

BATTERY POWER

2012

September 18-19 • Denver, Colorado



500 Attendees | **50+ Exhibitors** | **35 Sessions**

Register by July 26th for a Discounted Rate

Join us in Denver for the 10th annual Battery Power conference,
the best opportunity to see the latest technologies
impacting power performance.

www.BatteryPowerOnline.com

Battery Power 2012, an international conference highlighting the latest developments and technologies in the battery industry, will feature more than 30 presentations on portable, stationary and EV battery technology, as well as battery manufacturing, materials and research & development. Topics will include emerging technologies, power management, wireless power, charging and testing systems, as well as the latest market trends affecting the industry.

The conference is designed for OEM design engineers, system engineers, technical and management professionals involved in battery powered products and systems, battery manufacturing, battery technology research and development and power management technology.

Battery Power 2012 will provide you with the most up-to-date developments and technologies in the battery and power management market. If you are involved in the battery industry or if your products and systems run on batteries, this is a must attend event.

- Discover How New Technology is Impacting Power Management
- Attend Exceptional Pre-Conference Activities
- See the Latest Products Technologies Unveiled
- Learn to Optimize Your System Performance and Dependability
- Assure Compliance with Latest Safety Requirements and Standards
- Discuss Your Specific System Needs with Technology Experts
- Improve System Longevity and Power Delivery
- Maximize Return on Battery Technology System Investments
- Find the Latest Market, Pricing and Manufacturing Trends Worldwide

Hotel Information

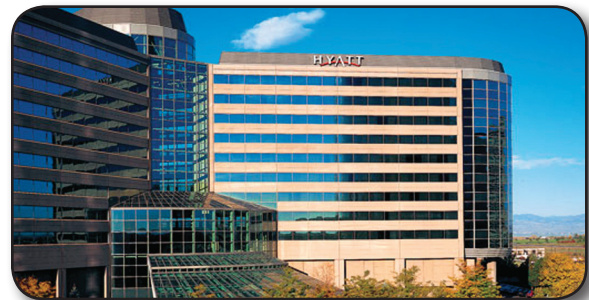
Battery Power 2012 will be held at the Hyatt Denver Tech Center. Register by August 24th, 2012 for a discounted room rate of \$149.00.



Photo Courtesy of VISIT DENVER

Who will be at Battery Power 2012:

- OEM design engineers of portable electronic products and battery-powered systems
- Developers and integrators of rechargeable battery products and systems
- System engineers of standby, backup and uninterruptible power systems
- System integrators, vendors, distributors
- Manufacturers of batteries and battery packs
- IC and chipset providers
- Manufacturers of charging, conditioning, monitoring and testing equipment
- System engineers of electric vehicles
- Product managers seeking new applications, and partnering opportunities
- Charging and testing system component providers
- Specialized energy materials suppliers
- Battery component providers



Hyatt Regency Denver Tech Center
7800 East Tufts Ave., Denver, CO 80237
Phone: 1-888-421-1442

Monday, September 17th Pre Conference Activities

Battery Power Applications: Safety, Charging, Fuel Gauging, Authentication and Cell Balancing

This workshop addresses the issues surrounding battery power applications for safely and efficiently charging the battery, smartly monitoring the battery operations, accurately estimating battery remaining capacity, cell balancing from handheld, laptop, power tools, e-Bikes and electric vehicles to medical applications.

Presented by: Jinrong Qian, Texas Instruments

Time: 8:00 AM to 12:00 PM

Registration: Before August 17th: \$99; after August 17th: \$149

Li-Ion Battery Design Tutorial

This full day workshop surveys all aspects of Li-Ion battery design ranging from materials and processes, to cells to packs. A thorough overview of the issues involved in life estimation, thermal behavior, and abuse tolerance is provided. How to design Li-Ion cells is discussed in detail with an emphasis on comparing different chemistries. The Battery Design Studio software is used to illustrate design techniques for cells and packs.

Presented by: Robert Spotnitz, Battery Design LLC

Time: 9:00 AM to 5:00 PM

Registration: Before August 17th: \$395; after August 17th: \$495

Shipping Lithium Batteries by Air and Ground

This workshop is for individuals who are involved in shipping small and medium lithium batteries alone, packed with or contained in equipment, using highway or air transportation. This includes both Li-Ion and lithium metal batteries. This course will be a certification course covering the use of the IATA (air) and 49CFR (ground) regulations as required by US DOT law.

