETS

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

IEEE POWER ELECTRONICS SOCIETY

NOMINATION FORM

The William E. Newell Power Electronics Award

Award Year 2010

Nominated by:_____ Nominator's IEEE Member Number:_____

Nominator's FAX Number:_____ Nominator's E-mail Address:_____

Nominee's Name:_____ Nominee's E-mail Address:_____

Nominee's Business Address:_____

Nominee's Educational Background:_____

_____

On a separate sheet or sheets of A4 or 8½" × 11" paper, summarize the Nominee's qualifications and contributions to the field of power electronics. Since not all members of the Selection Committee may know the Nominee, please describe his/her most pertinent achievements and provide specific examples of outstanding accomplishments. For example, with respect to patents and papers published, their particular significance and value should be pointed out.

A strict limit of 750 words must be observed for the attached document. Nominations longer than this limit will be truncated at 750 words before they are submitted to the Selection Committee.

Please send this form and the attached sheet(s) to PELS Society Administrator Donna Florek E-mail: d.florek@ieee.org

This form, fully completed, and accompanying page(s) must be received by 15 January 2010.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

IEEE POWER ELECTRONICS SOCIETY

NOMINATION FORM

Distinguished Service Award

Award Year 2010

Nominated by:_____ Nominator's IEEE Member Number:_____

Nominator's FAX Number:_____ Nominator's E-mail Address:_____

Nominee's Name:_____ Nominee's E-mail Address:_____

Nominee's Business Address:_____

Nominee's Educational Background:_____

_____

On a separate sheet or sheets of A4 or 8½"×11" paper, summarize the Nominee's qualifications and contributions to the Power Electronics Society. Since not all members of the Selection Committee may know the Nominee, please describe his/her most pertinent achievements and accomplishments in introducing new programs, nurturing growth of individual Society members, and enhancing the reputation and stature of the Society. Provide specific examples and explain their significance.

A strict limit of 600 words must be observed for the attached document. Nominations longer than this limit will be truncated at 600 words before they are submitted to the Selection Committee.

Please send this form and the attached sheet(s) to PELS Society Administrator: d.florek@ieee.org

This form, fully completed, and accompanying page(s) must be received by 31 January 2010

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

IEEE POWER ELECTRONICS SOCIETY

NOMINATION FORM

Richard M. Bass Outstanding Young Power Electronics Engineer Award

Award Year 2010

Nominated by:_____ Nominator's IEEE Member Number:_____

Nominator's FAX Number:_____ Nominator's E-mail Address:_____

Nominee's Name:_____ Nominee's E-mail Address:_____

Nominee's Business Address:_____

Nominee's Date of Birth:_____ Nominee's Educational Background:_____

_____

On a separate page, summarize the Nominee's qualifications and contributions to the field of power electronics. Since not all members of the Selection Committee may know the Nominee, please describe his/her most pertinent achievements and provide specific examples of outstanding accomplishments. For example, with respect to patents and papers published, their particular significance and value should be pointed out.

A strict limit of 600 words must be observed for the document. Nominations longer than this limit will be truncated at 600 words before they are submitted to the Selection Committee.

Please send this form and the attached sheet(s) to PELS Awards, E-mail: d.florek@ieee.org

This form, fully completed, and accompanying page(s) must be received by 31 January 2010

Meetings of Interest

25th Annual IEEE Applied Power Electronics Conference and Exposition, APEC'10, will be held 21–25 Feb. 2010 at the Palm Springs Convention Center, Palm Springs, CA, USA. For further details please visit www.apec-conf.org

12th International Conference on Optimization of Electrical and Electronic Equipment OPTIM 2010 to be held 20–22 May 2010, Brasov, Romania, http://www.info-optim.ro/conforg

2010 International Telecommunications Energy Conference (INTELEC 2010) is to be held 6–10 June 2010 in Orlando, Florida, USA. For more information on INTELEC 2010 visit the conference website: intelec.org/intelec2010

2010 International Power Electronics Conference (IPEC 2010) is to be held 21–24 June 2010 in Sapporo, Japan. For more information on IPEC 2010, visit the conference website at: www.ipec2010.org

12th IEEE Computers in Power Electronics Workshop (COMPEL 2010) is to be held 28–30 June 2010 at the University of Colorado, Boulder, CO, USA. For more information on COMPEL 2010, visit the conference website at: ecee.colorado.edu/compel10

Vehicle Power and Propulsion Conference (VPPC 2010) is to be held 1–3 September in Lille, France. For more information on VPPC 2010, visit the conference website at www.vppc2010.org

2nd Annual Energy Conversion Congress and Exposition (ECCE2010) is announced for 12–16 September 2010 at the Hilton Atlanta hotel, 255 Courtland St. NE, Atlanta, GA. For more information on ECCE2009 visit the conference website: www.ecce2010.org

Institute of Electrical and Electronics Engineers

Power Electronics Society

BYLAWS

Original: September 28, 1988
Rev. 1: January 12, 1990
Rev. 2: June 15, 1990
Rev. 3: June 2, 1992
Rev. 4: August 1993
Rev. 5: October 31, 1994
Rev. 6: February 23, 1997
Rev. 7: April 10, 1998
Rev. 8: March 10, 1999
Rev. 9: February 25, 2001
Rev. 10: October 8, 2001
Rev. 11: June 25, 2004
Rev. 12: February 25, 2007
Rev. 13: February 24, 2008
Rev. 14: February 16, 2009

Contents

1. Objectives

These Bylaws provide detailed guidance for the supervision and management of the affairs of the IEEE Power Electronics Society (PELS), hereinafter referred to as "the Society," in accordance with the Society Constitution. Amendments or additions may be made by means of the procedures described in the Constitution of the Society.

