

Motor, Drive & Automation Systems 2011

Advancements in Motion Control and Power Electronic Technology

March 1-2 • San Antonio, Texas

-  Improve Energy Efficiency and System Performance
-  Network with Industry Leaders
-  Integrate New Technology
-  Discover Market Trends and Opportunities

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Motor, Drive & Automation Systems 2011 is an international, industry-leading conference focused on the latest economic trends and technical advancements impacting motor, drive and automation systems. Join hundreds of peers and potential business partners and discover how new technologies are improving performance, energy efficiency and providing cost savings in a variety of applications.

The event serves technical and management professionals involved in all sectors of motor, drive and automation technologies including end users, integrators, manufacturers and dealers.

If you are involved in the motor, drive or automation industries or if your products and systems use these technologies, this is a must attend event.

Who will be at Motor, Drive & Automation Systems 2011:

- OEM and System Design Engineers
- System Integrators, Value Added Resellers and Dealers
- OEM Design Engineers and Development Managers seeking to equip their products, devices and systems with the latest technologies for improved performance, efficiency and optimal economics
- Control Managers and Developers
- Components Developers and Providers
- Product Managers seeking new applications, technology advancements and partnering opportunities
- Engineering and Development Managers of Motor, Drive & Automation Systems Manufacturers
- Motion Control Professionals
- Power Systems Engineers



Stay Where the Conference is!

Grand Hyatt San Antonio
600 E. Market Street • San Antonio, Texas
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Website: <http://grandsanantonio.hyatt.com>

A special room rate of \$199 is available for attendees. Be sure to reserve your room by February 7th, 2011, to receive this special rate. Be sure to mention Webcom Communications when reserving.

Contact Us

Registration: Julie Williams at
720-528-3770 ext. 117 or
JulieW@infowebcom.com

Exhibit/Sponsorship: Sue Hannebrink at
330-725-5812 or
SueH@infowebcom.com

Program: Shannon Given at
720-528-3770 ext. 104 or
ShannonG@infowebcom.com

Monday, February 28th

Electric Motor Power Measurement and Analysis

Presented by: Bill Gatheridge • Yokogawa Corp. of America
Ian Walker • GMW Associates

Time: 8:00 AM - 12:00 PM

Registration: Before 1/28: \$195; After 1/28: \$295

This four hour workshop will provide the attendees with a three-step process for making precision electrical and mechanical power measurements on various motors and variable speed drive systems. A special section will be devoted to the current sensors required for use on variable frequency drives and inverter systems.

Motor Control Fundamentals and Brushless Drives

Presented by: Dr. Dal Y. Ohm • Drivetech, Inc.

Time: 8:00 AM - 11:00 AM

Registration: Before 1/28: \$295; After 1/28: \$395

The purpose of this course is to provide fundamental concepts on motor control including commutation methods and power semiconductor circuits. The content will cover most of the basic knowledge in designing DC and brushless DC motor drives, including sensorless control techniques.

Designing Your BLDC Motor

Presented by: Jim Hendershot and Tanvir Rahman • Infolytica

Time: 8:00 AM to 5:00 PM

Registration: Before 1/28: \$595; After 1/28: \$695

This full day event will cover a broad range of topics and cover useful techniques and tips on how to approach your next motor project. The workshop will focus on practical problems faced by real designers in their work environment.

Field Oriented Control and Advanced AC Motor Control Algorithms

Presented by: Dr. Dal Y. Ohm • Drivetech, Inc.

Time: 1:00 PM - 4:00 PM

Registration: Before 1/28: \$295; After 1/28: \$395

The purpose of this course is to provide in-depth knowledge and skills in designing high performance AC motor drives. The course starts with the principles of FOC (Field Oriented Control, aka Vector Control) and applies FOC in PM synchronous (both IPM and SPM) and induction motors.

Reliability of IGBTs in Industrial Drives

Presented by: John Donlon and Eric Motto • Powerex, Inc.

Time: 1:00 PM - 5:00 PM

Registration: Before 1/28: \$175; After January 1/28: \$275

This four hour workshop will address the reliability of the IGBT power module which is the heart of modern industrial drives. This workshop will discuss the proper selection of the IGBT, its limitations and failure modes, the precautions that must be taken to ensure long life, and the design and application considerations that affect reliability.



Program

Tuesday, March 1st

- 7:00 Registration Opens / Continental Breakfast
- 8:00 Welcome and Opening Address

8:05 Keynote Presentation

Motors, Drives and Motion Control - Global Market Update

Hear the latest data on the low voltage AC induction motors and large motors markets and discover market updates on motion control, as well as low voltage and medium voltage motor drives. The market updates will include an estimate of the worldwide market sizes, as well as a discussion of growth and a forecast for the next three years. This session will provide industry sector and geographic region breakdowns.