Presented by: DGI Training, Inc.

Time: 9:00 AM to 4:00 PM

Registration: Before August 17th: \$275; after August 17th: \$325

Using Thermal Analysis and Calorimetry in the Design and Testing of Li-Ion Batteries and Materials

This workshop will explain in detail different thermal analysis techniques and how they can be best applied to the material development and full cell testing both for performance and safety. Techniques covered in this workshop will include differential scanning calorimetry, thermogravimetric analysis, adiabatic calorimetry and isothermal calorimetry.

Presented by: Peter Ralbovsky, NETZSCH Instruments North America, LLC

Time: 1:00 PM to 5:00 PM

Registration: Before August 17th: \$100; after August 17th: \$175

Tour of the National Renewable Energy Laboratory

Attendees will be given a tour of NREL's Battery Thermal Management Lab at the Thermal Test Facility, the Battery Material Research Lab at the Solar Energy Research Facility and Science and Technology Facility, as well as a tour of the Vehicle Test Integration Facility.

Presented by: NREL

Time: 1:00 PM to 4:00 PM

Registration: Free to Battery Power 2012 Conference Attendees

Tuesday, September 18th

8:00 AM Keynote Presentation Market Potential for Large Format Li-Ion Batteries

The Li-Ion battery market continues to evolve as high power and high capacity cells increase penetration into large-format applications. Vying for market adoption, the Li-Ion chemistry competes heavily with established energy storage technologies, such as lead acid, in many of these applications. However, key performance characteristics have enabled Li-Ion to make in-roads into the market, resulting in growth opportunities. This presentation will focus on key market drivers, market size and key competitors dominating this market.



*Vishal Sapru, Industry Manager - Energy and Power Systems
Frost & Sullivan*

9:15 AM Emerging Grid Energy Storage Market Opportunities

Our electricity grid is the world largest supply chain without a warehouse. The fulfillment of peak demand instantaneously with power generation results in a system that is over-built and under-utilized, as seen by the less than 50 percent utilization of the most efficient power plant. Increased use of non-load following power generation like wind and solar, combined with the need to replace the aging grid infrastructure is creating an opportunity for energy storage. Numerous products and applications are being developed for energy storage on the electricity grid. We will discuss these market opportunities, including product requirement, value and policy.

*Dr. William Acker, Executive Director
NY Battery and Energy Storage Technology Consortium, Inc.*

10:00 AM Networking Break in the Exhibit Hall

10:45 AM Powering the Next Generation of Consumer Mobile Devices

The mobile technology industry constantly introduces devices boasting new features based on power-hungry components packaged in tighter enclosures, but battery chemistries are still wrought with degradation issues affecting battery life, durability and safety. Consumers demand thinner designs, but designers are limited by current batteries' sizes and poor thermal properties. This presentation will address emerging battery technology that can expand design possibilities for OEMs and offer increased durability and safety, allowing consumers to work and play efficiently.

Dan Friel, Director of Systems Engineering • Leyden Energy



Integrated Automation Considerations in Battery Manufacturing

When designing a new battery cell manufacturing plant there are many questions to ponder. How can I evaluate my supply capacity against current and future market demand? What do I need to do to increase safety while decreasing defects? Unfortunately, many manufacturing plants overlook a major factor that affects all of these questions: integrated automation systems. Whether you produce batteries, design battery manufacturing equipment, or oversee operations for your business, this presentation will give important business and technology factors to consider in battery cell manufacturing.



*James Jackson, Battery Business Developer, N.A.
Siemens Industry Automation Division*

Key Elements to Assure a Well-Developed Performance Verification and Compliance Plan for Battery Powered Devices

Throughout the development cycle of battery powered devices there are concerns about how the battery will perform with the host device. Battery powered products and batteries are subject to customer, international and regional regulatory requirements. Some of these can vary based on how and where the product is shipped or even which industry the product is used. Having a well-developed performance verification and compliance plan at the beginning of the development cycle can help to mitigate these issues.