2. Membership

Membership in the Society is described in the following paragraphs.

2.1 Members

All IEEE members in any grade shall be eligible for membership in the Society, upon payment of the annual fee prescribed in Bylaw 9.1.1.

2.2 Students

Student membership in the Society is open to all members upon payment of the annual fee prescribed in Bylaw 9.1.2.

2.3 Affiliates

Affiliate qualification is based on the specific rules and requirements established for affiliation by the IEEE. Affiliates are not eligible for election to offices in the Society and must pay the annual fee prescribed in Bylaw 9.1.3.

2.4 Honorary Life Member

Such membership, exempt from the annual fee of this Society, shall be based on the recommendation of the Society Awards Committee, the endorsement of the Society AdCom and the approval of the General Manager of the IEEE. Unless expressly limited to a specific term, Honorary Membership shall be for life, provided the individual remains a member of the IEEE.

3. Administrative Committee

The Constitution provides that the AdCom shall consist of 18 elected members-at-large with vote plus ex-officio members listed in Bylaws 3.1 through 3.7. The term of the elected members-at-large begins on January 1 and is for three years, with six members elected each year.

3.1 President

The Society President shall chair the AdCom.

3.2 President-Elect

The Society President-Elect shall be a member of the AdCom.

3.3 Vice-Presidents

The Society Vice-Presidents shall be members of the AdCom.

3.4 Treasurer

The Society Treasurer shall be a member of the AdCom.

3.5 Past-Presidents

The two most recent retiring Society Presidents shall be known as the Past-Presidents and shall be ex-officio members of the AdCom with vote. Other retiring Society Presidents shall be ex-officio members of the AdCom without vote.

3.6 Other Ex-officio Members with Vote

The chairpersons of the committees of Awards, Constitution & Bylaws, Standards and Relations with TAB and other IEEE Boards & Committees, and the two principal officers (or their annually appointed designees), of all technical sub-groups shall be ex-officio members of the AdCom with vote.

3.7 Ex-officio Members without Vote

Except those specified in Section 3.6, the chairpersons of other standing committees, the Editor of the IEEE Transactions on Power Electronics, the Editor of the Society Newsletter, the Editor of the Power Electronics Letters, the Region 8 Liaison, the Region 9 Liaison, and the Region 10 liaison officers, the chairpersons of all technical committees shall be ex-officio members of the AdCom without vote.

Chapter chairpersons, subcommittee chairpersons, liaison representatives to other professional organizations, or other special appointees made by the President and who have not been elected members at-large shall be non-voting members of the AdCom.

3.8 Meetings

The AdCom shall hold at least two meetings each year; one of these meetings shall be designated as the Annual Meeting. The Annual Meeting shall be held in conjunction with a conference sponsored or co-sponsored by the PELS.

3.9 Rules of Order

Robert's Rules of Order shall govern the conduct of the AdCom meetings on all matters not otherwise specified in these Bylaws or in the Constitution.

3.10 Quorum

A Majority of the voting members of the AdCom committee thereof shall constitute a quorum.

3.11 Voting

a) The vote of a majority of the votes of the members present and entitled to vote, at the time of vote, provided a quorum is present, shall be the act of the AdCom and its committees.
b) The AdCom and its committees may meet and act upon the vote of its members by any means of telecommunication. The normal voting requirements shall apply when action is taken by means of telecommunications equipment allowing all persons participating in the meeting to hear each other at the same time.
c) The AdCom and its committees may take action without a meeting if applicable (e.g. email voting). An affirmative vote of a majority of all the voting members of the AdCom or any committee thereof shall be required to approve the action. The results of the vote shall be confirmed promptly in writing or by electronic transmission. The writings and/or electronic transmissions shall be filed with the minutes of the proceedings of the AdCom and

its committees. "Electronic transmission" means any form of electronic communication, such as e-mail, not directly involving the physical transmission of paper, that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient.

d) Voting. Individuals holding more than one position on the AdCom and its committees, shall be limited to one vote on each matter being considered by the AdCom and its committees.
e) Proxy voting is not allowed.

3.12 Removal of AdCom Members

Members may be removed from AdCom for misconduct or other reasons deemed appropriate. Appointed members can be removed by 2/3 of the votes in an AdCom meeting. Elected members can be removed either by (i) 2/3 of the votes in an AdCom meeting, or (ii) petition by at least 10% of the Society Members and then approval by a majority ballot cast for the removal of AdCom members.

4. Nominations and Election of Adcom

The Nominations Committee shall consist of a chairperson and nine members-at-large, all of whom must be Members of the Society. The term of the chairperson begins on January 1 and is for two years. The term of each member-at-large begins on January 1 and is for three years, with three members appointed each year.

a) The chairperson and members-at-large are appointed by the Society President and approved by the AdCom. The chairperson of the Nominations Committee shall be either the senior past president or the immediate past president of the AdCom. In the event of the incapacity or conflict of interest of the chairperson, the most recent Past chairperson of the Nominations Committee available shall be the chairperson of the Nominations Committee. With extenuating circumstances, a different individual may be appointed to this position.
b) The chairperson shall not be eligible to be elected to the AdCom during their term of service.
c) At least two-thirds of the voting members of the Nominations Committee shall be elected or appointed by the AdCom.
d) A member of Nominations Committee may be nominated and run for a position for which such member's respective Nominations Committee is responsible for making nominations only on the following conditions: (i) the nomination is not made by a member of the same Nominations Committee and (ii) the member resigns from the Nominations Committee prior to its first meeting of the year in which the nomination shall be made.

