NIWeek
WORLDWIDE GRAPHICAL SYSTEM DESIGN
CONFERENCE

AUGUST 5–8, 2013

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Dear Colleague,

Welcome to Austin and the 19th annual NIWeek—National Instruments' global event that showcases best practices and tools for the world's top engineers and scientists.

For the next few days, you will join a community of more than 3,200 fellow researchers, engineers, innovators, and educators who are using NI LabVIEW system design software and NI modular hardware to measure and fix the world around us.

Learn about new technologies and increase your professional skills at the many opportunities this year's NIWeek provides. Choose from more than 250 technical presentations, interact with technology from NI and nearly 300 leading companies, participate in advanced training sessions, or take certification exams while networking with your graphical system design colleagues.

You can maximize your experience by following twitter.com/niglobal to stay updated during the conference and remain connected, inspired, and innovative in your work throughout the year. Visit ni.com/niweekcommunity after the event for images, presentation slides, and other resources.

This is the ultimate learning environment for the development of software-defined measurement and control systems, so please enjoy this one of a kind experience to its fullest.

We thank the sponsors, exhibitors, and you for being part of this world-class event.

Best regards,

James Truchard
President, CEO, and Cofounder
National Instruments

Keynote Presentations

NIWeek keynote presentations give attendees a first glimpse at new, cutting-edge innovations for engineers and scientists from National Instruments as well as an opportunity to learn about customers and real-world solutions using tools and technologies from NI that inspire future innovators. Start each morning of the conference by exploring new products through demonstrations and customer presentations from NI leadership and engineers, and learn how NI LabVIEW can help you launch your applications and your career.

Tuesday, August 6

Dr. James Truchard, President, CEO, and Cofounder, NI
Start your NIWeek experience with Dr. James Truchard, who has led an industry transformation over the last three decades to software-defined instrumentation. Hear his perspective on the future of system design for measuring, automating, and controlling the world around us.

Eric Starkloff, Vice President of Global Marketing, NI
Watch Eric Starkloff, along with NI engineers, customers, and partners, unveil the latest products and technologies for test, measurement, and control. Explore state-of-the-art adaptable system platforms that equip engineers and scientists with the tools to accelerate their productivity, innovation, and discovery.

All keynote presentations are held from 8:30 to 10:00 a.m. in Exhibition Hall 4.

Keynote Presentations

Wednesday, August 7

Mike Santori, Business and Technology Fellow, Product Marketing, NI
Join Mike Santori as he shows how engineers are using their graphical system design expertise to solve some of the most difficult issues that impact our society. See demonstrations of innovative solutions to challenges in areas such as next-generation energy, communications, transportation, and advanced research.

Jeff Kodosky, Cofounder and Business and Technology Fellow, NI
Take advantage of the exclusive opportunity to hear directly from Jeff Kodosky, the coinventor and "father" of LabVIEW. Learn about his compelling vision on how graphical programming scales to system design to abstract complexity at the right levels and create intuitive, elegant solutions.

Thursday, August 8

Ray Almgren, Vice President of Corporate and Platform Marketing, NI
The need to attract and retain new engineering students puts professional engineers and scientists using graphical system design in a unique position to inspire the innovators of tomorrow. Join Ray Almgren as he hosts engineers from LEGO®, NASA, and leading universities as well as students who are solving problems in the real world with the tools that carry engineers and scientists from youth to game-changing careers in industry.

Dr. William "Red" L. Whittaker, Fredkin Professor of Robotics, The Robotics Institute, Carnegie Mellon University
Red Whittaker has an extensive record of success developing robots for craft, labor, and hazardous duty. Examples include robots in environments such as minefields, work sites, and natural terrain. He developed the robots that cleaned up the Three Mile Island nuclear accident, and his ground vehicles have driven thousands of autonomous miles. He won DARPA's $2 million Urban Challenge and his Humvees finished second and third in DARPA's Grand Challenge desert race.

Leland D. Melvin, Associate Administrator for Education, NASA
Mr. Leland Melvin is responsible for the development and implementation of NASA's education programs that strengthen student involvement in science, technology, engineering, and mathematics, or STEM. He has served as a mission specialist operating the robotic arm on two space shuttle missions to the International Space Station: STS-122 in 2008 and STS-129 in 2009. Prior to his career at NASA, he was a professional football player.

Conference Information

On-Site Check-In Hours

Sunday, August 4	7:30 a.m.–5:00 p.m.
Monday, August 5	7:00 a.m.–7:00 p.m.
Tuesday, August 6	7:30 a.m.–7:00 p.m.
Wednesday, August 7	7:30 a.m.–6:00 p.m.
Thursday, August 8	7:30 a.m.–1:00 p.m.

Daily Continental Breakfast

7:30–9:00 a.m.	1st Floor Foyer

Daily Lunch

11:30 a.m.–1:00 p.m.	Exhibition Halls 2 and 3

Lunch is provided for full-conference attendees and Expo Plus Pass holders.

Conference name badges are required for admission.

Exhibition Hall Hours

Monday, August 5	5:30–7:00 p.m.
Tuesday, August 6	10:00 a.m.–7:00 p.m.
Wednesday, August 7	10:00 a.m.–6:00 p.m.
Thursday, August 8	10:00 a.m.–1:00 p.m.

NI Campus Tour

Thursday, August 8	10:00 a.m.–12:30 p.m.

Visit National Instruments headquarters to tour the manufacturing facilities and view the results of more than three decades of innovation. Discover how NI has integrated its campus into a native Texas landscape that promotes the NI culture. Also learn how NI reduces its environmental impact and creates a better world for employees, customers, and fellow global citizens.
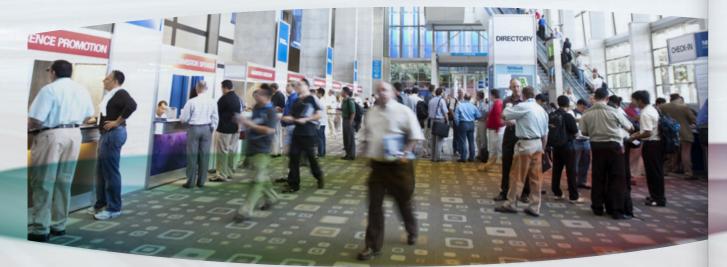
Shuttle runs from the Austin Convention Center to National Instruments starting at 10:00 a.m., departing from the registration area.

NIWeek Online and Mobile Application

Use our online and mobile application tool to create a personal schedule, review session abstracts and speakers, and learn about the exhibitors.

3 Ways to Access the NIWeek App
- *Use iOS device to search the App Store for NIWeek 2013*
- *Use Android device to search Google Play Apps for NIWeek 2013*
- *Use smartphone, tablet, or PC browser to access the web version at https://niweek2013.activeevents.com/attendee/mobile/home.jsp*

Social Media at NIWeek

Join the Community

Whether you're looking for session presentations after NIWeek, code and videos from key demos, conference updates, or networking opportunities, the NIWeek online community has it all. Bookmark ni.com/niweekcommunity and see for yourself.

Joining the NI Community has perks beyond NIWeek, too. Visit ni.com/community to connect with thousands of technical experts all over the world:

- *Share and vote on LabVIEW feature ideas*
- *Download example code to get your project up and running*
- *Join a user group to collaborate with other engineers who share your interests*
- *Participate in existing technical discussions or start one of your own*

Stay Social

Follow @NIGlobal—twitter.com/niglobal
Get real-time updates and valuable conference information from NI staff. Also remember to search #niweek to see what your colleagues are saying.

"Like" National Instruments on Facebook—facebook.com/NationalInstruments
Want to be friends? Stay up to date on conference news, connect with other NIWeek attendees, and be the first to hear company announcements by "liking" National Instruments on Facebook. You can also connect with fellow developers on our LabVIEW page.

youtube.com/nationalinstruments
View videos contributed by NI staff and other NIWeek attendees of cool product demonstrations from the NIWeek exhibition as well as interviews with NI leadership and industry experts.

linkedin.com/company/national-instruments
Making a lot of new contacts at NIWeek? Build your network of connections on LinkedIn and exchange information, ideas, and professional opportunities. Follow the National Instruments company page on LinkedIn to subscribe to conference updates and virtually connect with the NI community.

Networking and Evening Activities

NIWeek Kickoff Happy Hour

Monday, August 5 | 5:30–7:00 p.m. | Exhibition Hall

Kick off your NIWeek experience with an evening of drinks and music while networking with NI sales engineers, National Instruments Alliance Partners, the NI R&D team, LabVIEW Champions, exhibitors, and other NIWeek attendees.

Texas Day at NIWeek

Tuesday, August 6 | 8:00 a.m.–7:00 p.m. | Austin Convention Center

Luncheon | 11:30 a.m.–1:00 p.m. | Ballroom A

Texas Day gives engineering professionals around the state the opportunity to network with more than 3,200 engineers and scientists. Learn from today's leading innovators through a variety of interactive technical sessions, panel discussions, and hands-on and case study presentations for beginners and advanced developers. Join fellow Texans at a special keynote presentation and luncheon featuring science and engineering leaders. Meet your local NI field engineers and NI Alliance Partners, and discover how you can use NI products to advance your application and retain your competitive advantage.

NI Community Block Diagram Party

Tuesday, August 6 | 5:00–7:00 p.m. | Exhibition Hall

Enjoy food, drinks, and music as you meet fellow conference attendees from around the world. Watch the Challenge the Champions contest in the Technology Theater, attend the knighting ceremony of the new Knights of NI, or make history and join the world's largest user group gathering.

Sponsored by Design World

Annual NIWeek Conference Party

Wednesday, August 7 | 6:30–10:30 p.m. | Brazos Hall, 204 E 4th Street

Don't miss this opportunity to enjoy good food, cold drinks, and live music! Dance the night away to live music or kick back, take in the night air, and network with your peers at this popular conference event. *Within walking distance of the convention center.*

Sponsored by Intel

Special Events

In addition to a variety of technical sessions, NIWeek gives you several opportunities to meet industry and academic leaders, learn about engineers in the NI Community, and enhance your product knowledge and expertise during the following special events:

Academic Forum   10

Experience NIWeek with fellow educators and students to learn more about what's new in NI hardware and software for academia.

Graphical System Design Achievement Awards   16

Read about the most innovative user applications based on NI software and hardware that are being recognized during NIWeek 2013.

Build Your Own Embedded System Workshop   18

Discover how to use the LabVIEW Real-Time and LabVIEW FPGA modules to build a fully configured and programmed RIO-based embedded system.

The Future of System Design Panel   18

Learn about the latest system design technologies and research including processors and FPGA convergence, high-level synthesis tools and flows, and approaches for increasing design productivity.

Innovations in STEM Education   18

Inspire student interest in science, technology, engineering, and mathematics (STEM) careers through the use of robotics education, research, and innovations.

Training and Certification   19

Gain in-depth product knowledge, learn best practices for developing applications, and validate your skills.

Academic Forum

The Academic Forum provides a platform for academic professionals to share best practices in engineering education methods, discuss the future of engineering, and network with colleagues. View presentations from experts in engineering application areas, and learn how they integrate NI solutions to reinforce concepts and bring learning objectives to life.

Keynote

Do Engineering: Unleashing the Next Generation of System Designers

Monday, August 5 │ 11:00 a.m.–1:00 p.m. │ Ballroom A
Dave Wilson, NI

The engineers of tomorrow will need to design increasingly complex integrated systems to meet the demands of a rapidly changing technological landscape. To do so, the engineering students of today require hands-on education to understand the necessary theory underpinning system components. They also require experience synthesizing these components into an operational system. In this keynote, NI unveils how students can equip themselves with the proper tools to "do engineering" like never before and graduate as an unmatched generation of system designers.

Technical Sessions

Introduction to Software Defined Radio With NI USRP and NI LabVIEW

Monday, August 5 │ 8:30–10:00 a.m. │ Room 9A
Monday, August 5 │ 10:00–11:30 a.m. │ Room 9A
Anthony Fuller, NI

Discover how you can use LabVIEW system design software to easily design, prototype, and deploy a wireless communications system with the NI USRP™ software defined radio (SDR) platform. Build a simple spectrum analyzer, demodulate over-the-air broadcast FM radio, and explore a wireless digital communication system using this flexible SDR platform that scales from education to research applications.