Cindy Millsaps, CEO and President • Energy Assurance LLC

11:25 AM

Bio-Battery: A Novel Micropower Source for Portable Electronics

The need for a renewable micropower source is increasingly relevant for today's mobile and energy intensive applications. CFDRRC is designing, developing and demonstrating a Bio-Battery, which is an enzyme catalyzed power source generating energy from biofuels. The Bio-Battery can power applications for both military needs and civilian needs. Additionally applications are seen in biomedical devices, where power generation from physiological fluids could lead to improved implantable monitors and drug delivery systems. The technology's benefits include high energy density, safety, sustainability, renewable biocatalysts, logistically-favorable fuels, neutral pH, and room temperature operation. A mature prototype has been demonstrated.

*Sameer Singhal, Director, Biomedical & Energy Technologies
CFD Research Corp.*



An Application Centric, Targeted Approach to Li-Ion Battery Product Development

As military and consumer energy requirements escalate, effective material/performance matching is vital to meet market demands. Commercial Li-Ion batteries (LIB) are typically limited to a handful of anode/cathode material combinations that satisfy mass market needs. Where high power, high specific energy and/or wide temperature range are essential, these applications can benefit from a more targeted material system. Global research and development efforts for the past two decades have identified dozens of anode/cathode materials for LIB which must be utilized for an application centric targeted approach to product development. This presentation will highlight potential technologies/application combinations for a wide variety of military and consumer needs.

*Michael Krysiak, Research Scientist – Energy Storage
ADA Technologies, Inc.*

Battery Testset Design: Testset Design for Monitoring And Testing a Li-Ion Space Battery

Hear the approach to designing a test system to support the safe testing and functional verification of a space-level Li-Ion battery system. The test system is a multi-fault tolerant design that can monitor the battery system and notify personnel automatically in the event of an abnormal or undesired event through the use of multiple protocols to maintain safety in the event of part failures. Testing of the battery system and usage of the testset software is described in detail with consideration for safety and automation.

*Keith Newlander, Battery Engineer • Johns Hopkins Applied
Physics Laboratory (JHU/APL)*

12:00 PM

Lunch

1:30 PM

Battery Solutions for Medical Equipment

Medical devices such as ventilators and patient monitors that have traditionally been powered by heavy lead acid batteries or simple NiMH batteries are migrating to Li-Ion in order to benefit from the energy density and other features this technology provides. This presentation will outline the options available to medical device manufacturers in Li-Ion battery technologies. This session will also present innovations in charging technology relevant to the medical industry such as inductive/wireless charging and ensuring timely compliance with 3rd edition of IEC 6060-1.

Robin Tichy, Ph.D., Product Manager • Electrochem Solutions, Inc.



Calorimetry's Role in the Design of High Performance Li-Ion Batteries

Calorimetry plays a useful role throughout the development process. Thermal analysis along with calorimetry is used in the design and qualification of materials used in the construction of a cell. For both the small and very large cells and packs, isothermal calorimetry can provide information that can be used in thermal management, lifetime studies and cell performance. Understanding the strengths and weakness of the different techniques is key for correct application of these methods in the development and testing process.

*Peter Rabovsky, Calorimetry Sales and Application Support
NETZSCH Instruments North America, LLC*



Connecting Batteries in Parallel: Unexpected Effects And Solutions

In the days of lead acid we got away with connecting batteries in parallel without a second thought. However, doing so with today's large Li-Ion battery packs can have unforeseen and counter-intuitive consequences: extreme and potentially damaging inrush currents, scrambled SOC estimates and decreased reliability instead of redundancy. We'll look at the instant of initial contact between parallel batteries and at the surprising effect of a weak cell in one of many parallel strings. We'll explore the advantages of paralleling cells directly, a BMS that tracks SOC as hot-swap batteries are inserted and removed and safe ways to initially connect batteries in parallel.

Davide Andrea, Engineer • Elithion



2:10 PM

A New Very High-Energy, Low-Cost Li-Ion Battery

California Lithium Battery (CalBattery) is commercializing a high-energy long life-cycle large-format Li-Ion Battery (LIB) that will reduce battery life-cycle costs by an estimated 60 percent, in doing so, will transform the way power is generated, stored and used. This near-term disruptive battery technology will have a significant impact on EV costs and the wide-scale use of intermittent renewables. CalBattery plans to have a pre-production LIB with a cathode specific capacity of more than 500 Wh/Kg and an anode specific capacity of more than 1,100 mAh/gm, safely providing more power and three times the cycle life of any commercial lithium battery made today ready for production in 2014.