4.1 Instructions

The Society President each year shall issue instructions to the chairperson of the Nominations Committee to ensure an orderly progress and completion of the election procedures. In the preparation of the slate of nominees for the election, proper consideration shall be given to geographical representation and technical interest.

4.2 Members-At-Large Slate

A slate of nominees for members-at-large vacancies of the AdCom shall be prepared by the Nominations Committee. There will be at least three names for every two vacancies. A request for such nominations shall be solicited by a letter to all members of the then existing AdCom. In addition, the chairperson of the Nominating Committee shall cause a Call for Nominations by petition to be published and distributed to the entire Society membership at least 90 days before the date of closure of the ballot. The Call must state the recipient of the petition and the deadline for receipt of the petition.

4.3 Petitions

A Nominations petition signed by a minimum of 2% of the eligible Society Members, excluding Students and Affiliates, shall automatically place that nominee for AdCom member-at-large on the slate to be presented to the AdCom. The deadline for receipt of the Nominations petition is 28 days before date of the election.

Signatures can be submitted electronically through the official IEEE society annual election website, or by signing and mailing a paper petition. The name of each member signing the paper petition shall be clearly printed or typed. For identification purposes of signatures on paper petitions, membership numbers or addresses as listed in the official IEEE membership records shall be included. Only signatures submitted electronically through the IEEE society annual elections website or original signatures on paper petitions shall be accepted. Facsimiles, or other copies of the original signature, shall not be accepted.

The number of signatures required on a petition shall depend on the number of eligible society voters, as listed in the official IEEE membership records at the end of the year preceding the election.

4.4 Willingness to Serve

The chairperson of the Nominations Committee shall ensure that each person named on the slate of persons being considered for election is willing to serve if elected.

4.5 Election

The slate of nominees for AdCom Members-at-Large shall be submitted to the membership of the Society and all members in good standing are eligible to vote. Voting will be conducted according to IEEE policies and procedures and may take the form of electronic or mail balloting.

At the relevant Annual Meeting of the AdCom, the slate of nominees for Society Vice Presidents and President Elect will be presented and elections will be conducted by the Nominations Committee Chair or a designated representative assisted by one additional teller. Written ballots will be used and the positions will be filled by those nominees receiving the greatest number of votes. The President will be entitled to vote, but the Nominations Committee Chair will only vote to resolve ties. If the Nominations Committee Chair is unable to conduct the election, his or her preferential ballot must be communicated in advance to the designated representative, to be used in case of a tie. The results of the election should be communicated promptly to all candidates by the Nominations Committee Chair.

Those nominees who did not receive sufficient votes to be elected shall be considered as contingent members (ranked by votes received), to become effective if an elected member fails to accept the office, or if a disapproval is received from Headquarters. When this occurs, the President shall send written notification of election to the ranking contingent member.

4.5.1 Mail Ballots

At the discretion of the President and the Nominations Committee Chair, and with the consent of the AdCom, elections of Vice Presidents and President Elect may instead be carried out by mail. These may be carried out after the relevant Annual General Meeting. In this case, ballots presenting the slate of nominees must

be sent to all voting members at least 30 days in advance of a specified closing date for the election. A majority vote of voting members shall determine the election.

4.6 President-Elect, and Vice President Slates

The nominations Committee shall prepare slates for President-Elect and the Vice Presidents, consisting in each case of at least two nominees. The nominations for President-Elect shall be from elected AdCom members and the Vice Presidents. The nominations for the Vice Presidents shall be from voting AdCom members. The chairperson of the Nominations Committee shall ensure that each person named is willing to serve.

In the first year of the President's term, the Nominations Committee shall nominate at least two candidates for President-Elect. The successful candidate shall become President-Elect and shall become President at the expiration of the current President's term.

4.7 IEEE Division II Director

The Society policy regarding nomination for the IEEE Division II Director of the Power Electronics Society shall be in compliance with IEEE Bylaws. The policy shall allow for the submission of a single Division Director candidate to be placed on the Annual Election Ballot in compliance with the requirements stated in IEEE Bylaw T-902.3.

5. Officers

5.1 President, President-Elect and Vice-Presidents

The President is normally a non-voting member of the AdCom, but may choose to vote when there is a tie, or when written ballots are used. There will be a President-Elect who is a voting member of the AdCom. There shall be three Vice-Presidents; one designated Vice President for Operations, one designated for Meetings, and one designated for Products. The three Vice Presidents are voting members of the AdCom.

5.2 Treasurer

The Treasurer is an Officer of the Society and member of the AdCom with vote. The Treasurer is appointed by the President-Elect with the concurrence of the AdCom.

5.3 Terms

The terms of the elected Officers shall begin on January 1 and shall be for two years, except for the President-Elect. After serving for one term, the President shall not again be eligible for election to the Presidency until three years have elapsed. Vice- Presidents can be re-elected to serve additional terms without limit. Appointed Officers can be re-appointed and re-confirmed to additional terms without limit.

5.4 Plans and Objectives

The elected Officers shall prepare a set of plans and objectives as part of their obligation in assuming the responsibilities of their office. All Officers shall continue to serve until their successors take office.

5.5 Duties

5.5.1 President

The President shall supervise the affairs of the Society and shall speak for the Society on all matters not specifically delegated to others.