*Alex Chausovsky, Research Manager, Motion & Drives Group
IMS Research*

9:10 Featured Presentation

Investing in Energy Efficiency Panel

Discover how both motor and drive manufacturers and end-users are improving and integrating energy efficiency technologies.

*Kirk Barker, Electronics Product Manager, Maxon Motor
Ken Berringer, Engineer • Silicon Labs
Speaker TBA, National Instruments
Additional Panelists to be Announced*

10:00 Exhibit Hall Opens / Networking Break

10:45

Active Front End Drives for Optimizing Power

With rising energy cost and emphasis on reducing harmonics, Active Front End (AFE) technology is gaining relevance in the AC drives market. AFE technology use IGBT's to manage the DC bus for inverters. The inverters then invert the DC power to a three phase Pulse Width Modulated supply for an AC motor. This presentation will explore the advantages of having a static DC bus that is isolated from line or load fluctuations and optimizes power usage.

Craig Nelson, Product Marketing Manager • Siemens Industry, Inc.



Evaluation of the Thermal Image of a Motor and Its Effect on Performances

Thermal analysis is an important aspect of the electric motor design process and it is becoming more important due to the push for reduced weight and cost and increased efficiency. To obtain an accurate analytical thermal model all the important heat transfer paths must be included in the network and suitable algorithms should be used to calculate thermal resistances for such paths. Motor-CAD automatically constructs an electric motor thermal network from the users inputs of motor geometry and their selection of materials and cooling type. This makes it easy for non-heat transfer specialists to carry out thermal analysis of electric motors.

Philippe Wendling, Vice President • Magsoft

11:25

Various Sensorless Control Methods for AC Motor Drives

Discover the many different sensorless control methods used in the industry and compare the technologies for merits in performance, robustness, limitations, complexity in implementation and tuning. Topics will include back EMF detection, carrier injection method, direct field orientation, extended Kalman filtering, linear observers and sliding mode observers. This presentation will also cover inherent limitations of sensorless technologies and specific applications where sensed feedback is preferred.



Dr. Jae H. Park, Vice President of R&D • Drivetech, Inc.

Rapid 3D Motor Design using Finite Element Simulators

A finite element-based electromagnetic simulator, EMS, utilizes a finite element based solution method inside the CAD environment SolidWorks to offer versatility in its solutions. This allows for the ability to design and analyze a wide variety of devices that are readily accessible to the practicing engineer. Some devices, namely, a magnetic coupling device, a brushless DC motor and a stepper motor will be used to demonstrate this design solution. Three case studies will be included to illustrate the design methodology.

*Hussam Maleh, Application Specialist
ElectroMagneticWorks, Inc.*

12:00 Networking Lunch

1:30

Techniques for Improved Stepper Motor Control

Typical stepper motor control uses an open-loop, voltage-control method, where the faster the voltage ramps in the motor phase, the quicker the step is taken. While this method works well, it is not optimized for either energy efficiency or speed. Using a low-cost, motor-control digital signal controller with comparators, a closed-loop, current-control mode of operation can be implemented. This control method provides a significant step speed increase of up to 25 times faster. Another significant advantage of this control technique is a marked reduction in the motor noise level.

*Patrick Heath, Strategic Marketing Manager
Microchip Technology, Inc.*

Increasing Productivity Through Customized Gearbox and Motion Control Design

In a competitive market, you need to ensure that you are meeting productivity efficiency requirements. Customizing components (from mechanical to electrical to complete systems) not only creates new barriers for competitors but also allows for unprecedented levels of productivity to be achieved. This is a hands on technical overview presenting applications with standard motion system components and designs side-by-side with custom components and the optimization which can be realized.

Paul Anderson, Mechanical Engineer • Wittenstein, Inc.

2:10
Efficiency Optimization for Standard Planetary Gears

Planetary gears are one of the most powerful gearbox types in regard to the efficiency based on the power density. They give a powerful answer to the current demands for energy and cost efficiency. IMS Gear has investigated lubricated planetary gears in the low cost segment, specifically for the modular possibilities to improve efficiency. Learn how selectively optimize the gear unit overall efficiency while maintaining application specific properties of the drive.



Joe Sitta, President • IMS Gear Planetary Gears, Inc.

2:45 Networking Break

3:15
Sixth Generation IGBT Modules with Innovative Packaging

Since the introduction of the IGBT module, improvements in power loss have been achieved by applying new processing technologies. At the same time, new module packages have been developed to simplify motor drive designs and reduce costs. Discover the performance and advantages of the latest 6th generation IGBT and free wheel diode chips along with new optimized module packages.

Eric R. Motto, Principal Engineer • Powerex, Inc.