Phillip Roberts, CEO and Founder • California Lithium Battery

Using Thermodynamic Foundations for Simulation And Prediction of Battery Aging Across Diverse and Arbitrary Usage Conditions

There is inadequate knowledge regarding long-term aging processes in batteries envisioned for electric drive vehicles (EDVs), particularly in cases of high variability in both usage patterns and environmental conditions. To address this need, this presentation covers theoretical and mathematical developments for evaluating the effects from an arbitrary aging condition that is allowed to vary over time. The capability is demonstrated with Li-Ion cells, wherein prognostic tools are used to assess long-term aging trends for cells at use in a number of major US cities, as well as to evaluate the benefit of thermal management scenarios to prolong cell life.

*Kevin L. Gering, Ph.D., Technical Program Manager
Idaho National Laboratory*



Using Supercapacitors as Power Buffers for Energy Harvesters and Wireless Sensors

Small wireless sensors are becoming ubiquitous. In many applications, these sensors are being powered by energy harvesters, which eliminates the need, expense and waste management to periodically replace primary batteries. However, the energy harvesting source often cannot deliver the power required to collect and transmit data. This presentation will explain how to use a supercapacitor as a power buffer and the supercapacitor properties a designer should be aware of. These include ESR and capacitance variation with temperature, aging characteristics, leakage current, charge current, self discharge and cell balancing.

*Pierre Mars, VP of Quality and Applications Engineering
CAP-XX Ltd.*



2:40 PM **Networking Break in the Exhibit Hall**

3:15 PM Energy Storage Systems for Electric Grid Applications

Due to infrastructure, policy and market dynamics, electric utilities and independent power producers are continuing to test and deploy energy storage systems. This presentation examines key policy developments, market perspectives and Li-Ion battery energy storage systems.

Kevin Fok, Sales Manager • LG Chem Power, Inc.

Cost Structure of Li-Ion Batteries for Electric Vehicles

Li-Ion batteries constitute a substantial portion of overall electric vehicle cost, and remain the major obstacle to low cost vehicles with sufficient electric range. Numerous players ranging from government laboratories to corporate strategists continue to dig deep into the Li-Ion battery, looking for innovations that can unlock lower costs to improve the value proposition for battery-powered vehicles. Here, we will look at the cost structure of Li-Ion batteries today, and the outlook for the future as major manufacturers continue to increase scale with an eye towards a growing electric vehicle market. Furthermore we'll examine where electrification fits in the automotive market of the future, and how economics and ecosystem affect the outlook for electric vehicles.

Kevin See, Ph.D., Analyst • Lux Research, Inc.



3:55 PM

Smart Energy Storage

Learn how to take energy storage beyond batteries and power electronics by providing software and control systems to solve complex energy management issues. Discover how to maximize value of energy storage through intelligent control strategies, manage a fleet of energy storage in a grid network, integrate energy storage in context of changing infrastructure and make use of increasing levels of information on the grid. With real world examples of our installations, big data analysis and algorithm development, we will show how energy storage will maximize the value of the electron.

John Jung, CEO • Greensmith



Charging Stations: Global Certification and Standards

For automakers, electric vehicle supply equipment (EVSE) manufacturers and residential and commercial buyers of EVSE, understanding certification requirements and standards for charging stations and battery chargers is key to developing industry growth. The success of the electric vehicle market is contingent upon a supportive infrastructure to address range anxiety, plus broad consumer investment and further progression. Learn the current state of the standards and certification requirements for EVSE. The presentation will include the North American Safety Listing and European CE Marking requirements for EVSE, including certification of DC Quick Charge battery chargers.

*Rich Byczek, Technical Lead, Electric Vehicle and Energy Storage
Intertek*



4:30 PM

Addressing Performance Gaps In Renewable Energy Storage: Trends in Li-Ion Battery Technology May Hold the Answers

Addressing performance gaps in renewable energy storage will remain a key challenge for the industry over the next several months. The primary focus of this effort will be rechargeable Li-Ion battery (LIB) technology, which comprises 50-plus percent of the \$24 billion-plus total energy storage market and is recognized as the fastest growing energy storage technology. We will examine innovative approaches currently in progress to apply advanced chemistry to LIB technology challenges, taking an integrated approach using multiple chemical combinations for improved coating systems that will enable greater whole-system optimization.