5.5.2 President-Elect

The President-Elect shall assist the President in the administration of the Society and shall attend meetings of the IEEE Technical Activities Board. In the absence or incapacity of the President, the duties of the President's office shall be performed by the President-Elect.

5.5.3 Vice-President for Operations

The Vice President for Operations shall fulfill the duties of the President-Elect in his/her absence or incapacity. Duties of the Vice President for Operations include the coordination and supervision of the Standing Committees and the Technical Committees, the coordination of the Chapter activities, and the establishment of the Technical Interest Profile of the Society through membership interests and trends in the field.

5.5.4 Vice-President for Meetings

The Vice-President for Meetings serves as the Meetings Committee Chair and is an ex-officio member of steering committees for major Society meetings.

5.5.5 Vice-President for Products

The Vice-President for Products oversees the Publications Committee, the Publicity Committee and the Web-based Content Committee.

5.5.6 Executive Director

The President of the Society may appoint a paid Executive Director with the advice and consent of the AdCom. The Executive Director provides administrative support to Society Officers, the AdCom, and other committees. The Executive Director is an ex-officio member of the AdCom without vote.

5.5.7 Treasurer

The Treasurer shall be responsible for the financial control and records of the Society. The Treasurer shall compile financial and budget data, analyze and make appropriate recommendations to the AdCom and other committees on such items as publication costs, meeting expenses, the total annual operation and long-term solvency of the Society. The Treasurer shall prepare reports, budgets and other documents useful in maintaining the financial health of the Society. The Treasurer shall solicit from the Technical and Standing Committees and the editors, inputs for establishing the budget. The Treasurer shall report to the AdCom on the financial status of the Society.

6. Sub-Groups

Sub-groups are voluntary associations of a significant portion of the Society membership.

6.1 Chapters
Chapters are permanent sub-groups organized on a geographical basis. (For further information refer to the IEEE Bylaws, the IEEE Society Section of the Technical Activities Manual, and the Section Manual.)

6.2 Technical Sub-Groups
A technical sub-group may be organized subject to the approval of the AdCom, to cover a specified portion of the field of interest of the Society. Technical sub-groups may organize separate, specialized symposia. Technical sub-groups may organize special issues of the Transactions or a special section in an issue. Any service for technical sub-group members, beyond those provided all Society members, must be paid for by the technical sub-group. If this takes the form of special assessment, its form and amount must be endorsed by the AdCom. One or two of the principal officers, or their annual appointed designees of each technical sub-group shall be ex- officio members of the AdCom with vote. The AdCom will determine whether a technical sub-group will be allocated one or two ex-officio positions at the time the technical sub-group is approved.

Subject to Society AdCom approval, a technical sub-group may establish an operating fund which will be maintained as a separate account in the Society books. A technical sub-group's operating fund account will exist until such time as it is exhausted of funds or the AdCom abolishes the technical sub-group. In the latter case, any balance in the operating fund will revert to the Society's reserve account. The technical sub-group shall submit a budget proposal at the annual meeting of the Society to request expenditure of assets from the sub-group's operating fund, for activities to be sponsored by the sub-group during the following calendar year. Any budgeted deficit must be equal to or less than the sub-group's current operating fund balance not encumbered by current or prior year's commitments.

Surplus revenue generated by an activity of a technical sub-group will be evenly divided between the operating fund of the sub-group and the general reserves of the Society. Any loss suffered by a technical sub-group beyond the approved budget limit for the year will be absorbed equally by the Society reserves and the available reserves in the technical sub-group's operating fund. If the loss is so large as to exhaust the technical sub-group's operating fund, the Society will absorb the remainder. The combined amount of all technical sub-group operating funds shall not exceed 60% of the Society reserves. In addition, the annual operating fund amount for an individual technical sub-group shall not exceed 25% of the Society reserves.

6.3 Officers
Each chapter or group shall elect from one of their kind, a Chairperson and Secretary. Additional officers may be elected as needed.

7. Liaison Representatives
The President, with concurrence of the AdCom, may appoint persons to such liaison posts as shall be determined and established by the AdCom. Liaison Representatives to other professional organizations shall constitute the Intersociety Liaison Committee chaired by the Vice President for Operations.

8. Society Business
The President and Officers shall conduct the Society affairs, subject to the advice and consent of the AdCom, except where other authorization is specified.

8.1 AdCom Meetings
AdCom members shall be notified at least 30 days prior to the scheduled date of any meeting held to transact business.

8.2 Effective Date of Action

8.2.1 With Quorum
If a duly-called meeting achieves a quorum of attendees, actions taken and passed in accordance with the rules for the conduct of business become effective immediately unless otherwise required in the Constitution.

8.2.2 Without Quorum
If a duly-called meeting fails to reach a quorum of attendees, tentative actions may be taken which shall become effective upon subsequent ratification by mail by a majority of the voting members of the AdCom unless otherwise required in the Constitution. In this case the Executive Director shall mail minutes of the meeting to each member of the AdCom. The document shall be clearly marked as requiring a return response from the voting AdCom members with a deadline of 30 days from the date of mailing of the document.