3:50
FPGA Technology as a Platform for Innovation Integration in Motor Drives Applications

FPGA technology is misleadingly perceived as 'just another chip technology' compared to other existing chip technologies. This presentation presents FPGA technology as 'the next step' in embedded system design for motor drives applications. It is presented in a creative and original way by making a parallel on how iPhones have changed the rules in the electronic consumer product industry by offering a common-hardware product differentiated by 3rd party software components and how FPGA can do the same in embedded systems for motor drives applications.



Marc Perron, President • Alizem

Efficiency Testing of Switched Reluctance and AC Permanent Magnet Motors

Switched Reluctance (SR) and Permanent Magnet (PM) drives have efficiency advantages compared to variable speed or variable frequency drives. SR and PM torque density can easily exceed that of AC motors. However, there are trade-offs because efficiency falls off faster at light loads for PM motors than for SR motors. This presentation will provide insight of the project to test the energy performance over the entire speed and torque range of these emerging technologies that have recently become commercially available. It is believed that the results of the proposed tests and this investigation will bring a solid information base that can influence actions in promoting high efficiency and best choices in customer technologies.

*Pierre Angers, Researcher - End Use Technologies
 Hydro-Québec Research Institute*

4:30
Meeting Reliability and Lifetime Goals in IGBT Based Converter Designs

The lifetime limitations of IGBT based modules due to temperature cycling effects are well documented. This presentation will discuss three aspects of the design process to help engineers meet the ever increasing demands placed on power converter design in terms of temperature cycling and lifetime goals. This presentation will discuss latest state-of-the-art technology used in module construction to maximize module design life and examples from real life applications showing how to estimate module lifetime from machine work and mission cycles.



*David Levett, Power Electronics Design and Applications Engineer • Infineon Technologies Industrial Power, Inc.
 Piotr Luniewski • Infineon Technologies Industrial Power, Inc.*

5:00 Cocktail Reception

Wednesday, March 2nd

7:30 Registration Opens / Continental Breakfast

8:00 Keynote Presentation
Motor and Drive Industry Insights

*Michael Rashe, Global Program Manager for
 Power Transmissions • Frost & Sullivan*

9:10 Featured Presentation
**What in the World of Motors is Going On: A
 Review of World-Wide Activity of Motor
 Efficiency Policies, Programs, Legislation and
 New Technologies**

This presentation will review world-wide motor policies, programs and new technologies relative to efficiencies, testing standardization and implications for the US. Recently enacted US congressional legislation will be discussed, pending efforts to regulate new motor categories and surrounding legal challenges. Included will be a discussion of the implications of the following technologies: switched reluctance motors, permanent magnet motors, VSD's, the copper rotor motor, material commodities availability and their impact and role in the future.



*Richard E. deFay, Project Manager, Sustainable
 Electric Energy • Copper Development Association, Inc.*

10:00 Exhibit Hall Opens / Networking Break

10:30
**Electrified Vehicle Electric Motor Development
 Combining Test and Simulation**

The development of electric motors for electrified vehicles requires evaluation of the fit for purpose. This is usually verified with testing that includes simulation. This simulation can be performed in a laboratory with a dynamometer providing the mechanical load replicating the driver, road, vehicle, tires and axles on the output of the motor. The requirements of test and simulation platform will be presented as well as some example systems. These examples include electric motor only, with inverters and as part of a transmission assembly.



*Michael Ryder • University of Michigan
 Ray Skinner • A&D Technology*

**A Robust Intelligent Power Module Family for Low
 Cost Drive Applications**

Modern architecture demands invisible, silent and efficient systems for heating, ventilation, air conditioning and refrigeration (HVAC&R). This leads to very small drive systems for decentralized air and liquid moving installations, such as fans, blowers, and pumps. This results in high power density and can only be achieved by optimizing the heat transfer path and by reducing the absolute amount of heat, which is dissipated. This presentation discuss the constraints for such drive systems and proposes a solution for electronic design engineers to get out of their dilemma and to meet the requirements of the system.



*Wolfgang Frank • Infineon Technologies AG, Germany
 Peter Stipan • Infineon Technologies Industrial Power, USA*

11:10
**Technical Considerations for the Testing of
 Small Motors**

Small motors are more difficult to characterize than integral horsepower motors. One major reason for this difficulty is that the measured quantities in these machines are small. Other issues are related to the theory of operation and special features of small motors as compared to integral horsepower motors. Several test techniques and technical considerations are discussed in this presentation for testing single phase induction motors and electronically commutated motors below one horsepower.

*Emmanuel Agamloh, Motors and Drives Consultant
 Advanced Energy*

**Coordinated Circuit Protection Solutions for
 Power Supplies, Relays, Solenoids and Controllers**

Power supplies, relays, solenoids, controllers and motors used in automated equipment can benefit from a coordinated circuit protection approach that helps prevent damage caused by excessive currents during a fault or overload condition, as well as voltage spikes or exposure to steady-state overvoltage conditions. Coordinated protection can help improve equipment reliability, reduce component count and facilitate compliance with critical safety agency requirements.