Academic Forum

LabVIEW and LEGO® MINDSTORMS® as an Intro to Engineering

Monday, August 5 │ 9:00–9:30 a.m. │ Ballroom B
Ethan Danahy, Tufts University

Hear how Tufts University School of Engineering staff reworked its first-year Introduction to Engineering courses so students can immediately engage in hands-on, project-based learning; negotiate group work; experience leadership training; and explore various engineering disciplines. For example, the new Simple Robotics course explores ideas from mechanical to structural and from electronics to computer science, all using NI LabVIEW and the LEGO MINDSTORMS robotic toolset. At this session, examine student coursework, the role of creativity in engineering education, and generating diverse, innovative student solutions for assignments.

LabVIEW Student Design Competition Finalists

Monday, August 5 │ 9:00–10:00 a.m. │ Ballroom C
Sam Strickling, NI

Review the LabVIEW Student Design Competition finalists and discover how teams used LabVIEW and the graphical system design approach to meet engineering challenges.

Engaging With K–12 Teachers and Students: STEM Outreach That Works

Monday, August 5 │ 9:30–10:00 a.m. │ Ballroom B
Carli Sichler, University of Virginia; **Gordon Williams**, Oak Ridge High School; **Mike Yakubovsky**, Coppell High; and **Ray Hsu**, NI

University achievement, industry success, and the future of global innovation all begin with highly capable students. Through industry partnerships and university outreach programs, high school teachers and students are doing amazing things in science, technology, engineering, and math (STEM). See their innovations, learn what works, and get help growing your own program.

LEGO MINDSTORMS Week for Mechatronics Freshmen

Monday, August 5 │ 10:30–11:00 a.m. │ Ballroom B
Michael Beitelschmidt, Dresden University of Technology

Since 2010, the five-year diploma program in mechatronics engineering at Dresden University of Technology has required students, for one week of the first semester, to use LabVIEW and the LEGO MINDSTORMS system to build and program robots. In doing so, the students complete tasks covering different aspects of mechatronics engineering such as building vehicles and reliable structures, implementing advanced data-processing algorithms, and establishing smooth motion control of the robot. At this session, explore the development of and experiences with this innovative teaching concept.

Microwave Education and Research Through NI and AWR Integrated Solutions

Monday, August 5 │ 10:30–11:00 a.m. │ Ballroom C
Changzhi Li, Texas Tech University

With NI and AWR integrated solutions, including the AWR Design Environment, the Visual System Simulator, PXI, and LabVIEW, microwave education and research have significantly advanced. At this session, learn how Texas Tech research teams used NI and AWR tools to develop a real-time tumor-tracking system for clinical study in lung cancer radiotherapy and wireless sensing systems for structural health monitoring. These applications cover a frequency range from hundreds of megahertz to 24 GHz.

Academic Forum

GNSS Receiver and Radio Frequency Signal Landscape Simulator

Monday, August 5 | 11:00–11:30 a.m. | Ballroom B
Zak Kassas, University of Texas at Austin

Global Navigation Satellite System (GNSS) software-defined receivers (SDRs) offer many advantages over their hardware-based counterparts such as flexibility and upgradability. A typical GNSS receiver is readily expressible as a block diagram, making LabVIEW a natural choice for realizing GNSS SDRs. At this session, discuss how to use LabVIEW to build a state-of-the-art GNSS SDR and design a radio frequency signal landscape simulator for teaching and research.

Cross Methods and Technologies in Engineering Education

Monday, August 5 | 11:00–11:30 a.m. | Ballroom C
Doru Ursutiu, Transilvania University of Brasov–Romania

Discover how the Center for Valorization and Transfer of Competencies at the Transilvania University of Brasov is using the NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) and NI myDAQ platforms for both local and remote education. Examine how graphical programming and these platforms have been used for hands-on engineering education and learn about the benefits of such an approach.

Power Electronics Laboratory Pedagogy Featuring CompactRIO and LabVIEW

Monday, August 5 | 1:30–2:00 p.m. | Ballroom C
Robert Balog, Texas A&M

Power electronics laboratory-based education is challenging because students need significant background knowledge before building a working power converter from scratch. Texas A&M is expanding the pedagogy capability of existing "blue box" hardware to teach students how to perform computer-controlled parameter sweeps. This helps them experimentally quantify the effect of switching frequency and component selection on the average value and ripple performance of power electronic circuits using CompactRIO and LabVIEW.

Under the Hood of NI Products for Final Year Design

Monday, August 5 | 1:30–2:00 p.m. | Ballroom B
Monday, August 5 | 2:00–2:30 p.m. | Ballroom B
Margaret Barrett, NI

National Instruments provides revolutionary products designed specifically for students. Explore the NI final year design offering and how students are empowered to do engineering in one semester like never before.

Experiential Learning in Measurement and Automation

Monday, August 5 | 2:00–2:30 p.m. | Ballroom C
John Dyer, University of Oklahoma

Learn how the University of Oklahoma Measurement and Automation Laboratory provides students with an experiential learning environment using NI hardware and LabVIEW to study the mathematical theory of signals and systems. It is designed with a variety of centrally located sensors and conditioned signal sources distributed to each station, so all stations have a common signal or system. Follow-on graduate instrumentation courses using NI products are being developed for applied biomedical signal acquisition and analysis, RF analysis, and renewable energy control.

Equipping Students to Do Real Engineering Projects in One Semester

Monday, August 5 | 2:30–3:00 p.m. | Ballroom B
Dan Dickrell, University of Florida

Discover how NI tools are revolutionizing projects students can complete as undergraduates. Using NI hardware and software, students achieve their ideas in one semester and complete projects that previously went unfinished using tools from alternate vendors. Explore how you can combine art with engineering to create more engaging and creative projects.

Lessons From EE40: Multimedia and Flipping the Classroom

Monday, August 5 | 2:30–3:00 p.m. | Ballroom C
Michel Maharbiz, University of California, Berkeley

Examine the impact of the teaching approach to EE40, the introductory circuits course at the University of California, Berkeley. For four semesters, this course has included videos, a demanding lab, and a final project. Discuss the next steps being taken to continue to attract students to the study of circuits and hardware designwill also be discussed.

Academic Forum

How the University of New Mexico Innovation Plaza Is Bridging the Gap

Monday, August 5 | 3:30–4:00 p.m. | Ballroom B
Ramiro Jordan, University of New Mexico

The University of New Mexico Innovation Plaza helps bridge the gap between math, physics, chemistry, and engineering at an early stage by linking theory to real-world experience and increasing retention, engagement, and creativity. Students can actively interact and collaborate with industry and research institutions to ultimately produce world-class, interdisciplinary, and functioning projects for their Senior Design course. At this session, hear about an Innovation Plaza design team that used NI and Quanser tools to successfully simulate hardware-in-the-loop flight control.

Triangulating on the Truth to Develop Engineering Student Problem-Solving Skills

Monday, August 5 | 3:30–4:00 p.m. | Ballroom C
Ed Doering, Rose-Hulman Institute of Technology

Explore three NI myDAQ-based multimedia-rich supplements created for three electrical engineering courses: Circuits, Microelectronics, and Signals and Systems. These supplements guide students through a three-pronged solution of each problem using analysis, simulation, and measurement. Solving the same problem three ways empowers students to triangulate on the correct result by mutual reinforcement while improving their confidence in their own analytical and laboratory skills.

Moving From Classroom to Lab to Career With Software Defined Radio

Monday, August 5 | 4:00–4:30 p.m. | Ballroom C
George Papen, University of California, San Diego

In the "real world," communication systems are designed by cross-functional teams of computer scientists, electrical engineers, and computer engineers. Learn how the University of California, San Diego, is moving a diverse set of students up the learning curve from a cold start to designing orthogonal frequency division multiplexing radios and providing the hands-on experiences they need to excel in their technical careers.

Portable Control Laboratories Using NI myDAQ

Monday, August 5 | 4:00–4:30 p.m. | Ballroom B
David Trumper, MIT

Examine portable control experiments developed at MIT for the course Analysis and Design of Feedback Control Systems. Students can take the lab hardware home and complete experiments in their dorm rooms. The weekly lab session time is used for face-to-face discussions during which students demonstrate their working hardware to the staff. An NI myDAQ device serves as the power supply, function generator, oscilloscope, dynamic signal analyzer, and real-time controller.

Awards and Recognition Reception

Monday, August 5 | 5:00–6:00 p.m. | Ballroom A

The National Instruments Academic team would like to thank you for your attendance and participation in the NIWeek Academic Forum. Your valuable input as recognized leaders in science and engineering education guides our academic product development. You seek out and imagine new ways to use NI technologies to empower students, both inside and outside the classroom. You lead efforts to make curriculum advancements that advocate the use of NI technologies. You inspire. You create. You innovate. You motivate others to do the same. Join us at this reception so we can show our appreciation.

Academic Forum

Student Modeling and Implementation of a CompactRIO ECU for a Motorcycle Engine
Monday, August 5 | 4:30–5:00 p.m. | Ballroom B
Benedikt von Imhoff and **Thomas Zimmer**, Institute of Internal Combustion Engines at TU Munich

For an internship, students detached a BMW motorcycle boxer engine from its engine control unit (ECU) and controlled it with NI CompactRIO and LabVIEW. They learned how to work on real-time applications, especially with FPGA; design detections of crank angle position on FPGA; program control functions on real-time hardware; and test an ECU against an engine model. At this session, learn how students moved from a hardware-in-the-loop environment to the test bench and controlled the engine with an ECU based on CompactRIO.

Using Project-Based Learning to Attract and Retain Students in the RF and Communications Field
Monday, August 5 | 4:30–5:00 p.m. | Ballroom C
Xiaoli Ma, School of Electrical and Computer Engineering, Georgia Institute of Technology

Digital signal processing and wireless communications have changed rapidly in recent years. Yet, without appropriate introductions and education, students are attracted to other, less challenging areas. See how Georgia Tech is preparing undergrad and graduate students for high-tech DSP and communication careers using hands-on projects with NI USRP and LabVIEW such as using radio waves to see through walls and building a RadioBot to learn spectrum dynamically.

Academic Forum Poster Session
See how engineering students and professors from around the world are incorporating LabVIEW and graphical system design into a variety of design projects at this poster session. From inexpensive medical devices to complex underwater autonomous vehicles, university students and professors engineer a better world using LabVIEW. Check out applications at the poster session in the lobby throughout the day during breaks in the Academic Forum.

Academic Forum—UT Lab Tours

Tour some of the cutting-edge engineering labs at The University of Texas at Austin to see work in various application areas and discover how the facilities further academic research using LabVIEW and other NI technologies.

Department of Mechanical Engineering Rehabilitation and Neuromuscular (ReNeu) Robotics Lab
Directed by Dr. Ashish Deshpande, this lab focuses on the development of robotic devices, based on biomechanical analyses, to assist in rehabilitation, improve prostheses design, and provide fitness opportunities for the severely disabled. The study of the underlying mechanisms of human movement control through human subject experiments and mathematical modeling is another major research area in the lab. With their special interest in the study of hands, ReNeu Robotics Lab researchers are developing robotic hands for prosthetic and rehabilitation applications and are conducting human subject studies for an improved understanding of human hand biomechanics and control. They are using the LabVIEW FPGA Module, CompactRIO, and NI Single-Board RIO to develop multiaxis robotic hands.

Department of Aerospace Engineering and Engineering Mechanics Radionavigation Laboratory
Radionavigation Laboratory researchers examine novel ways to exploit and protect radionavigation systems such as GPS. The lab develops technologies that advance software-defined global navigation satellite system (GNSS) receivers, enable opportunistic navigation, ensure navigation security and integrity, and explain ionospheric phenomena. The research is broadly organized into the categories of radionavigation security, GNSS software receiver development, opportunistic navigation, radionavigation integrity, and ionospheric research. The multidisciplinary research group members (aerospace, electrical, and computer engineering) use LabVIEW and PXI in their applications, including analyzing the signal properties of GPS jammers.

Department of Electrical and Computer Engineering Wireless Networking and Communications Group
This laboratory explores a new idea in wireless communications research: full-duplex radios that can transmit and receive simultaneously using the same time and frequency domain. The benefits of using full-duplex radios include a near doubling of the throughput in point-to-point networks, new physical adaptation techniques, new medium access control (MAC) architectures, and new routing mechanisms for both centralized and decentralized network operation. Full-duplex operation is enabled by self-interference mitigation using a combination of antenna cancellation, analog RF cancellation, and digital self-interference cancellation. A real-time full-duplex radio system is demonstrated using LabVIEW software and PXI controllers.