*Alan Nelson, Director, Research & Development - Energy Materials
Dow Chemical Company*

In Search of the Optimal Battery Chemistry for the Micro-Hybrid Vehicle Market

Learn the growing need for new advanced battery solutions in the burgeoning micro-hybrid and mild/full hybrid markets. We will start with a broad overview of the existing landscape of traditional chemistries, including lead-acid, nickel-metal hydride and Li-Ion. Discover the benefits, limitations and risks of these incumbent technologies, particularly lead-acid, for micro-hybrid vehicles. We will then take a closer look at some promising technologies on the horizon, such as nickel-zinc, and highlight how innovations in more efficient low cost battery technologies are helping to drive the market for cleaner transportation.

Dan Squiller, CEO • PowerGenix



5:00 PM

Cocktail Reception

Wednesday, September 19th

8:15 AM **Keynote Presentation** **MIPI Wireless Power Panel Discussion**

Members of MIPI will discuss standards, regulations, product integration and what's ahead in wireless power technology.

Speakers to be Announced

9:25 AM **Operational and Regulatory Requirements for Wireless Charging Systems**

New advances allow for the use of wireless charging systems replacing existing corded charging technology. As these products come to the marketplace, regulatory requirements must be addressed prior to placing these products on the marketplace. The Wireless Power consortium has established a series of standards that address the effective and safe use of these wireless charging systems, as well as the interoperability of devices to be used with other approved devices. The testing criteria will be outlined in detail in this presentation as well as a list of requirements and their criteria.

*Jack Black, Business Development Manager
DLS Electronic Systems, Inc.*

Challenges and Prospects for High-Voltage Li-Ion Cells

Hear an overview of 5 V-class Li-Ion cathode materials and their impact on electrode, electrolyte and cell design. These cathode materials offer several advantages to power systems including fewer cells needed to reach target voltages along with high specific energy and power, but these materials typically suffer from poor stability and cycle life. This presentation will discuss the issues that must be overcome with various high-voltage cathode materials, approaches used to address these challenges, and ADA's recent development of 5 V-class Li-Ion cells with exceptional cycle life and rate capability.

*Joshua Buettner-Garrett, Senior Research Scientist
ADA Technologies, Inc.*

10:00 AM **Networking Break in the Exhibit Hall**

10:30 AM **Communication Errors Caused by Ground Return Potentials**

Monitoring battery status is integral to battery control systems. SMBus protocol used as the communication channel has multiple drivers/receivers trying to control the bus; ideally all ICs have the same ground reference. Two common design practices that could cause communication errors or shutdown are sensing battery current with a resistor and locating battery charger far from battery. Both create ground potentials between battery ICs and system ICs, which if too large cause missed bits or substrate currents. Learn the results of an investigation into errors caused by these phenomena, and corrective actions to eliminate them.

Michael Barlage • Philips Healthcare

Cleaner Manganese to Improve the Safety and Efficiency of Li-Ion Batteries

Kemetco Research, Inc. is currently undergoing research for the production of high purity lithium manganese dioxide, which will be used in the application of superior Li-Ion battery material. Hear the research and development into improving current Li-Ion battery technology, the potential for future application and the process of developing high grade electrolytic manganese dioxide through a hydrometallurgical process that is more energy and cost efficient than conventional methods.

Norman Chow, P.Eng, President • Kemetco Research, Inc.

11:10 AM

Advanced Battery Charger System Considerations For Portable Devices

With continuous growth of portable devices such as tablets and ultrabooks, battery charging becomes more challenging in terms of safety, fast battery charging and battery operating system performance. Advanced battery charging topologies will be presented for achieving system operation while charging a deeply discharged battery. Various dynamic power path management techniques will be also discussed for achieving fastest load transient response to avoid system crash while keeping minimum size of an AC adapter. Fast charging technique and extending the battery run time become one of the most important design considerations. We will talk about how to reduce the battery charge time with impedance compensation and how to design a high efficiency battery charging and discharging system.

Jinrong Qian, Product Line Manager • Texas Instruments



Methods for Good Material Selection and Battery Lifetime Improvement

The battery industry has made significant advances in recent years to improve the performance and lifetime of today's batteries. In this talk, we will discuss analytical methods that allow good material selection during battery manufacturing. One important consideration is controlling the composition and impurity level from one material supplier to another, or even from batch to batch from the same supplier. Battery lifetime degradation is known to be caused by the continuous growth of an SEI film on the surface of electrode particles. Characterizing this layer allows a better understanding of electrochemical processes and results in improved battery design. Hear the technical challenges associated with analyzing this critical film.