*Matthew Williams, Global Applications Engineering Manager
 Tyco Electronics*

11:45 Networking Lunch



1:00

Magnetization and Measurement of PM Motors

Recent advancements in motor technology have seen an increase in the use of permanent magnets, as well as expanding complexity in the configuration and variety of magnet systems. Most motors use NdFeB magnets instead of Ferrite magnets. Rotors can be laminated or solid. These facts entail special requirements for the magnetizing equipment, which are pointed out as well as the significance of different measuring methods.



*Hartmut Pagel, International Sales Director
MAGSYS Magnet Systeme*

FPU – An Advantage Over Fixed Point for Three-Phase Motor Control

Traditional three-phase motor control algorithms use vector control formulation that involve complex transformations and control loops for the speed and position control. High speed micro controllers (MCU) and Digital Signal Processors (DSP) implement vector control using fixed point formulation because these devices do not have a hardware floating point unit (FPU). In this presentation, an FPU implementation of three-phase motor control algorithms using the floating point C programming is introduced. We will discuss several key computations using fixed point and floating point implementation and show how the FPU provides an advantage.

Yashvant Jani • Renesas Electronics America, Inc.

1:40

Magnetic Bearing Technology for Electric Motors and Other Rotating Machinery – Ready For Prime Time

Magnetic bearings offer myriad operational advantages and efficiency improvement over oil lubricated bearings. In use for the past thirty years, but for several reasons, they have been limited to niche applications that required their unique capabilities. Recent advances in technology have made these bearings more practical for broad range of applications. They have become smaller and simpler, while costs have been reduced. In addition to a basic explanation of how these bearings work, this presentation will review actual operating history and performance, while taking a fresh look at the economics.

John Rama, P.E., Vice President – Sales • Synchrony, Inc.

2:15 **Conclusion of Conference**

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Registration Information & Co-Located Event



Full Two Day Pass - Provides access to both days of the conference. Includes all networking and expo activities and reception.

Register after 1/20: \$995 \$895 \$795

Team Discount - If two people from your company attend the conference, \$100 will be deducted from each attendee's registration fee. If three or more people from your company will be attending the conference, \$200 will be deducted from each attendee's registration fee.

Single Day Pass - Provides access to either one of the individual days of the conference, including networking and expo activities.

Register After 1/20: \$595

Federal Pass - Discounted rate for Federal, State, County and local entities, including military.

Register After 1/20: \$595

Expo Only Pass - Provides access to the exhibit area only. Exhibit Only Pass does NOT include conference CD-ROM, admittance to conference sessions or food/beverage.

Expo Only Pass: \$50

Pre Conference Workshops - See page 3 for pricing information.

Magnetics 2010 Conference Upgrade - Provides access to both days of the conference and all conference proceedings.

Magnetics 2010 Conference Upgrade: \$300

Ways to Register

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Motor, Drive & Automation Systems 2011 will be co-located with the MAGNETICS 2011 conference. MAGNETICS 2011 is focused on the latest economic developments and technical advancements in magnetics markets and technologies bringing together worldwide magnetics experts.

Attendees will have access to the combined exhibit hall and networking breaks, reception and luncheons. For a nominal "conference upgrade" fee of \$300, attendees will have access to both conference programs and proceedings.

More than 20 presentations at MAGNETICS 2011 including:

Potential Energy Savings Using Direct Drive Permanent Magnet Servo Motors • TruTech Speciality Motors

Efficient Machine Design through Multiple Configurations in Analysis • ElectroMagneticWorks, Inc.

Understanding China's Magnet Material Supply Channels: Past, Present and Future • Hangzhou Permanent Magnet Group (HPMG)

Semi-Hard Magnets: The Important Role of Materials with Intermediate Coercivity • Arnold Magnetic Technologies Corp.

'Rest of the World Rare Earth Supply Chains' Galloping Forward • Avalon Rare Metals, Inc.

Recent Improvements in the Simulation of Quench in Low and High Temperature Superconducting Magnets • Cobham Technical Services Vector Fields Software

The Global Permanent Magnet Industry: 2010-2020 • Walter T. Benecki LLC

Counting the Costs to Start Up and Manufacture Flexible Magnetic Sheeting in the US • ALL Magnetics, Inc.

Bit-Patterned Magnetic Arrays for Magnetic Data Storage Applications • University of Houston

Clean Energy Demand for Rare Earth Permanent Magnets • Rare Earth Industry and Technology Association (REITA)

Soft Magnetic Cobalt-Iron Alloys for High-Performance Motors and Actuators • Vacuumschmelze GmbH und Co. KG

Developing a New Transformer • Buswell Energy LLC

The USMMA's "Manufacturing First" Proposal for Sintered NdFeB Magnets • USMMA