Monday, August 5 | 8:30–11:15 a.m.
The University of Texas at Austin
Tour participants should meet in the registration area for transportation at 8:30 a.m.

Achievement Awards

The Graphical System Design Achievement Awards recognize the most innovative user applications based on NI software and hardware. This year, nearly 300 authors from 29 countries submitted technical papers that depict their greatest achievements in graphical system design. Visit the contest poster display, located on the first level, to learn about the finalists' applications for each of the nine application categories.

Winners of each category, as well as the recipients of several featured awards including the NI Community's Choice, Green Engineering, Humanitarian, Editor's Choice, Xilinx All Programmable Innovation, Intel Intelligent System Design, and the 2013 Application of the Year, will be announced at the invitation-only awards dinner on Tuesday, August 6.

Advanced Control Systems

Control of a Hydraulic Motion Compensated Gangway to Improve Access to Offshore Wind Turbines

Andrew Clegg, Industrial Systems and Control Ltd, UK

Developing a Data Acquisition and Control System for a Trisonic Wind Tunnel

Praveen Baburao and Temin Sam Dalton, Captronic Systems Private Limited, India

Advanced Research

Controlling a Particle Accelerator for Effective Ion Beam Cancer Therapy Using LabVIEW FPGA and NI FlexRIO

Dr. Johannes Gutleber, CERN, Switzerland

Developing a Control System for an Electron Beam Machine With LabVIEW and NI PXI

Gao Jie, Ralf Edinger, and Dmitri Sandler, PAVAC Industries Inc., Canada

Automated Test

Future Proofing a Hearing Aid Production Test at GN ReSound

Johnny Hansen, GN ReSound, Denmark

Optimization of Parametric Defect Localization on Integrated Circuits

Luc SAURY and Sébastien CANY, ST-ERICSSON and STMicroelectronics, France

Education

Developing a Renewable Energy Laboratory Using NI ELVIS, NI LabVIEW, and NI myDAQ

Petru Adrian Cotfas and Daniel T. Cotfas, Transilvania University of Brasov, Romania

Introducing Digital Data Transmission to Students With the NI Software Defined Radio Platform

Jan Dohl, Technical University, Dresden, Germany

Energy

Improving the Efficiency of Wind Turbines With an Intelligent Measurement and Control System

Niels Anker Olesen, Vestas Technology, and Bjarke Dahl-Madsen, CIM Industrial Systems A/S, Denmark

A Novel Distributed PV System Design

Zhao Rumin, Department of Systems and Naval Mechatronic Engineering, National Cheng Kung University, Taiwan

Life Sciences

Enhancing Endoscopic Surgery With an Improved Ultrasonically Activated Scalpel

Dr. Yoshinobu Murayama, Department of Electrical and Electronic Engineering, College of Engineering, Nihon University

Performing Fatigue Destructive Testing on Ankle-Foot Prostheses

Hung-Jen Lai, TEH LIN PROSTHETIC & ORTHOPAEDIC, Malaysia

RF and Communications

Qualcomm Atheros Improves WLAN Test Speed and Coverage Using the NI PXI Vector Signal Transceiver and NI LabVIEW

Doug Johnson, Qualcomm Atheros, USA

Averna Expands and Accelerates Cable Device Testing Using the NI Vector Signal Transceiver and LabVIEW FPGA

Andy Brown, Averna Technologies, USA/Canada

Structural and Physical Test and Monitoring

Valve Leakage Detection in Industrial Pumps

Pål Jacob Nessjøen and Age Kyllingstad, National Oilwell Varco Norway AS

Fiber-Optic Strain Gages Protect Restoration of Milan Cathedral

Dr. Alfredo Cigada, Politecnico di Milano, Italy

Transportation

Using LabVIEW and PXI for Deterministic Multiple Unit Vehicle Stability Control

Michael Arant and Damon Delorenzis, Clemson University, International Center for Automotive Research (ICAR), USA

Ford Deploys Fuel Cell Test System Using NI VeriStand and the *INERTIA* Add-On

Michael P.C. Cornwall, Todd VanGilder, and Darryn La Zar, Wineman Technology Inc.; and Todd VanCamp, Ford Motor Company

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Special Events

Maximize your NIWeek conference experience by attending the following special events. At the Build Your Own Embedded System hands-on workshop, learn how to prototype an embedded system based on LabVIEW and NI hardware. Hear industry experts on the future of system design in the Future of System Design Symposium and how NASA and NI are inspiring students in the areas of STEM.

Build Your Own Embedded System Workshop

Monday, August 5 | 9:00 a.m.–5:00 p.m. | Room 18B

This hands-on workshop focuses on extending your LabVIEW skills into FPGA-based design using NI reconfigurable I/O (RIO) hardware. Learn how to use the LabVIEW Real-Time and LabVIEW FPGA modules to configure, program, and deploy a RIO-based embedded system and take it home after the conference. There is an additional fee for this full-day workshop. *Sponsored by Cyth.*

The Future of System Design Panel: A View From the Top

Tuesday, August 6 | 4:45–5:45 p.m. | Room 15

Join an interactive discussion among leading executives and academic experts with unique and visionary perspectives into the state of the art for system design, the future of system design, the needs of system designers, and technologies to address these needs. A motivating application area is cyber-physical systems, an emerging categorization of systems that encompasses sensors and actuators, big data, high-performance computing, high-level synthesis, simulation, embedded technology and systems on a chip, verification and validation, formal methods, and more. Examples include smart grid, distributed control of scientific instruments, smart buildings, weather prediction, automotive traffic monitoring and control, and avionic control.

Innovations in STEM Education With Leland Melvin, NASA Associate Administrator for Education

Wednesday, August 7 | 3:30–4:30 p.m. | Room 3

This session by Leland Melvin, former NFL athlete and associate administrator for Education at NASA, focuses on the joint effort by NASA and National Instruments to inspire student interest in science, technology, engineering, and mathematics (STEM) careers through the use of robotics education, research, and innovations. This event brings together industry professionals, K–12 students, and teachers from around the United States for a candid discussion with Mr. Melvin.

Training and Certification

Training and Continuing Education

Gain in-depth product knowledge and learn best practices for developing applications by attending a two-day training course that begins two days prior to NIWeek. By taking each course, you can earn 1.4 continuing education units to maintain a professional status such as Professional Engineer. The following courses are offered as two-day modules from Sunday to Monday, August 4–5:

- *LabVIEW Real-Time 1*
- *LabVIEW Core 2*
- *LabVIEW Connectivity*
- *NI VeriStand Fundamentals (condensed)*
- *Managing Software Engineering in LabVIEW*
- *Object-Oriented Design and Programming in LabVIEW*

Certification Exams

Validate your skills or renew your LabVIEW, NI TestStand, or LabWindows™/CVI certification at NIWeek at discounted rates:

- *All NIWeek attendees: 35 percent off list price*
- *Alliance Partners: 50 percent off list price*

Certification Preparation

Not ready to obtain certifications yet? NI offers complementary certification preparation courses for the Certified LabVIEW Developer (CLD) and Certified LabVIEW Architect (CLA) exams prior to NIWeek on Monday, August 5:

- *Certified LabVIEW Developer Preparation Session*   8:00–10:00 a.m.
- *Office hours—bring your certification questions for our experts*   10:00–Noon
- *Certified LabVIEW Architect Preparation Session*   1:00–3:00 p.m.
- *Certified LabVIEW Embedded Systems Developer Preparation Session*   3:00–5:00 p.m.

Exam Schedule

	Room	August 5	August 6–August 8
Certified LabVIEW Associate Developer (CLAD) Certified TestStand Architect (CTA) Certified TestStand Developer (CTD) Certified LabVIEW Architect Recertification (CLA-R) Certified LabVIEW Developer Recertification (CLD-R) Certified LabVIEW Associate Developer Recertification Certified TestStand Developer Recertification Certified TestStand Architect Recertification	5C	1:30–2:30 p.m. 3:30–4:30 p.m.	10:30–11:30 a.m. 1:30–2:30 p.m. 3:30–4:30 p.m.
Certified LabVIEW Architect (CLA) Certified LabVIEW Developer (CLD) Certified LabWindows/CVI Developer (CCVID) Certified LabWindows/CVI Developer Recertification	5B		1:00–5:00 p.m.

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Summits

Aerospace and Defense

For decades, commercial off-the-shelf test platforms have evolved significantly to address complex system requirements while decreasing time to market and reducing total cost of ownership. Learn how to address the entire life cycle of aerospace and defense systems ranging from creating flexible, software-defined test systems to deploying real-time embedded systems for control, monitoring, and operation.

Technical Sessions

Vibration-Based Sensor Design to Detect Lubrication Levels

Tuesday, August 6 | 10:30–11:30 a.m. | Room 17A
Scott Pflumm, ARL Penn State

Lubrication loss causes many gear and bearing system failures, so finding the most effective and efficient method to detect it in a closed mechanical lubrication system is important. At this session, examine tests performed on two ground vehicle differentials to determine if a vibration sensor and an NI DAQ system could detect lubrication levels. The tests showed a correlation between the vibration and lubrication levels. Learn how you can determine the lubrication level of the differential by monitoring these vibrations.

Rapidly Emulating Obsolete Hardware With R Series Multifunction RIO Devices

Tuesday, August 6 | 1:00–2:00 p.m. | Room 17A
Kim Vogel, Tandel Systems Inc.

Upgrading obsolete hardware is a lucrative business for LabVIEW developers, but it is poorly documented. The more cost-effective approach is to treat the obsolete hardware as a "black box" and emulate its functionality with NI R Series multifunction reconfigurable I/O (RIO) devices and LabVIEW FPGA software. At this session, explore case studies for which complex, obsolete hardware was re-created with a single NI PXI-7811R module in just a few weeks.

System Synchronization Using IRIG Standards

Tuesday, August 6 | 2:15–3:15 p.m. | Room 17A
Owen Search, Bloomy Controls

In a high-throughput data-logging application involving multiple independent DAQ systems, synchronizing acquired data is challenging. Through an example application for an aerospace system integration lab, learn how to use an IRIG generation unit to produce a highly accurate time code that is transmitted and shared by multiple systems.

Signal Generation and Processing With the NI Vector Signal Transceiver

Tuesday, August 6 | 3:30–4:30 p.m. | Room 17A
Marc Pollina, M3 Systems

Explore the NI GNSS Simulation Toolkit featuring a combined GNSS receiver and GNSS signal generator based on the NI vector signal transceiver. Discover how to assess the key performances of both GNSS generation and reception systems and take advantage of the full control and repeatability required for advanced testing.

Rapidly Develop a Long-Range Hail and Warning System With LabVIEW and CompactRIO

Tuesday, August 6 | 4:45–5:45 p.m. | Room 17A
Andrew Barnard, Penn State University

Learn how to rapidly develop a smaller, lighter, and rugged prototype long-range hail and warning system while maintaining failsafe remote control over safety-critical components by combining the LabVIEW Real-Time and LabVIEW FPGA modules, CompactRIO, and NI startup consulting services. This system was developed for the DSLA-Lite system in less than two man-months.

Developing System and Subsystem Integration Test Rigs for Aerospace Applications

Wednesday, August 7 | 10:30–11:30 a.m. | Room 17A
Darryn La Zar, Wineman Technology Inc.

Discuss the challenges aerospace developers face when deploying new aerospace systems for commercial and military aircraft. Also learn how to develop the equipment you need to validate these systems in the lab before integrating them in the aircraft.

HPMAAC: High-Performance Test Rig for Aeronautics

Wednesday, August 7 | 1:00–2:00 p.m. | Room 17A
Pierre Roth and **Guy Sauner**, CLEMESSY

Explore the high-performance modular architecture of an acquisition and control (HPMAAC) command system, which tests aeronautic electrical systems.