*Sanjay Patel, Ph.D, Director of Analytical Services
Evans Analytical Group*



11:45 AM

"Smart Activation" Resettable Circuit Protection for High-Rate Discharge Li-Ion Battery Applications

In 2010, a new Metal Hybrid PPTC (MHP) technology was introduced to address the rapidly expanding market for high-rate-discharge Li-Ion battery applications such as power tools, e-bikes, light electric vehicles (LEVs) and standby power applications. The MHP arc-less contact technology results in circuit protection devices capable of providing 30 A+ hold currents at voltage ratings over 30 VDC. This technology offers designers a cost-effective, space-saving alternative to conventional battery pack circuit protection solutions. This presentation will describe how the latest MHP technology, introduced in 2012, builds upon the previous-generation MHP device family by adding "smart activation" functionality.

*Barry Brents, P.E., Field Application Engineering Manager
TE Circuit Protection*



Nanofiber/Microfiber Li-Ion Battery Separators for Higher Power and Faster Recharge

Current stretched porous film battery separators for Li-Ion batteries are thin, strong and provide a good barrier between electrodes, at the cost of having very high internal resistance and low ionic flow due to low porosity (generally <40 percent) and high "dead space" that come from starting with a solid material and trying to impart porosity. This work uses an alternative approach, where linear nanofibers and microfibers are combined in wet laid nonwoven processes to give separators that are strong and thin, but have higher porosity (60 percent to 70 percent) and so have much higher ionic flow. Batteries made with these separators have shown 25 percent increase in energy density, 300 percent higher power and four times the recharge rate of similar batteries made with incumbent film materials.

Dr. Brian Morin, CEO • Dreamweaver International, Inc.

12:15 PM Lunch

1:15 PM

Li-Ion Battery Failure Analysis: Processes, Do's and Don'ts

There have been consumer product failures involving Li-Ion batteries. As an industry, we know more technical details and reasoning about consumer product failures involving Li-Ion batteries every day. In order to reduce the risk associated with the failures of Li-Ion batteries and keep learning, it is necessary to follow a methodical approach for each failure. This presentation highlights a methodical failure analysis process which could enable the industry to learn more from each failure event. It also highlights typical Do's and Don'ts when it comes to failures involving Li-Ion batteries.

*Snehal Dalal, Ph. D., Managing Engineer, Electrical Practice
Exponent Failure Analysis Associates*

1:55 PM

Internal Short-Circuit Test Method Development for Li-Ion Batteries

Thermal runaway caused by internal short circuit (ISC) in Li-Ion cells during usage is a very challenging and critical safety topic that has been investigated by battery researchers for years. A test method that can induce an ISC in a simple manner indicative of field failures would be very valuable tool in improving safety standards for such energetic energy storage devices. This research will describe some of the main criteria that a simulated ISC test method would need to satisfy and then, using the 18650 type Li-Ion cells, compare and contrast a variety of ISC tests. Finally, we make a case for one of these tests, an Indentation-Induced ISC (IIISC) test as the most suitable test method for simulating ISC in Li-Ion cells by demonstrating its ability to differentiate the performance of 18650 cells with different safety features.



*Alvin Wu, Corporate Research
Underwriters Laboratories Taiwan Co., Ltd.*

2:30 PM

Required Testing for Safety of Li-Ion Batteries

Li-Ion battery manufacturers are working to reduce safety risks in transporting, storing and operating these batteries while continuing to bring them to market quickly and cost effectively. We will overview the conditions that can cause thermal runaway chain reactions leading to leaks, smoke, gas release, fire and explosion. We will discuss the new IEC 62133 standard, which went into effect May 1, 2012, that specifies requirements and tests for the safe operation, shipping and export of these batteries. We will also overview domestic US DOT regulatory requirements regarding the shipment of lithium and Li-Ion cells and batteries under part 49 of the Code of Federal Regulations, and UN/DOT under Section 38.3.