8.3 Order of Business
An appropriate order of business at the Annual Meeting of the AdCom could be as shown below.

1) Roll call
2) Reading of minutes of previous Annual Meeting
3) Reading of report on business transacted other than at meetings
4) Report of communications
5) Reports of Officers
6) Reports of committees
7) Unfinished business
8) Report of Nominations Committee introducing slate of nominees for members-at-large
9) Election of members-at-large
10) Report of Nominations Committee introducing slate of nominees for Officers
11) Election of Officers for succeeding year
12) New business
13) Adjournment

8.4 AdCom Invitations
All AdCom members, Chapter and Committee chairpersons, and IEEE ex-officio members shall be invited to AdCom meetings. Other persons, at the discretion of the President, may be invited to attend the AdCom.

9. Society Funds
Society funds shall be derived from annual Society fees, income from conferences, interest on assets, sale of conference records, sale of the Transactions of the Society, etc.

9.1 Membership Fees

9.1.1 Annual Dues and Fees
The annual Society membership dues and fees shall be established by the AdCom in accordance with the IEEE guidelines.

9.1.2 Student Dues and Fees
The annual Student membership fee shall be established by the IEEE.

9.1.3 Affiliate Dues and Fees
The annual fee for Affiliates shall be the fee required for Society Members plus the Affiliate surcharge set by the IEEE.

9.2 Bursar
IEEE Headquarters shall act as a bursar for all Society funds except as specified hereunder. Billings and receipt of annual dues and fees shall be via the IEEE membership and fiscal departments. All other fiscal affairs shall be handled through the office of the Technical Activities Secretary.

9.3 Symposia and Conferences
The general committee for a symposium or technical conference may, with the advice and consent of the AdCom, authorize the symposium treasurer or fiscal officer to open an account to be used for the deposit and disbursement of funds related to the symposium or conference. In each case the AdCom shall be advised of the name of the bank, the anticipated size of the account, the names of the account signatories, and of arrangements for insurance and bonding. Symposia and conferences jointly sponsored with other technical societies are excluded from the above provisions where a charter of operations for those societies is approved by the AdCom and the IEEE.

9.4 Disbursement of Society Funds
Budgeted funds shall be disbursed by the office of Technical Activities of the IEEE on the recommendation of the Treasurer or the President of the Society. Discretionary funds not previously designated may be disbursed with the approval of the AdCom.

10. Technical Commitees
A Technical Committee, operated solely by PELS or jointly by a group of societies including PELS, functions in a specific technical area with a scope to be approved by the AdCom.

10.1 Appointment
The Chairperson of each PELS Technical Committee shall be appointed by the President with the advice and consent of AdCom. The Chairperson shall be an ex-officio member of AdCom and his/her voting rights is specified in Sections 3.6 and 3.7.

The Chairperson of a Joint Technical Committee shall be recommended by the President and approved by the PELS AdCom. The Chairperson shall be an ex-officio member of AdCom with vote, if he or she is a PELS member.

Committee members shall be appointed with the consent of the AdCom on the recommendation of the Committee Chairperson.

10.1.1
The term of office of the Chairpersons and members shall be for one year from January 1 through December 31. Chairpersons and members can serve additional terms without limit, or until a successor is appointed and takes office, unless a different term of office is designated by the AdCom.

10.2 Functions
Each Technical Committee shall promote activities in its field and shall provide the expert knowledge and assistance.

10.2.1
The Technical Committee shall prepare a set of plans and objectives as part of the obligation in assuming the responsibilities of the position.

10.2.2
The Technical Committee shall generate and promote papers within its scope in cooperation with the Transactions Editor.

10.2.3
The Technical Committee may organize and operate independent symposia, seminars, workshops, or sessions at meetings of other organizations with which the Society is cooperating in accordance with IEEE rules and the rules in effect at such meetings.

10.2.4
The Technical Committee may arrange through appropriate editors for publishing pertinent papers in IEEE publications.

10.2.5
The Technical Committee shall generate and assist in the development of appropriate standards in its field for consideration by the IEEE Standards Board, transmitted through the Society Standards Committee in accordance with IEEE policies.

10.2.6
The Technical Committee shall promote, organize and conduct peer reviews of digests submitted for selected PELS-sponsored conferences in cooperation with the conference technical program chair.

10.3 Operations
The operation of each Technical Committee shall be in accordance with AdCom rules and policies.

10.4 Council
The chairpersons of all the Technical Committees shall constitute a Council to coordinate their activities. The Council shall be chaired by the Vice President for Operations.

11. Standing Committees
The Long Range Planning Committee shall be chaired by the Senior Past President, the Intersociety Liaison Committee shall be chaired by the Vice President for Operations, and the Meetings Committee shall be chaired by the Vice President for Meetings. The Chairperson of each Standing Committee shall be appointed by the Society President, with the advice and consent of the AdCom. Each Chairperson shall be an ex-officio member of the AdCom and his/her voting rights is specified in Sections 3.6 and 3.7. Committee members shall be appointed with the consent of the AdCom on the recommendation of the Committee Chairperson.

11.1 Term

The term of office of the Chairpersons and members shall be for one year from January 1 through December 31. Chairpersons and members can serve additional terms without limit, or until a successor is appointed and takes office, unless a different term of office is designated by the AdCom or by the Bylaws.

11.2 Ad Hoc Committees

Special or ad hoc committees may be created by the AdCom. For each such case, the AdCom shall specify the number of members the committee shall have and how the members are to be selected. Special or ad hoc committees shall be automatically dissolved after one year unless the AdCom sets an expiration date.

11.3 Standing Committees

Examples of typical Standing Committees of the Society are Committees on:

a) Academic Affairs
b) Awards
c) Chapter Development
d) Constitution and Bylaws
e) Education Activities
f) Fellows
g) History
h) International Relations
i) Intersociety Liaison
j) Long Range Planning
k) Meetings
l) Membership
m) Nominations
n) Publications
o) Publicity
p) Relations with TAB and other IEEE Boards and Committees
q) Standards

11.4 Responsibilities of Standing Committees

Examples of typical standing-committee responsibilities are enumerated in the following paragraphs.