NI Technology in the European Transonic Wind Tunnel Facility

Wednesday, August 7 | 2:15–3:15 p.m. | Room 17A
Gerd Schmitz, S.E.A. Datentechnik GmbH

Get an update on the European Transonic Wind Tunnel (ETW) facility including the model positioning and liquid nitrogen control system. The applied approach is based on a reusable, flexible software concept featuring NI PXI and the LabVIEW Real-Time Module. A major challenge of this legacy control system update is minimum risk and interference with ongoing ETW operations.

Advances in Software-Defined and Synthetic Instrumentation for RF and Microwave

Wednesday, August 7 | 3:30–4:30 p.m. | Room 17A
Robert Lowdermilk, RADX Technologies, Inc., and **David Carey**, Wilkes University

With the appropriate software and advances in analog-to-digital converters, high-speed data buses (PCI Express), and high-performance computing, modular test systems can be configured to create software-based tests or measurements and the user interface for most RF test requirements. At this session, review advances in synthetic and software-defined instrumentation (SI/SDI) with an emphasis on PXI-based SI/SDI architectures and the performance, size, cost, and software development associated with the implementation of various measurement modes for RF and microwave applications.

Automated Test and Calibration System for Energy-Mass Spectrometers

Wednesday, August 7 | 4:45–5:45 p.m. | Room 17A
Greg Koynash, IKI (SRI)

Examine the development of an automated test and calibration system for energy-mass spectrometers used to investigate the solar system during Russian space missions like Fobos, Luna-Glob, and Luna-Resurs. The system is built on LabVIEW, PXI, and NI FlexRIO and provides automated tests of assembled devices and separate tests of each subsystem—electronics, microchannel plate, electron optics, and so on. Learn how to use NI FlexRIO FPGA hardware for the real-time processing of measured signals.

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Energy Technology

The theme for the 2013 summit is "Deploying the smart grid—effective deployment techniques for smart grid embedded control and monitoring systems." This developer's forum covers a wide range of topics such as transmission and distribution control and monitoring systems, grid-tied power conversion and power flow control, renewable energy generation and storage, and energy asset monitoring. You don't want to miss this in-depth technical discussion of effective design and development techniques for cutting-edge smart grid technology deployment.

Keynotes

Transforming the Distribution Power Grid Using Distributed Control and Analytics

Tuesday, August 6 | 1:00–2:00 p.m. | Ballroom G
Bob Leigh, LocalGrid Technologies, and **Sushma Narisetty-Gupta**, Toronto Hydro-Electric System Limited

Discover how LocalGrid Technologies uses the new CompactRIO controller, based on heterogeneous FPGA technology, to build a microgrid network platform so power providers can cost-effectively deploy modular and standards-based microgrid solutions. LocalGrid's solution enables seamless, secure high-resolution analytics and control of distributed generation resources and grid assets to monitor feeder networks, dispatch generation, optimize distribution assets, or manage a microgrid network. LocalGrid software uses military-grade communications and a cross-platform embedded database to create a scalable, inherently redundant, and secure network platform.

[a] FPGA-Based Real-Time Simulation and PMU-Based Distributed Monitoring and Control

Tuesday, August 6 | 4:45–5:45 p.m. | Ballroom G
Mario Paolone, Swiss Federal Institute of Technology

Recent progress in developing appropriate mathematical constructs, solvers, and frameworks is addressing the unique challenges of high-fidelity, high-speed real-time simulation of grid-tied switched-mode power converters and power grids using hybrid FPGA and digital signal processing devices. Graphical FPGA programming tools have also enabled the development of advanced phasor measurement unit algorithms suitable for distribution control systems. At this session, examine advanced LabVIEW FPGA applications for creating an ultrahigh-speed real-time power grid and power system simulator and advanced phasor measurement units.

National Grid: Developing, Monitoring, and Understanding the UK's Transmission Network

Wednesday, August 7 | 10:30–11:30 a.m. | Ballroom G
Danson Michael Joseph and **Peter Haigh**, National Grid

Examine National Grid's system to measure, collate, and analyze power quality on the UK transmission network. It comprises 110 NI cRIO-9082 systems permanently installed at selected substations and 25 portable NI cRIO-9024 and cRIO-9113 systems that measure sites not covered by the permanent installations. The data is sent to a central server via Ethernet and mobile networks and presented with a web application. Learn how National Grid overcame the limitations of dedicated power quality monitors and can add functionality with CompactRIO.

Energy Technology

Technical Sessions

[a] A Flexible Control Architecture for Lawrence Berkeley National Labs

Tuesday, August 6 | 10:30–11:00 a.m. | Ballroom G
Cindy Regnier, Lawrence Berkeley National Labs, and **Cem Karahan**, Cal-Bay Systems

Explore the design and deployment of a flexible data acquisition and control architecture that commercial and government researchers can use to design and execute cutting-edge building technology experiments with access to custom low-level HVAC control and software support for external environmental building simulation packages.

Preventing Equipment Failure and Excessive Energy Use Through Alert Monitoring Based on CompactRIO

Tuesday, August 6 | 11:00–11:30 a.m. | Ballroom G
Aria Pakravan and **George A. Sutherland**, Richman Surrey

Learn how Richman Surrey used CompactRIO and LabVIEW to develop the RS Alert/Monitoring System. Little is known about electrical system efficiency and how it potentially costs businesses hundreds of thousands of dollars a year in energy overpayments, downtime, and untimely equipment failure. This proprietary alert monitoring system provides powerful electrical system analysis and predictive analytics to prevent energy waste and untimely equipment failure. Using trending, Richman Surrey offers solutions that reduce energy consumption and eliminate excessive utility payments.

Improving the Power Reliability of Mexico's Electric Grid

Tuesday, August 6 | 2:45–3:15 p.m. | Ballroom G
Alfredo Olachea Aguayo, CFE

CFE, Mexico's electric power utility, has begun a WAMS pilot project using applications based on LabVIEW to assemble synchrophasor, communications, and real-time application development, so power system operators can improve power system reliability and acquire and record better information on power system variables for offline analysis. Learn how this project has improved reliability and provided multiclient and reliable access to information for real-time applications such as frequency response evaluation, electromechanical oscillation detection, PES supervision, and IEEE c37.118 analysis.

How to Build an NI-Based Smart Grid Measurement Platform for WAMS

Tuesday, August 6 | 3:30–4:00 p.m. | Ballroom G
Dr. Daniel Kaminsky, ELCOM, a.s.

Discover how to build a wide area measurement system (WAMS) for smart grids using NI reconfigurable I/O (RIO) hardware and the LabVIEW graphical programming environment. Get an overview of the successful nationwide phasor measurement unit (PMU) projects deployed in Central Europe and hear about the new power quality monitoring measurement analyzers developed with NI platforms. Also learn from an experienced integrator of power quality analyzer and PMU systems how to create an advanced WAMS using NI RIO technology.

Sponsor

Energy Technology

Developing an HIL Simulation of Microgrids for Research and Education

Tuesday, August 6 | 4:00–4:30 p.m. | Ballroom G

Dr. Anton Petrochenkov, Perm National Research Polytechnic University, and **Ilya Stepanenko**, NI Russia

Learn how Perm National Research Polytechnic University in Russia developed a complete hardware-in-the-loop (HIL) simulation system of a microgrid managed by a distributed controller network. This system relies on the NI PXI platform, reconfigurable FPGA technology, and LabVIEW software. R Series FPGA-based I/O modules worked well for the low-level voltage/current measurements and simulation, while PXI and LabVIEW acted as a flexible and scalable platform for implementing complex hardware configurations combined with mathematical models such as SCADA and HMI.

Building a Transient Recorder System for the CERN Large Hadron Collider

Wednesday, August 7 | 1:00–1:30 p.m. | Ballroom G

Bjarke Dahl Madsen and **Anders Meister**, CIM Industrial Systems A/S

Learn how CIM and CERN developers designed a distributed system that features a flexible number of configurable DAQ stations based on CompactRIO. All stations are tightly synchronized and can send and receive triggers for recording electrical perturbations simultaneously on the CERN-distributed high-voltage network that supplies the Large Hadron Collider. They ultimately capture the most important information generated during milliseconds across the power system and then save it on a centralized Linux server.

How to Design Real-Time Prognostic Analysis Systems for Monitoring and Damage Mitigation

Wednesday, August 7 | 1:30–2:00 p.m. | Ballroom G

David Greene, Greene R&D International, Inc., and **Preston Johnson**, NI

BatScan is a unique monitoring and damage mitigation technology that assesses operating condition and system performance to provide operators with real-time prognostic analyses. For example, the system has monitored power plant steam generators using accelerometers to predict fault or damage conditions masked by background noise with no false alarms in 30 years. At this session, learn how you can develop similar advanced prognostics systems using NI reconfigurable I/O technologies.

Duke Energy: Deploying Smart Maintenance and Diagnostics Update for Electrical Power Generation

Wednesday, August 7 | 2:15–2:45 p.m. | Ballroom G

Bernie Cook, Duke Energy

Examine Duke Energy's large-scale monitoring and automation initiative to increase asset availability, reduce cost, and address workforce challenges. In the past, 80 percent of key maintenance and diagnostics (M&D) personnel time and efforts were spent on data collection instead of analytics. The Smart M&D project goals include using a centralized database and distributed, intelligent DAQ nodes to automate the data collection process and shift the focus to data analysis. At this session, explore Duke Energy's M&D infrastructure featuring CompactRIO.

The Center for the Commercialization of Electric Technologies Public Board Meeting

Wednesday, August 7 | 12:30–4:00 p.m. | Room 2

Attend the 2013 summer public board meeting of the Center for the Commercialization of Electric Technologies (CCET). This Texas nonprofit enhances the safety, reliability, security, and efficiency of the Texas electric transmission and distribution system through the research, development, and commercialization of emerging technologies. CCET brings together electric utilities, high-tech companies, research companies, and university researchers to find technology solutions to challenges the Texas electric power industry faces.

Energy Technology

Exelon: Technology Innovation and Workforce Optimization

Wednesday, August 7 | 2:45–3:15 p.m. | Ballroom G

Mohammed Yousuf, Exelon Generation

Exelon has been proactively using systems featuring technology such as NI real-time DAQ to collect real-time plant data, analyze it throughout the plant fleet, and promptly correct problems. Explore how equipment-related downtime has been significantly reduced and time-based maintenance tasks have given way to condition-based maintenance tasks.

Solid-State Power: A Step Change in Reliability and Efficiency

Wednesday, August 7 | 3:30–4:00 p.m. | Ballroom G

Jeremy Henson and **Pasi Taimela**, FlexGen Power Systems

FlexGen Power Systems has developed diesel and gas generator hybridization technology that integrates configurable energy storage, power converters, and controls with a wide range of diesel and gas generators as well as gas turbines to dramatically reduce fuel consumption, emissions, sound, vibration, and maintenance costs without impacting the performance, safety, or reliability of the power system. Learn about how FlexGen developed the technology to optimize commercial island grid diesel and gas power systems.

Designing Advanced Bidirectional Inverters for Energy Storage and Renewables

Wednesday, August 7 | 4:00–4:30 p.m. | Ballroom G

Apurva Somani, Dynapower Company LLC

Dynapower Energy Management is a global leader in the design and manufacture of bidirectional inverters for use in battery energy storage systems. Learn how Dynapower uses the NI Single-Board RIO General Purpose Inverter Controller and LabVIEW to develop state-of-the-art control systems. Features include IEC 61850 networking, cloud-based data logging, revenue grade power metering, and advanced proprietary control algorithms to detect grid instability and transfer from grid-connected to stand-alone battery operation in one 60 Hz cycle.

Panel Discussion: Protecting Electrical Infrastructure From Cyber Attacks

Wednesday, August 7 | 4:45–5:45 p.m. | Ballroom G

Phil Hester, NI; **Dr. Thomas King**, Oak Ridge National Laboratory; and **Mark Powell**, Duke Energy

According to the Federal Energy Regulatory Commission, power outages and disturbances cost the United States between $119 billion and $188 billion a year. To reduce these costly unplanned outages, intelligent electronic devices are being developed to improve grid operation reliability. However, the deployment of these networked measurement and control devices also raises cyber security concerns. As the grid goes digital, how do we protect our electrical infrastructure from cyber attacks? Join us for a panel discussion moderated by NI Global Energy Segment Vice President Owen Golden and featuring cyber security experts from national labs, utilities, industry, and academia.