Dr. Vahid Ebadat, CEO • Chilworth North America

3:00 PM

Conclusion of Battery Power 2012

Supporting Organizations and Media Sponsors





Battery Power
Silver Sponsor



America



Exhibit and Sponsorship Opportunities

Interested in promoting your company's products and services to key technical contacts? Battery Power 2012 will provide a great opportunity to reach new customers. Booths are being filled on a first-come, first-serve basis. Contact Jeremy Fleming at 720-528-3770 ext. 121 or Jeremyf@infowebcom.com.

Advancements in Thermal Management, Mobile Antenna Systems and Remote Monitoring & Control will share a the combined exhibit hall and networking sessions with Battery Power.

For a \$300 conference upgrade, attendees will have access to all four conference sessions and proceedings.

ADVANCEMENTS IN THERMAL MANAGEMENT 2012

Advancements in Thermal Management 2012 is a symposium for engineers and product developers is a conference highlighting the latest advancements in thermal technology for product design, system development and process management.

This event will feature presentations on the latest advancements in thermal management and thermal technology for electronics packaging and cooling, temperature sensing and control, thermal materials, systems design and management for optimizing thermal properties.

Topics will include new thermal technology, commercial applications of recent research and development in thermal science, and the latest market trends in thermal materials, products and systems.

www.ThermalNews.com

MOBILE ANTENNA SYSTEMS 2012

OEM Solutions for New Mobility & Technology

Mobile Antenna Systems 2012 brings the industry together to evaluate new market opportunities, implement new technologies and discover future applications and technical developments.

This symposium will have four tracks to address the antenna market for mobile devices including Antenna Design, Integration & Manufacturing, 4G Developments &

Insights, Emerging & Growth Applications, and Supporting Technology & Integration. Each track is designed to cover the latest advancements in the applications, technology, materials, and economic development of antennas and antenna systems.

Mobile Antenna Systems 2012 will provide an opportunity to network with peers, professionals and potential business partners involved in technology solutions serving a variety of applications. If the performance of your product or service depends on an antenna, this conference is for you!

www.AntennasOnline.com

Remote 2012 Monitoring & Control

Remote Monitoring and Control 2012 will focus on the leading advancements for the monitoring and management of distributed equipment and facilities, remote assets, infrastructure, automated process & system controls and device networks. Large-scale users and industry experts will speak on SCADA, remote networking technology, se-

curity (cyber and physical), control, automation, onsite and back-up power, M2M, emerging wireless technology, telemetry and condition monitoring.

Remote 2012 will allow you to catch up on the latest technology, standards and protocols in the industry and learn how they affect your systems. You'll find out the best ways to adapt or upgrade existing remote monitoring and control, security and onsite power systems, as well as develop new remote communication networks.

www.RemoteExpo.com

Exhibitors

Alpha Energy
Av-DEC
CST of America, Inc.
Cumming Microwave
CXR Larus
Durex Industries
EM Software Systems (FEKO)

FLIR
Netted Automation
Remcom
Rogers Corp.
Semaphore
Sonnet Software

Full Conference Pass (two day pass)

Includes access to Battery Power sessions, combined exhibit hall for all four co-located events, networking breaks and the cocktail reception.

	(1 person)	(2 people)	(3 people)
Before July 26 th :	\$695	\$595	\$495
After July 26 th :	\$995	\$895	\$795

Online registration closes September 11th; onsite pricing begins.

	(1 person)	(2 people)	(3 people)
	\$1,295	\$1,195	\$1,095

Single Day Pass

Provides access to either one of the individual days.

Before July 26th: \$395 After July 26th: \$595

Online registration closes September 11th; onsite pricing begins: \$795

Federal Pass

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

Before July 26th: \$495 After July 26th: \$595

Expo Only Pass (One registration valid for all four co-located exhibits) : \$50

BATTERY POWER

Remote 2012

Monitoring & Control

MOBILE ANTENNA SYSTEMS 2012

Real Solutions for Real Mobility & Technology

ADVANCEMENTS IN THERMAL MANAGEMENT 2012

For an Extra \$300, Attend all Co-Located Conference Sessions

Two Day Pass Provides access to both days of all of the co-located conferences (Advancements in Thermal Management, Mobile Antenna Systems, Battery Power, and Remote Monitoring & Control), combined exhibit hall for all four co-located events, networking breaks and reception.

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Contact Us

Have a registration question? Please contact Julie Williams at Juliew@infowebcom.com 800-803-9488 x.117.



Photo Courtesy of Steve Cicalius and VISIT DENVER