11.4.1 Academic Affairs Committee

The functions of the Academic Affairs Committee will be to:

a) Establish and maintain formal liaison with the IEEE Student Branch Counselors;
b) Identify and review opportunities for joint interaction and bring these to the AdCom; and
c) Promote the Society within the academic community to the end that faculty and students become active in the Society.

11.4.2 Awards Committee

The functions of the Awards Committee will be to:

a) Recommend candidates for all awards and prizes in accordance with requirements, requests, and rules and regulations of IEEE Headquarters, both for general IEEE awards and those of the Society;
b) Recommend candidates for Fellow grade; and
c) Assist in appropriate ways in other member recognition and award matters.

11.4.3 Chapter Development Committee

The functions of the Chapter Development Committee will be to:

a) Create and promote interest in the Sections for the formation of Chapters of the Society;
b) Assist existing Chapters, particularly on special projects;
c) Work with Chapters and Sections to provide plans and methods for promoting successful Section or Chapter meetings;
d) Assist in providing topics, media or speakers for Section or Chapter meetings;
e) Develop materials to assist Chapters and Sections in support of Student Branch activities and other educational programs; and
f) Maintain appropriate liaison with IEEE Regions and Sections and report to the AdCom on plans or issues.

11.4.4 Constitution and Bylaws Committee

The functions of the Constitution and Bylaws Committee will be to:

a) Maintain records of the Constitution and Bylaws;
b) Ascertain that the Constitution and Bylaws are not in conflict with any requirements or rules of the IEEE Headquarters: and
c) Make recommended changes in the Constitution or Bylaws as necessary to conform to the developments of its Society, its AdCom, membership and its mode of operations.

11.4.5 Education Activities Committee

The functions of the Education Activities Committee will be to:

a) Develop and review proposals for educational programs - tutorials, seminars, short courses, etc.;
b) Provide liaison with IEEE and other professional educational organizations and staffs; and
c) Develop policies and guidelines for educational programs.

11.4.6 Fellow Evaluation Committee

The functions of the Fellows Committee will be to:

a) Fulfill the Society's obligation to assist the IEEE Fellow Committee in reviewing and evaluating the technical contributions of all nominees who have worked in technical fields related to those of the Society.

11.4.7 History Committee

This committee shall be chaired by the Historian. The functions of the History Committee will be to:

a) Solicit from any appropriate source memorabilia which record the history of the Society; and
b) Archive and preserve historical records of the Society.

11.4.8 International Relations Committee

The functions of the International Relations Committee will be to:

a) Strengthen ties with the Society members in Regions 7 through 10 who are not members of a Chapter; and
b) Establish liaison representatives in Regions 7 through 10 for the Society when deemed appropriate by the AdCom.

11.4.9 Intersociety Liaison Committee

The Intersociety Liaison Committee shall be comprised of the designated Society representatives to other societies and it shall be

chaired by the Vice President for Operations. The function of the Intersociety Liaison Committee will be to:

a) Establish and maintain formal liaison with societies that have common interests with the Society and to identify and review opportunities and proposals for jointly sponsored activities.

11.4.10 Long Range Planning Committee

Long-Range Planning Committee shall be comprised of the Senior Past President, Junior Past President, PELS Treasurer, Region 8 Liaison, Region 9 Liaison, Region 10 Liaison and two other members to be chosen by the Committee Chair with the advice and consent of the AdCom. This committee shall be chaired by the Senior Past President and report to the Vice President for Operations.

The duties of the Long-Range Planning Committee will be to:

a) Propose five-year goals for the Society and strategies by which to reach these goals.
b) Update and present the five-year plan to the AdCom for approval at its fall meeting in every even-numbered year; and
c) Observe financial operations of the Society and take appropriate actions to ensure that money is spent or invested wisely and in the best interests of the Society.

11.4.11 Meetings Committee

The functions of the Meetings Committee will be to:

a) Develop policies and guidelines for the organization and management of Society-sponsored events;
b) Maintain a current conference mailing list;
c) Screen proposals for involvement by the Society in new conferences and workshops prior to submission to AdCom;
d) Review the budgets and financial reports of all Society-sponsored events;
e) Recommend and review appointments to conference leadership positions;
f) Act as consultant and functional supervisor to Treasurers of various meetings sponsored by the Society;
g) Publish Calls for Proposals for major Society meetings;
h) Propose requirements for meeting co-sponsorship or cooperation, and
i) Ensure the proper and timely closing of conferences.

11.4.12 Membership Committee

The functions of the Membership Committee will be to:

a) Monitor the Society membership and advise the AdCom of trends and opportunities;
b) Provide promotional material and plan membership drives;
c) Encourage eligible members to apply for advancement to Senior Member; and
d) Provide liaison with the IEEE Membership Development Committee, the Admission and Advancement Committee, the Section and Chapter officers, and with members of the other staff committees involved with membership problems.

11.4.13 Nominations Committee

Duties of the Nominations Committee are detailed in Section 4 of these Bylaws.

11.4.14 Publications Committee

The Publications Committee is composed of the Publications Chair, Transactions Editor-in-Chief, Transactions Associate Editor-in-Chief, Webmaster, Newsletter Editor-in-Chief, Newsletter Associate Editor, PELS Letters Editor-in-Chief, Newsletter Advertising Manager and two at-Large members appointed by the PELS President.