RF and Wireless Test

Learn how National Instruments is redefining RF and wireless test. Hear from RF, microwave, and wireless industry experts as they explain the latest trends, emerging technologies, and test techniques.

Keynotes

Challenges of RF Test in HVM

Tuesday, August 6 | 10:30–11:30 a.m. | Ballroom F
Kevin Redmond, Intel

Explore the challenges of bringing RF test to high-volume test solutions. The cost of testing mobile device SOC/SIPs is driving hard choices in production testing. Zero test time or zero capital equipment or infinite parallelism: each corner drives complexity and compromises in the test platform. As SOC/SIP devices drive complexity up, traditional HVM methods and equipment are challenged from both the capability and cost point of view.

The Massively Broadband® Wireless Future

Wednesday, August 7 | 10:30–11:30 a.m. | Ballroom F
Dr. Theodore (Ted) Rappaport, Polytechnic Institute of New York University

The millimeter-wave spectrum above the 10 GHz frequency band has yet to be tapped by wireless mobile networks. But advances in CMOS semiconductor technologies and recent communication system research show that mobile wireless communication networks can soon use this spectrum to offer thousands of times greater data rates than today's 4G LTE cellular systems. Examine key breakthroughs, future system architectures, and the research challenges of a new era in wireless featuring multigigabit-per-second data rates.

Technical Sessions

Examples and LabVIEW FPGA Application IP for NI Vector Signal Transceivers

Tuesday, August 6 | 1:00–2:00 p.m. | Ballroom F
Ryan Verret, NI

You can take advantage of the open FPGA on NI vector signal transceivers (VSTs) with NI-provided examples and application-specific IP. Learn how to use this IP to create VST "personalities" for specific use cases, from accelerated automated test to tests requiring functionality not found on a traditional vector signal analyzer or vector signal generator.

Challenges in Testing Future Wireless Infrastructure

Tuesday, August 6 | 2:15–3:15 p.m. | Ballroom F
Tim Hentschel, Signalion

Wireless traffic will increase at a compound annual growth rate of 50 to 80 percent in the next few years. Cellular networks will handle a big portion of this traffic. Future heterogeneous cellular networks will feature a variety of radio access equipment, which will challenge test equipment and test methodologies. Learn how NI is rising to this challenge with its modular platform and leading-edge wireless technology. As an example, explore NI's approach to remote radio head (RRH/RRU) testing.

Sponsor

Microwave Journal

RF and Wireless Test

High-Efficiency Envelope Tracking PAs for LTE-A Wireless Base Stations and Mobile

Tuesday, August 6 | 3:30–4:30 p.m. | Ballroom F
Dr. Johana Yan, **Gayle Collins**, and **Don Kimball**, MaXentric Technologies, LLC

Envelope tracking (ET) provides the potential for achieving high efficiency in power amplifiers for next-generation wireless transmitters. Explore the development of various ET amplifiers and their requirements for applications in base station and handset PAs. Then discuss digital predistortion techniques to compensate for any system nonlinearity. Lastly, examine an implementation for a hardware-in-the-loop envelope tracking test bed using NI solutions.

Experts Panel: Future of RF Instrumentation

Tuesday, August 6 | 4:45–5:45 p.m. | Ballroom F
Larry Desjardin, Modular Methods;
Doug Johnson, Qualcomm Atheros; **David Vye**, Microwave Journal; and **Mike Santori,** NI

Discuss the growing speed and performance demands on next-generation RF instrumentation platforms.

LabVIEW for Software Defined Radio

Wednesday, August 7 | 1:00–2:00 p.m. | Ballroom F
Erik Luther, NI

Software defined radio (SDR) offers an affordable and flexible way to prototype new algorithms faster, thereby shortening time to results. Discover how LabVIEW is enabling algorithm design and the rapid prototyping of a broad range of SDR applications from simple record and playback to advanced MIMO prototyping and next-generation protocols.

Future of Wireless, mmWave, and Beyond

Wednesday, August 7 | 2:15–2:45 p.m. | Ballroom F
Dr. Paul Khanna, Phase Matrix Inc.

The promise of mmWave technologies to deliver the future of wireless communication systems presents new opportunities and challenges in both hardware and software. In this session, get an overview of the advanced mmWave technology and components Phase Matrix is developing so researchers and engineers can prototype and test complex next-generation wireless networks.

5G Is Coming, What Might It Be?

Wednesday, August 7 | 2:45–3:15 p.m. | Ballroom F
Mark Cudak, Nokia Siemens Network

Review 5G technology trends starting with a framework for 5G local area access designed to meet the capacity demands of 2020. Then learn about the upcoming LTE features and the spectrum opportunity for 5G systems. Envision enhancements for local area access for spectra both below 6 GHz and at mmWave. Conclude with an outline of mmWave technology for both access and backhaul that addresses different components like air interface, antenna arrays, and IC technology.

The Evolution of Next-Generation Cellular Networks

Wednesday, August 7 | 3:30–4:30 p.m. | Ballroom F
Brian Evans, University of Texas, and
Mustafa Gurcan, Imperial College London

As wireless researchers look beyond the physical layer in search of new breakthroughs, examine the potential of prototyping solutions that can address the higher layers of the protocol stack (like MAC) for wireless standards such as 802.11, LTE, and so on. Also explore programming paradigms for developing finite state machines and integrating them in heterogeneous architectures that incorporate real-time and FPGA-based design, prototyping, and deployment.

Experts Panel: Future of Wireless Communications System Design

Wednesday, August 7 | 4:45–5:45 p.m. | Ballroom F
Dr. Ted Rappaport, Polytechnic Institute of New York University; **Dr. Brian Evans**, University of Texas at Austin; **Mark Cudak**, Nokia Siemens Network; **Dr. Costas Georghiades**, Texas A&M; and **Matt Ettus**, Ettus Research

Explore the challenges of meeting the growing bandwidth demands of next-generation wireless communication networks and the roles wireless communication design tools have in the design, prototyping, and deployment of the enabling wireless technologies of tomorrow.

Transportation

Explore how passenger vehicles, heavy trucks, construction equipment, agricultural machinery, rail systems, and more are rapidly evolving due to growth in the electronic complexity of systems and how that affects many stages of the development cycle for a variety of applications. Examine the latest industry trends through sessions from Continental, General Motors, IBM, Robert Bosch, SAE, and others.

Keynote

The Current and Future State of Transportation

Tuesday, August 6 | 10:30–11:30 a.m. | Ballroom E
Andrew Smart, SAE International

As automobiles, combines, trucks, trains, and construction equipment across the many transportation industries continue to incorporate more electronic devices and become smarter each day, the life of the engineer who develops and tests these components and systems is rapidly changing. During this keynote, hear from SAE Director Andrew Smart on what SAE views as the key trends and challenges introduced by this growth in complexity and how they will affect the transportation industry for years to come.

Technical Sessions

Understanding and Addressing the Challenges of High-Fidelity Electric Motor Modeling

Tuesday, August 6 | 1:00–1:30 p.m. | Ballroom E
Ben Black, NI

With the continued adoption of electrified power trains in the industry, traditional hardware-in-the-loop simulation tools are not equipped to provide the necessary accuracy for simulations and tests. In this session, examine some of the key challenges engineers face today and explore methodologies and tools that can help simplify this complicated domain.

Battery Management System Advancements

Tuesday, August 6 | 1:30–2:00 p.m. | Ballroom E
Jonathan Murray, Bloomy Controls Inc.

Learn about the latest advancements in battery management systems (BMSs) and explore design considerations for implementing large-scale hybrid and electric vehicle battery packs. Examine the proper test methods for validating and verifying BMS critical functionality throughout the product life cycle, and observe how a battery hardware-in-the-loop system is used to simulate a range of battery cell conditions and sensor health states for closed-loop BMS testing.

Using Full-Vehicle Components Simulation For Control System Development

Tuesday, August 6 | 2:15–3:15 p.m. | Ballroom E
Alberto Peña, Tecnalia

Explore the advantages of model-based design and hardware-in-the-loop testing through real applications. The development of control algorithms using advanced hardware, software, and engineering methodologies reduces the money and time spent on development and improves the safety of the solutions. Examine several real case studies featuring a variety of tools and methodologies used in applications ranging from international R&D programs to engineering developments.

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Transportation

Best Practices for Developing an End-of-Line Test System for Hybrid Vehicles

Tuesday, August 6 | 3:30–4:00 p.m. | Ballroom E
Alessandro Andreoli and **Alessandro De Grassi**, Loccioni

New requirements for pollution reduction and better car performance push car makers to investigate new engine and car concepts such as the hybrid vehicle, which uses two different power sources to move. The electric engine system is mainly composed of an electric motor, a battery system, and an electric power converter (inverter). At this session, examine a bench specifically developed to test an inverter for automotive applications.

[a] Automatic Test and Characterization of Automotive Cameras Using PXI and LabVIEW

Tuesday, August 6 | 4:00–4:30 p.m. | Ballroom E
Hamid Yazdi, Robert Bosch

Discover how NI products (LabVIEW and PXI) were used to evaluate the optical and image quality of Bosch's rearview camera modules. Various environmental impacts on the reliability and lifetime performance of the imaging devices were also measured. Explore how to use the NI Vision Development Module to implement international standard methods (ISO) for the quantification and characterization of device-under-test optical and imaging performance under severe and extreme environmental conditions and learn novel approaches for test execution.

Advanced Combustion Engines: Enabling Complete Engine Control and Test

Tuesday, August 6 | 4:45–5:15 p.m. | Ballroom E
Andrew Polk, Mississippi State University

Examine the rapid control prototyping (RCP) and testing of a heavy-duty multicylinder compression ignition engine using NI Powertrain Controls (Drivven) products. The original engine control module was comprehensively "reverse engineered" to calibrate the RCP NI engine controller. Subsequently, the Drivven Combustion Analysis Toolkit (DCAT) was used for DAQ and combustion analysis. DCAT also provided a consolidated DAQ interface for steady-state in-cylinder DAQ along with heat release rate modeling and other important combustion metrics.

[a] Rapid Control Prototyping for IC Engine Control Using LabVIEW and NI VeriStand

Tuesday, August 6 | 5:15–5:45 p.m. | Ballroom E
Steven D'souza, General Motors

Learn about a rapid control prototyping platform developed as a research tool to precisely control the location and duration of fuel injection and ignition for single- and multi-cylinder engines. The hardware features off-the-shelf components from NI, and the control system software was developed in LabVIEW. NI VeriStand was used to integrate the control system code, engine control algorithms, and data logging into one stand-alone system.

Transportation

Frost & Sullivan Analysis of the Automotive Test Industry

Wednesday, August 7 | 10:30–11:00 a.m. | Ballroom E

Jessy Cavazos, Frost & Sullivan

Review the current and long-term future trends of the automotive industry and discuss best practices for addressing the key challenges test engineers face. Also hear feedback Frost & Sullivan has received during discussions with end users and test suppliers in the automotive industry. Key themes include the smart car concept, safety, and electric vehicles.

The Impact of Global Production Test Standardization on the Total Cost of Test

Wednesday, August 7 | 11:00–11:30 a.m. | Ballroom E

Noah Reding, NI

The growth in electronic complexity in the modern automobile focuses attention even more on reliable and efficient testing. For Continental Automotive Group, managing its global test efforts is an enormous task, given the size of the organization and its status as one of the leading suppliers of automotive electronics. At this session, learn how to standardize on a global production test platform to reduce overall test cost.

SSE Accelerator for Automotive Functional Safety ISO 26262 Compliance Through Life-Cycle Tool Integration

Wednesday, August 7 | 1:00–1:30 p.m. | Ballroom E

Greg Gorman, IBM

ISO 26262 is the functional safety standard for managing the safety life cycle of automotive electrical and electronic components. It requires strong integration between the tools used in the safety life cycle to manage artifacts and development processes. At this session, examine a life-cycle-based approach to ISO 26262 compliance using IBM Rational Team Concert and NI TestStand integrated with IBM Rational Quality Manager and Rational DOORS to provide an overarching solution for hardware-in-the-loop testing with significant business benefits.

Qualifying COTS Tools for ISO 26262 Verification

Wednesday, August 7 | 1:30–2:00 p.m. | Ballroom E

Jeff Gray, CertTech, L.L.C.

The ISO 26262 functional safety standard provides guidance for qualifying software tools, including commercial off-the-shelf (COTS) tools, used to help tailor the safety life cycle. The qualification process ensures that the level of applied rigor is proportional to the risks associated with using the tool. At this session, examine the basic methodologies for qualifying COTS test automation tools with example tools you can use in a qualified capacity to save time and effort in meeting stringent ISO 26262 requirements.

Transportation

HIL Testing on the Engineer's Desktop

Wednesday, August 7 | 2:15–2:45 p.m. | Ballroom E

Michael Hutton, NI

Learn how NI helps embedded software developers easily and quickly simulate complex real-world conditions on the desktop and uncover defects that normally emerge only during the validation phase of product development.

Challenges and Best Practices for Implementing a Test Cell Control System

Wednesday, August 7 | 2:45–3:15 p.m. | Ballroom E

Darryn La Zar, Wineman Technology Inc.

Explore some of the key challenges and trends for test cell control applications along with a few best practices and recommendations for how to address them. Also review applications involving combustion engines and learn about efforts to improve fuel economy through engine control unit modifications, engine hot test, and hybrid applications. All of these are unique applications; however, they feature some common threads and varying challenges.

Understanding the Possibilities of Ethernet as an In-Vehicle Network

Wednesday, August 7 | 3:30–4:30 p.m. | Ballroom E

Rodney Cummings, NI, and **Matt Gonzalez**, Echo

As more data from infotainment systems, mobile devices, and driver-assistance programs funnels through cars' networks, in-vehicle networks like the controller area network (CAN) are reaching their limits. Explore other network types for the most complex and demanding applications. Learn from an IEEE 802 committee member about new developments on the standard to address these challenges and see how NI technology partner Echo Audio is solving some specific infotainment test problems.

APIs and Abstraction Layers: Upgrading Without Breaking Existing Test Processes

Wednesday, August 7 | 4:45–5:15 p.m. | Ballroom E

Bryan Kennedy, Ball Systems Inc.

Upgrading test processes can be tricky, especially when an organization has invested in an existing test architecture. To avoid breaking established test flows, a good API and a solid abstraction layer in a system are crucial. Cummins faced this problem when upgrading its hardware-in-the-loop test system with a newer, more efficient software test engine. At this session, discover how Cummins and Ball Systems near-seamlessly introduced this new component as well as what hindered and what aided the transition.

Where the Blacktop Ends: Logging Vibration Data on Logging Trucks With CompactRIO

Wednesday, August 7 | 5:15–5:45 p.m. | Ballroom E

Robert Hoffman, Signal.X Technologies, and **Kevin Marsh**, Eaton Corporation

Eaton Corporation has used Signal.X products to diagnose torsional vibration issues on commercial logging trucks. Learn about the software, hardware, and data management considerations when installing DAQ systems and sensors to collect high-speed CAN and accelerometer data for days at a time on trucks used 25 miles off paved roads. Review the software to enable autonomous DAQ for long durations, sensor selection and placement, and the extraction of meaningful information from collected data using DIAdem.

Vision

For the last seven years, this summit has offered one of the most comprehensive conference lineups in North America on imaging applications and technologies. Learn about new technologies and industry best practices and network with vendors, integrators, end users, and other vision experts including NI R&D representatives.

Keynotes

Augmented Vision for the Sight-Impaired
Tuesday, August 6 | 1:00–2:00 p.m. | Room 17B
Dr. Stephen Hicks, University of Oxford

Discover how NI vision technology was used to develop solutions to help blind and partially sighted people increase their independence. Dr. Hicks and his team have created an intuitive way to improve navigation and walking for the visually impaired by using a depth camera to map a simplified view of nearby objects and projecting the resulting images onto transparent OLED glasses. Learn how they also developed a wearable vision-based reading assistant that delivers some of the same experiences of reading a newspaper by enabling users to turn pages of a universal newspaper to find articles which are then synthesized into speech.

Artificial Intelligence for Robotic Butlers and Surgeons
Wednesday, August 7 | 3:30–4:30 p.m. | Room 17B
Pieter Abbeel, UC Berkeley

Current robotic control methodology is slow and labor intensive, but advances in vision-based machine learning have the potential to revolutionize robotics. Discover new machine learning techniques tailored to robotics such as a new approach to high-performance robot control based on learning from human demonstrations. See how these new techniques combined with vision technology have been applied to advanced unmanned helicopter aerobatics, surgical robots, and the enabling of robots to learn on their own.

Technical Sessions

What's New in the NI Vision Development Module 2013
Tuesday, August 6 | 10:30–11:30 a.m. | Room 17B
Dinesh Nair, NI

The Vision Development Module is designed to help you develop and deploy machine vision applications. It offers hundreds of functions to acquire and process images for feature location, object identification, dimensional measurement, and more. At this session, examine new Vision Development Module features, including object tracking and new pattern matching algorithms.

Synchronizing Your Vision System With Your Assembly Line
Tuesday, August 6 | 2:15–3:15 p.m. | Room 17B
Brad Buchanan, NI

Many vision systems require precise synchronization between vision, sensors, encoders, rejection and sorting systems, and other I/O. New in 2013, Vision RIO enables users to configure a queue of pulses, providing a reliable, hardware-timed method of synchronizing I/O with visually inspected parts. This session will cover the new feature and how it can be used to simplify a number of visual inspection scenarios.

Create Better Vision Applications by Understanding the Neuroscience of Human Visual Perception
Tuesday, August 6 | 3:30-4:00 p.m. | Room 17B
Steve Varga, P&G

Understanding the neuroscience of the human visual process can help explain why machine vision results don't always match our own visual judgments. Learn how this knowledge can be used to build industrial imaging applications that better mimic human visual perceptions.

Vision

Using a Standard Vision Platform to Quickly Create Custom Solutions
Tuesday, August 6 | 4:00–4:30 p.m. | Room 17B
Yohan Vallet, Qualimatest

Learn how Qualimatest has been consistently delivering elaborate vision systems leveraging QMT Vision Inspector, a hardware- and software-based platform built on Vision Builder AI. See examples of solutions quickly tailored to customer needs and hear discussions on the advanced customization options within QMT Vision Inspector and how using a standard platform has made a positive impact on integration revenue.

Display Test: Challenges and Use Cases
Tuesday, August 6 | 4:45–5:15 p.m. | Room 17B
Manuel Bogedain, Noffz Computertechnik GmbH

The consumer, automotive, and multimedia industries are requiring more display and human machine interface applications with detailed testing on pixel defects, color, character recognition, and symbol check in development and production. At this session, explore the NOFFZ Display Test Toolkit and the NOFFZ vision universal tester platform based on NI vision tools, LabVIEW, and NI TestStand. Also discuss the challenges of display and LED test through different use cases, applications, and test platforms.

Getting Started With NI Vision
Tuesday, August 6 | 4:45–5:45 p.m. | Room 18C
Wednesday, August 7 | 3:30–4:30 p.m. | Room 18C
Elmar Widowitz, NI

Explore the features of the NI Vision Builder for Automated Inspection in an instructor-led environment. Learn how to acquire and process images and build complete applications using NI vision hardware, including NI Smart Cameras.

Getting the Most Out of Your Line Scan Camera
Tuesday, August 6 | 5:15–5:45 p.m. | Room 17B
Steve Kinney, JAI, and **Christopher Koci**, Graftek Imaging

Line scan cameras are needed for web inspection, high-speed sorting, and other demanding applications in today's business environment. However, production time, cost, and quality can be severely affected by a line scan inspection system that is not properly designed for the application. At this session, explore the best practices and common pitfalls of using multisensor and multispectral line scan cameras, including characterizing hardware and optical performance and maximizing the use of LabVIEW for the application.

Vision

Creating Vision Algorithms in FPGA

Wednesday, August 7 | 10:30–11:30 a.m. | Room 17B

Dinesh Nair, NI

The parallel nature of FPGAs lets you accelerate many types of image processing algorithms, and can dramatically reduce processing time compared to CPU implementations. Review tools and techniques for creating image processing algorithms for FPGAs using LabVIEW FPGA and high-level-synthesis tools such as the LabVIEW FPGA IP Builder.

Development and Deployment of Embedded Vision in Industry: An Update

Wednesday, August 7 | 1:00–2:00 p.m. | Room 17B

Jeff Bier, Embedded Vision Alliance

Increasingly powerful, inexpensive processors and image sensors are enabling the incorporation of vision capabilities in a wide range of products such as point-of-sale kiosks, medical devices, automotive safety systems, and smartphones. At this session, get an update on the development and deployment of embedded vision technology in industry and explore important advancements in enabling technologies, including processors, sensors, development platforms, and standards. Also examine the new Embedded Vision Alliance map of the embedded vision industry.

Designing an Image Acquisition System Using LabVIEW

Wednesday, August 7 | 2:15–2:45 p.m. | Room 17B

Paul Falkenstein, Coleman Technologies Inc.

Whether it is improving quality assurance, reducing manufacturing costs, or adding intelligence to a machine, vision is quickly becoming a must-have. Learn how to select the right technology and architecture for your machine vision application through discussions on choosing the correct components, including lighting, optics, and cameras as well as part handling and common pitfalls.

USB3 Vision is Here! Details and Best Practices

Wednesday, August 7 | 2:45–3:15 p.m. | Room 17B

Jared Jenson, NI

Discover specifics of the recently released USB3 Vision standard and how the new camera interface stacks up against existing image acquisition options. Learn the benefits, common pitfalls, and best practices when using USB3 Vision as well as the new types of applications the standard opens.

CompactRIO and Machine Vision: A Perfect Match

Wednesday, August 7 | 4:45–5:15 p.m. | Room 17B

Asa Kirby, NI

Advances in the processing capabilities of CompactRIO systems have made it an effective platform for control and monitoring applications augmented with the flexibility of machine vision. At this session, learn about vision-guided motion, the integration of images in your monitoring tasks, and other ways to take your application to the next level with NI machine vision and CompactRIO hardware.

3D Meets Color: High Resolution Color 3D Imaging at High Speeds

Wednesday, August 7 | 5:15–5:45 p.m. | Room 17B

Markus Schnitzlein, Chromasens

High resolution 3D images in color are highly beneficial in a number of applications including banknote quality control, cosmetics, semiconductor packaging, and micromechanics. Learn how ImagingLab integrated Chromasens 3D-PIXA series cameras with LabVIEW to acquire and process calibrated 3D color images in the micron range. See how single/dual trilinear charge-coupled device sensors in stereo configuration are interfaced via NI Camera Link frame grabbers to generate large, detailed images which can then be used for feature extraction and 3D image processing within LabVIEW using the ImagingLab 3D Machine Vision Library and NI Vision Development Module.

Technical Sessions

a Advanced Technical Sessions

NIWeek advanced technical sessions examine some of the most sophisticated applications of evolving technology in industry and academia. Targeted at those with proficiency in their respective topics, these sessions feature knowledge sharing from leading experts in their fields.
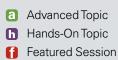
h Hands-On

NIWeek hands-on technical sessions give attendees the chance to interact directly with the latest technologies and the experts who developed them. In these popular forums, you have the opportunity to learn how to use these tools and work with them more efficiently. Attend these technical sessions to get hands-on experience.

Big Physics

As a physicist or an engineer at a physics lab or research facility, attend the Big Physics recommended sessions focused on the tools and techniques that can be used for control, measurement, and diagnostics in particle accelerators, synchrotrons, fusion reactors, and telescopes. At the following sessions, learn from industry experts and NI engineers about best practices and the latest technologies to make you successful in your application.

Robotics

The world's top roboticists, researchers, design engineers, and domain experts unite. With in-depth technical sessions and corresponding live demonstrations at the Robotics Pavilion on the expo floor, learn how to apply the latest technology from real-time devices, FPGAs, and graphical and textual programming to design robotics systems faster than your peers.

Smart Machine Design

NIWeek smart machine design sessions focus on the tools and techniques used to develop control and monitoring applications for smart machines. Learn from industry experts and NI R&D engineers about key technologies for machine applications including motion, simulation, and control design.

Automated Test Systems

Accelerating Design Validation for Home and Industrial Products

Wednesday, August 7 | 10:30–11:30 a.m. | Room 11A/B

Joseph Buck, Chamberlain, and **Antonio Terrazas**, Averna

Explore how Averna created a test solution to speed up design validation by testing different software components and mechanical changes before they reach the production line. Averna engineers used NI TestStand and LabVIEW to design a functional tester that dramatically reduced the time to validate the initial product specifications. Learn about Averna's test station features, including advanced NI instruments, NI switchers, multimeters, and I/O devices integrated with custom electrical interfaces.