The functions of the Publications Committee will be to:

a) Develop and implement policies and plans for all Society-supported publications;
b) Review the budgets and publication plans of all Society-supported publications prior to submission to the AdCom for approval;
c) Provide an interface to IEEE publication organizations and staffs;
d) Recommend to the President and the AdCom for their approval names of prospective editors for Society supported publications;
e) Train editors for Society-supported publications; and
f) Recommend to the AdCom specific remunerative compensation for editors when appropriate.

Under the Publicatons Committee, there are subordinate editorial boards for the Transactions (Editor-in-Chief, Associate Editor-in-Chief and all Associate Editors, plus the Publications Chair), PELS Letters (Editor-in-Chief and Associate Editors, plus the Publications Chair) and the Newsletter (Editor-in-Chief, Associate Editor, IEEE IAS representative and Advertising Manager, plus the Publications Chair.

11.4.15 Publicity Committee

The functions of the Publicity Committee will be to:

a) Make contacts with the various sources of publicity, such as trade and technical journals, newspapers, radio and TV, etc.;
b) Use the contacts to the best advantage in promoting the interests of the Society concerning its publications, meetings, and other activities; and
c) Offer counsel and assistance to the other committees of the Society, particularly those concerned with meetings and symposia.

11.4.16 Relations with TAB and Other IEEE Boards and Committees

Relations with the TAB and other IEEE Boards and Committees shall be by Society representatives who are appointed by the President to those committees where the Society representation is appropriate.

11.4.17 Standards

The function of the Standards Committee will be to encourage and coordinate the work of the Technical Committees on standards related to the field.

Combined electrical and thermal simulation

PLECS

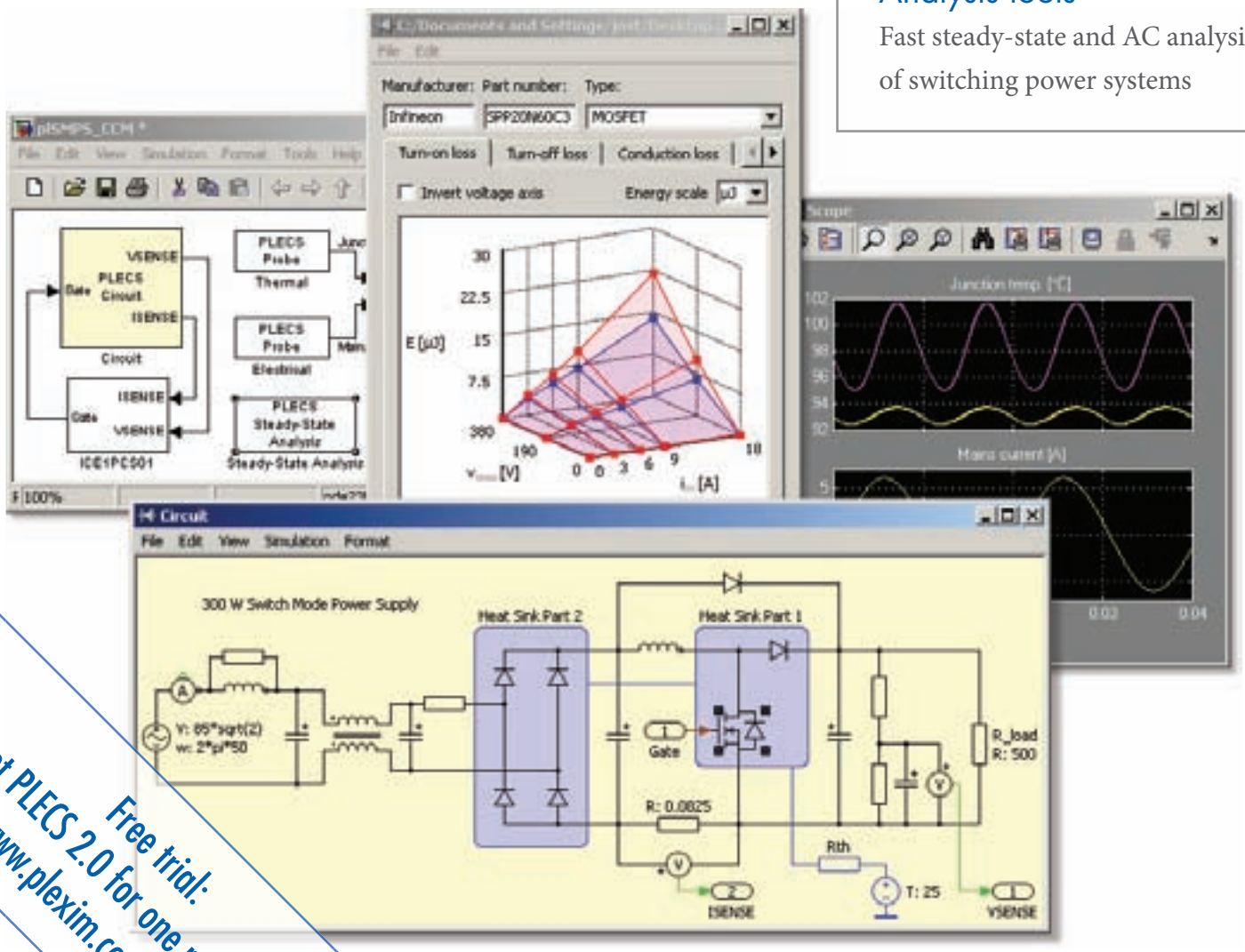
... circuit simulation at system level

PLECS 2.0 features:

Power electronic circuits
Electrical circuits with ideal switches embedded in Simulink®

Thermal loss modeling
Power semiconductor losses computed from look-up tables

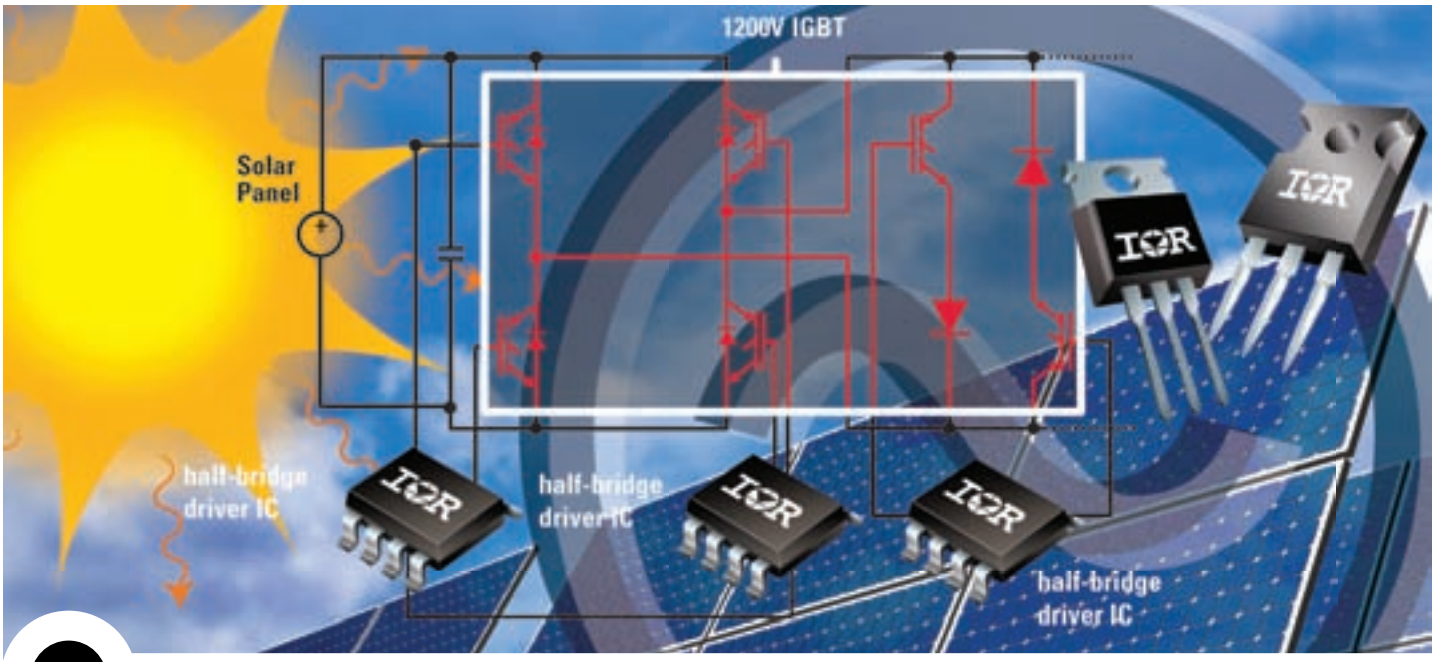
Analysis tools
Fast steady-state and AC analysis of switching power systems



Free trial:
Get PLECS 2.0 for one month at
www.plexim.com/trial

Plexim GmbH +41 44 445 24 10 info@plexim.com www.plexim.com

plexim



1200 Volt Solar Inverter Solutions

IR's Energy Efficient Portfolio for Grid-Connected Solar Inverter Output Circuits

1200V Fast Switching IGBTs for PWM*

Part Number	Rated Current T_{CASE} = 100C , V_{GE} = 15V	$V_{ce(on)}$	td(on)	tr	td(off)	tf
IRG4PH40UDPBF	21.0A	2.43V	42 ns	32 ns	240 ns	510 ns
IRG4PH50UDPBF	24.0A	2.78V	46 ns	27 ns	240 ns	330 ns
IRG4PSH71UDPBF	70.0A	2.52V	43 ns	78 ns	330 ns	480 ns
IRGP20B120UD-EP	20.0A	3.05V	50 ns	20 ns	204 ns	24 ns
IRGPS40B120UDP	40.0A	3.12V	76 ns	39 ns	332 ns	25 ns
IRG7PH42UDPBF	30.0A	1.7V	20 ns	31 ns	310 ns	63 ns

1200V Half Bridge Gate Driver ICs*

Part Number	Package Type	Io+	Io-
IR2213STRPBF	SOIC	2.0 A	2.5 A
IR2214SSTRPBF	SOIC	2.0 A	3.0 A

1200V Low Uce(sat) IGBTs for less than 1kHz*

Part Number	Package Type	Ic at 100°C	$V_{CE(on)}$ at Rated Current	Qg	$R_{th(j-c)}$
IRG4PH50SPBF	TO-247	33A	1.47V	167 nC	0.64 °C/W

Features

- Optimized 1200V IGBTs, 1200V standard speed IGBTs and HVIC for the inverter side
- High efficiency
- High density solution

*Also available in 600V

for more information call 1.800.981.8699 or visit us at www.irf.com

International
IOR Rectifier
THE POWER MANAGEMENT LEADER