Architecting Streaming Applications With LabVIEW FPGA

Tuesday, August 6 | 2:15–3:15 p.m. | Room 12A

Alejandro Asenjo, NI

Learn the key concepts and techniques for creating high-performance PXI systems that combine NI FlexRIO hardware and modular instruments.

Automated Automotive LVDS Video Testing

Wednesday, August 7 | 4:45–5:45 p.m. | Room 12A

Mick Fearnow and **Weng Dean Leong**, Delphi; and **Peter Connolly** and **Ben James**, NI

An automotive low-voltage differential signaling (LVDS) video (FPD-Link) application uses a variety of serializer/deserializer ICs. But no automotive LVDS video test solutions work with multiple serializer/deserializer ICs, and creating custom test solutions for each variation is costly. Delphi and NI developed a reusable automotive LVDS video test system using existing building blocks and off-the-shelf components. Test engineers do not need to be LVDS video experts to use this solution.

Automating Quality Management

Tuesday, August 6 | 1:00–2:00 p.m. | Room 12A

Chris Washington, NI

Embedded control software is growing exponentially in mechanical systems, which forces test methods to evolve even faster. Hear from National Instruments and IBM on how end-to-end traceability and test component reuse are providing superior system quality and validation efficiency for these systems by enabling consistent testing, results analysis, and traceability throughout the development process.

Automating the Testing of RED 4K Video Products to Increase Quality and Reliability

Wednesday, August 7 | 3:30–4:30 p.m. | Room 12A

Randy Schmidt, RED Digital Cinema

RED uses engineering and manufacturing test with NI technology to ensure the quality, reliability, and stability of its 4K digital cameras, players, and projectors. Discover how RED sets the industry standard for digital cinematography equipment and uses NI hardware and software to design and manufacture its cutting-edge products while building an infrastructure to support new products quickly and easily.

Better Manage Your ATE Software and Hardware Using Test Data

Tuesday, August 7 | 4:45–5:45 p.m. | Room 11A/B

Harsh Wanigaratne, IntraStage

Hear about the experiences of a major US-based aerospace electronics manufacturer in the Pacific Northwest that understood the importance of managing its automated test equipment (ATE) better by using test data. Review specific examples of when the manufacturer used and monitored its test data with IntraStage software to more cleverly reduce manufacturing operation costs and improve its overall engineering efficiencies.

Automated Test Systems

Build an Automated Test System With NI TestStand and the PXI Platform

Tuesday, August 6 | 3:30–5:45 p.m. | Room 18A
Wednesday, August 7 | 3:30–5:45 p.m. | Room 18A

Lars Lindstrom, NI

This three-hour hands-on session provides an introduction to developing an automated test system using NI's test solution to increase test development productivity and reduce overall costs. Learn to perform a functional test on multiple units under test using ready-to-run test management software, NI TestStand, and a PC-based modular instrumentation platform, PXI.

Building High-Performance Test, Measurement, and Control Systems

Tuesday, August 6 | 3:30–4:30 p.m. | Room 11A/B

Chetan Kapoor, NI

Applications such as high-throughput production test, hardware-in-the-loop test, advanced real-time medical imaging, and signal intelligence are pushing the capabilities of the PXI platform. They fundamentally need to transfer and process vast amounts of data in real time. Explore new NI PXI technologies that better serve the needs of these applications.

C Tools for Software-in-the-Loop Testing and Simulation

Tuesday, August 6 | 1:00–2:00 p.m. | Room 11A/B

Nicholas Keel and **Jonathan Newton**, NI

Software-in-the-loop testing (SIL) is the process of evaluating C code that runs on an embedded device before it is deployed. Learn how to perform SIL testing with NI VeriStand and the LabWindows™/CVI ANSI C integrated development environment to develop and debug C-based control software and help you improve embedded software quality.

Choosing the Best Software Tools to Design Automated Test Systems

Thursday, August 8 | 10:30–11:30 a.m. | Room 11A/B

Lars Lindstrom, NI

An important piece of an automated test system is the software framework, which runs the tests, stores the data, and evaluates the results. Learn about a four-layer architecture (instrumentation, drivers, test development software, and test management software), discuss the variety of software tools test developers can use, and discover how to choose the best tools for your application.

Converting a Digitizer Into an Oscilloscope Using a Photonic Time-Stretch Preprocessor

Thursday, August 8 | 1:00–2:00 p.m. | Room 11A/B

Andrew Baek, W Scientific

W Scientific built a compact time-stretching photonic preprocessor to expand the sampling rate and input bandwidth of the back-end digitizer. Combined with the photonic preprocessor, a 1 Gbit/s electronic digitizer can capture 40 Gbit/s data and beyond with real-time capability. Discover how you can integrate this photonic preprocessor with an NI PXI-based digitizer to address measurement needs for the next generation of wired and wireless communications systems.

Developing a New X-Ray Source for Innovative Solutions

Thursday, August 8 | 2:15–3:15 p.m. | Room 18B

Carlos Camara, Tribogenics

Tribogenics is productizing a state-of-the-art X-ray source technology that is less bulky (and thus more portable), safer (does not require a high-voltage power supply), and less expensive to allow for greater access to X-ray technology than ever before. It enables new solutions, which in turn require extensive testing and validation, so Tribogenics uses flexible NI PXI Express chassis and modules to perform all the testing and uses LabVIEW to standardize DAQ and develop the validation algorithms.

Automated Test Systems

Headless ATE System Based on NI Single-Board RIO
Thursday, August 8 | 2:15–3:15 p.m. | Room 18C
Rob Putala, Bloomy Controls

Explore how Bloomy Controls developed a headless ATE system based on NI Single-Board RIO. Also learn how you can control commercial off-the-shelf equipment with an NI Single-Board RIO device networked to a central PC for simplified process setup and data collection.

Innovative Switching Architectures That Optimize DC Performance
Wednesday, August 7 | 2:15–3:15 p.m. | Room 11A/B
Jake Harnack, NI

A little creativity can go a long way when designing a precision DC and switching system. At this session, explore innovative real-life examples of test engineers optimizing their systems for performance, cost, and density. Topics include relay layout, signal routing, and advanced features of precision DC instruments.

Introduction to LabVIEW for Automated Test
Tuesday, August 6 | 1:00–3:00 p.m. | Room 18A
Adri Kruger, NI

Learn how to use LabVIEW and PXI to build an automated test system. Also explore the basics of creating LabVIEW test applications that you can use in a larger test framework.

Introduction to PXI
Tuesday, August 6 | 10:30–11:30 a.m. | Room 11A/B
Lea Dekker, NI

Examine the basics of the PXI platform and learn why top Fortune 500 companies are embracing it to address their test, measurement, and control needs. Also get a sneak peek at new products and customer solutions.

Lessons Learned From a Decade of Building Test Systems
Tuesday, August 6 | 3:30–4:30 p.m. | Room 12A
Aaron Gelfand, Gelfand Technology LLC

Making mistakes is one way people learn. Discussing, documenting, and sharing mistakes is a way for other people to avoid making the same mistake. At this session, hear some common and not so common mistakes made while working with test systems.

Meet the Analog Experts
Wednesday, August 7 | 10:30–11:30 a.m. | Room 12A
Joey Tun, NI

Get an in-depth look at the latest NI analog instrumentation technologies directly from the experts who design them. At the end of this session, you can discuss with these experts products ranging from high-precision multimeters and source measure units to high-speed high-performance digitizers.

NI TestStand XML Report Data Compilation and Analysis
Tuesday, August 6 | 4:45–5:45 p.m. | Room 12A
Sam Broyles, INOVA Geophysical

Learn how to compile and analyze XML report data generated with NI TestStand. Walk through a LabVIEW application designed to analyze XML report data from multiple products across multiple test systems and manufacturing locations. Also discuss parsing, filtering, graphing, and analysis techniques to study manufacturing trends, defects, and test limits. All source code will be freely available.

Optimizing Manufacturing Throughput for Military Communication Systems
Wednesday, August 7 | 3:30–4:30 p.m. | Room 11A/B
Alexandre Boyer, Averna

Discover how Averna used NI TestStand, LabVIEW, modular PXI products, a PXI form factor, and custom fixturing to produce a test solution for a communication module featuring audio, an emergency intercom, Ethernet, RS232, and a combat radio. All aspects of the module needed validation and each test system needed to generate the appropriate signals while capturing key electrical and audio measurements. Also hear how Averna use NI TestStand for parallel, batch, and sequential testing to accelerate manufacturing throughput.

Automated Test Systems

Product Diversity Test Using NI TestStand
Tuesday, August 6 | 4:45–5:45 p.m. | Room 11A/B
Anders Meister and **Henrik Molsen**, CIM Industrial Systems

Despite being in the same product line, some products are likely to have dissimilar test requirements and, in some cases, may differ completely. High-mix testing presents challenges like entirely separate tests for each slight product variation leading to redundancy in code, difficult code maintenance, and tests that are not reusable. At this session, learn how NI Gold Alliance Partner CIM Industrial Systems created a tool for diversity handling based on LabVIEW and NI TestStand.

PXI Advanced
Wednesday, August 7 | 1:00–2:00 p.m. | Room 11A/B
Lea Dekker, NI

Explore some of the most advanced PXI platform capabilities.

Race to the Finish: Build an Automated Test System in 40 Minutes
Tuesday, August 6 | 2:15–3:15 p.m. | Room 11A/B
Brandon Brice, NI

Heckle the product manager, Lars Lindstrom, as he attempts to build an automated test system from scratch in record time. Get a quick overview of building to help you decide if you want to participate in the three-hour hands-on session, and learn how NI Alliance Partners can help you deliver faster.

Select the Right Digitizer or Oscilloscope for Your Application
Tuesday, August 6 | 10:30–11:30 a.m. | Room 12A
Christian Gindorf, NI

Explore digitizer and oscilloscope specifications like ENOB and SFDR and discuss how to read data sheets and compare instruments. Also explore advanced features like undersampling for acquiring signals with sampling speeds that do not meet Nyquist or equivalent time sampling rates. And examine signal processing with LabVIEW FPGA to increase the number of effective bits in software.

Standardize Your CAN Applications With NI-XNET
Wednesday, August 7 | 2:15–3:15 p.m. | Room 12A
Noah Reding, NI

NI-XNET products for CAN, LIN, and FlexRay networks make it easy to develop a single application that you can port to different environments and platforms including PXI, PCI, NI CompactDAQ, and CompactRIO. Learn how a single API and high-performance hardware can reduce development time for automotive network communication across multiple networks and platforms.

Standardizing Manufacturing Test Stations With NI TestStand
Wednesday, August 7 | 1:00-2:00 p.m. | Room 12A
Mathieu Laroshe, Averna, and **Daniel Lockhead**, Alstom

Due to legacy issues, distributed production centers, and other factors, OEMs have to manage a heterogeneous mix of test stations running different custom software, which can require highly specialized skill sets, labor-intensive operating procedures, and lengthy maintenance and upgrade schedules. Learn how Averna and Alstom used NI TestStand to develop a "generic" test interface to simplify and standardize the test environment across multiple stations to achieve faster test development, better test sequencing, and more.

Understanding and Measuring Jitter
Thursday, August 8 | 10:30–11:30 a.m. | Ballroom G
Christian Gindorf, NI

Evolving technology makes it increasingly difficult for system developers to produce and maintain complete, unimpaired signals in digital systems. Putting it succinctly, there are two kinds of designers: those who have signal integrity problems and those that will. This session provides insight into jitter-related digital system challenges and describes their causes, characteristics, effects, and solutions.

Data Acquisition Systems

10 Best Practices for Making Acoustic Measurements

Thursday, August 8 │ 1:00–2:00 p.m. │ Ballroom E

Mike Denton, NI

Explore the 10 most important considerations when measuring data with microphones.

A Multiprocess and Rotor Modeling Approach to Power Plant Condition Monitoring

Thursday, August 8 │ 2:15–3:15 p.m. │ Room 17B

Tom White, ELSTAR Elektronik AG

Hear how ELSTAR developed its model-based, rotor-balancing CABSTAR software system to perform condition monitoring in power plants. Measurements taken using trial weights during run up and run down reduced the time needed to balance the rotor in situ. This required using distributed multiprocess DAQ systems that apply different methods to multiple measurement types.

Audio Testing 101

Tuesday, August 6 │ 10:30–11:30 a.m. │ Room 18B

Wednesday, August 7 │ 10:30–11:30 a.m. │ Room 18B

Mike Denton, NI

Develop an audio test procedure with both analog output and analog input channels. Learn how to account for signal delay and perform the most common audio test analyses on stimulus-response data.

Automating National Board Lab and Processes for Pressure Relief Device Testing

Tuesday, August 6 │ 10:30–11:30 a.m. │ Room 15

Rick Humphrey, Advint, and **Brandan Ashbrook**, The National Board of Boiler and Pressure Vessel Inspectors

The National Board Test Laboratory staff conducts over 180 tests each month on pressure-relieving devices according to ASME standards. In 2012, the lab invested in hardware and software to upgrade and automate the laboratory. This included a 2500 psi high-pressure test line and the automation of four test systems and the overall process using NI CompactDAQ and LabVIEW.

Best Practices for Pressure Sensor, Torque Sensor, and Load Cell Selection

Thursday, August 8 │ 2:15–3:15 p.m. │ Room 13A/B

Brian Duffy, Honeywell

You have plenty of parameters to think about when selecting a sensor for your application—from packaging, to output, to ranges, and more. At this session, learn what you should consider when selecting pressure and load sensors and how to pair them with NI hardware.

Building a Next-Generation Data-Logging System

Tuesday, August 6 │ 1:00–2:00 p.m. │ Room 13A/B

Elizabeth Dolman, NI

As data acquisition and logging needs grow more complex, the systems recording the physical and electrical phenomena of today and tomorrow need to meet new challenges. Learn how to build a next-generation stand-alone data-logging system to take advantage of the latest trends and technologies.

Building and Testing the Fastest Car in the World

Thursday, August 8 │ 2:15–3:15 p.m. │ Room 12B

Ed Shadle and **Steve Wallace**, North American Eagle

The North American Eagle, a modified F-104 Starfighter jet, is set to challenge the land speed record of 763 mph. Explore the project's history, the vehicle's design, and control and DAQ systems. Also learn how a team of American and Canadian volunteers is pushing engineering to its limits to topple the record set by the British ThrustSSC.

CAT Who? Understanding Isolation Specifications

Tuesday, August 6 │ 4:45–5:45 p.m. │ Room 12B

Marti Chance and **Jun Lu**, NI

The term "isolation" can have many connotations depending on the user, hardware, and even country. Some data sheets throw this term around carelessly without much definition. Learn what to look for in a specification and the different types of isolation to ensure an accurate, safe measurement.

Data Acquisition Systems

Choosing the Right DAQ System for Your Application

Tuesday, August 6 │ 10:30–11:30 a.m. │ Room 12B

Keith Moore, NI

In today's world, engineers and scientists have countless options for building DAQ systems. Get tips for selecting the right sensors, DAQ hardware, bus, computer, and software for your next measurement application.

Communicate More in Less Time

Thursday, August 8 │ 2:15–3:15 p.m. │ Room 18A

Claudio Vivante, TOOLS for SMART MINDS

Discover how to create true distributed computing solutions in a smooth fashion. Learn about the success of TOOLS for SMART MINDS in helping engineers develop a cross-platform communications protocol based on TCP/IP that allows reliable, bidirectional, and high-performance communication with mobile devices such as smartphones.

DAQ Advanced: Better Scaling and Synchronization

Thursday, August 8 │ 1:00–2:00 p.m. │ Room 17B

Daniel Domene and **Zach Hindes**, NI

Explore how to use NI-DAQmx and NI-Sync to synchronize your DAQ devices to obtain correlated data for any application. Whether your devices are in separate rooms and buildings or on separate continents, you can architect a world-class solution with these advanced tips.

DAQ Advanced: Building Systems End to End

Wednesday, August 7 │ 3:30–5:45 p.m. │ Room 12B

Daniel Domene, NI

Learn from the NI R&D team tips for building sustainable and reliable systems and view live demos to understand the key decisions made at each stage. Topics include multifamily hardware setup, distributed DAQ with central processing, software architecture, synchronization, data transfer and storage, streaming performance, and reliability.

DAQ Advanced: Distributed Ethernet and Wireless NI CompactDAQ

Tuesday, August 6 │ 3:30–4:30 p.m. │ Room 12B

Aaron Rossetto and **Tom Walling**, NI

Take a deep dive into the technical information you need to optimize distributed applications using network NI CompactDAQ. Hear from the R&D experts who designed the hardware, protocols, and drivers about which tricks and trade-offs can squeeze the last bit of performance out of your system while ensuring reliability.

DAQ Advanced: Multichassis NI CompactDAQ Synchronization

Wednesday, August 7 │ 10:30–11:30 a.m. │ Room 18C

Wednesday, August 7 │ 4:45–5:45 p.m. │ Room 18C

Cristina Fuentes and **Sunil Kowlgi**, NI

Join NI R&D engineers as they provide step-by-step guidance for synchronizing modules in different NI CompactDAQ chassis. Learn best practices for synchronizing measurements and signal generation between multiple modules, chassis, and systems.

DAQ Applications: The Truth, The Whole Truth, and Nothing But The Truth

Wednesday, August 7 │ 1:00–2:00 p.m. │ Room 12B

Ashish Naik and **Micah McClelland**, NI

Have you ever wanted to rip apart someone else's application to learn how they developed it? Here's your chance. Listen to true stories from two experienced engineers on the DAQ applications they built, the hardware and software architectures and technology they chose, and the successes and failures they had along the way.

Fiber-Optic Sensing

Wednesday, August 7 │ 2:15–3:15 p.m. │ Room 18A

David Ashlock, NI

Discover how to use fiber-optic sensors to conduct common measurements including temperature and strain. Also connect sensors to the NI PXIe-4844 optical sensor interrogator, configure them in software, and read from them using LabVIEW system design software.

Data Acquisition Systems

Hack Your Car With NI CAN Interfaces and LabVIEW

Thursday, August 8 | 1:00–2:00 p.m. | Room 13A/B

Noah Reding, NI

Examine the details of automotive diagnostics (OBD-II) and the controller area networking used in every car produced since 2008. Discover how to use LabVIEW and NI USB controller area network (CAN) interfaces to gain hidden data from your car, read diagnostic trouble codes, and build custom automotive diagnostic applications.

Integrating Systems With Multiple Data and Control Sources

Thursday, August 7 | 10:30–11:30 a.m. | Room 17B

Cindy Whitley, Jacobs Technology

When designing and integrating test systems, engineers often need to combine data and controls information from multiple sources, especially in high-channel-count systems requiring mixed-signal types (temperature, pressure, strain) and communication to different control sources in the same application. At this session, examine system integration challenges such as time delays, data alignment, and communication with multiple sources.

Introduction to LabVIEW and NI CompactDAQ

Tuesday, August 6 | 1:00–2:00 p.m. | Room 18C
Tuesday, August 6 | 2:15–3:15 p.m. | Room 18C
Tuesday, August 6 | 3:30–4:30 p.m. | Room 18C

Keith Moore and **Katie Collette**, NI

Even in a world full of immersive media, there is still no better way to learn new concepts than the hands-on experience. This session, geared toward new DAQ users, explores the basics of LabVIEW and DAQ, including connecting your signals, performing inline analysis and file I/O, and building rich user interfaces. Get answers to your questions from NI engineers at the session.

LabVIEW DAQ Launchpads

Tuesday, August 6 | 1:00–2:00 p.m. | Room 12B

Graham Green, NI

Do you struggle with a blank VI every time you start a new DAQ project? Explore examples, templates, and common software designs to ensure reliable functionality that is easy to maintain without unnecessary coding. Also discuss popular DAQ software architectures, when to use them, how to get the most out of them, and how to customize them.

Learn 10 Functions to Handle 80 Percent of Your DAQ Application

Thursday, August 8 | 10:30–11:30 a.m. | Room 13A/B

Jackie Byrne, NI

The DAQ Assistant is an effective way to get started taking measurements quickly, but the DAQmx API can offer much more flexibility and advanced capabilities. Learn 10 functions that you can use to move beyond the DAQ Assistant and take advantage of the powerful NI-DAQmx driver.

Making a Shaker Table

Tuesday, August 6 | 3:30–4:30 p.m. | Room 18D
Wednesday, August 7 | 3:30–4:30 p.m. | Room 18D

Mike Denton, NI

Discover the key considerations when designing a shaker control system. Then walk through a LabVIEW template for controlling a shaker with a CompactRIO system. Modify the template to provide a sinusoidal stimulus instead of a random stimulus.

NI's Approach to Parking Deck Structural Monitoring

Thursday, August 8 | 10:30–11:30 a.m. | Room 12B

David Ashlock, NI

Explore a structural health monitoring system developed for one of the parking decks on NI's corporate campus. It uses PXI-based optical sensing, vibrating wire based on CompactRIO, and wireless sensor network dynamic electrical bridge-based strain measurements. This data is stored and consumed via the cloud.

Data Acquisition Systems

Rugged by Design: How Integrators Deploy Systems Into Harsh Environments

Tuesday, August 6 | 10:30–11:30 a.m. | Room 13A/B

Doug Farrell and **Asa Kirby**, NI

Hardware systems are sometimes placed in environments that test their physical design limits, and they require after-market ruggedization to ensure they can safely and accurately perform their functions. In this session, C Series users share their experiences and best practices on topics like wiring, enclosures, and heating and cooling to help you meet your most extreme physical specifications.

Software Architectures for High-Channel-Count Measurements

Tuesday, August 6 | 2:15–3:15 p.m. | Room 12B

Jim Black, NI

High-channel-count measurement systems present new challenges including higher customer expectations. Discuss user concerns and workflow experiences for successful high-channel-count measurement systems, including system definition, configuration, and data management.

Strain Gage Fundamentals

Wednesday, August 7 | 1:00–2:00 p.m. | Room 18A

Justin Petry, NI

Learn about the three unique use cases for strain gages. Examine a quarter-bridge, half-bridge, and three-element rosette and practice applying adhesive and bonding a quarter-bridge strain gage to a metallic surface.

Understanding the Key Technologies of In-Vehicle Data-Logging Applications

Wednesday, August 7 | 2:15–3:15 p.m. | Room 12B

Daniel Reidelbauch, NI

In-vehicle data-logging applications require a wide breadth of I/O options, a configurable and easy-to-use software environment, and an open framework to extend constantly evolving projects. Learn how the combination of the new NI CompactDAQ stand-alone system and NI software tools can help you meet these challenges.

Understanding Measurement Microphones

Tuesday, August 6 | 1:00–2:00 p.m. | Room 18B
Thursday, August 8 | 10:30–11:30 a.m. | Room 18B

Mike Denton, NI

Review the key considerations of selecting a measurement microphone. Walk through calibrating and taking a measurement with LabVIEW.

Using LabVIEW for CAN Bus Monitoring

Wednesday, August 7 | 10:30–11:30 a.m. | Room 12B

AJ Burke, Eaton ETI

Explore NI CAN technology to address the monitoring and analysis needs of engineering test and validation labs. Hear about one engineer's CAN experiences ranging from Google Lunar XPRIZE entries to more traditional automotive applications. And learn best practices, tips, and trade-offs when developing useful VIs for CAN bus monitoring and subsequent analysis with NI CompactDAQ.

Wireless Technologies for Remote DAQ and Transmission

Thursday, August 8 | 1:00–2:00 p.m. | Room 12B

Doug Farrell and **Jim Schwartz,** NI

DAQ systems can often be installed in locations where it is neither easy nor convenient to run an Ethernet cable, so wireless communication is required. At this session, explore the different wireless technologies in DAQ and the use cases and best practices for implementing each, including WiFi, ZigBee, low-Earth orbit satellite, broad spectrum radio, and cellular.

Embedded Systems

Featured Session

LabVIEW on the Moon

Tuesday, August 6 | 10:30–11:30 a.m. | Room 14
William Whittaker, Carnegie Mellon University

Carnegie Mellon researchers have developed software using LabVIEW and LabVIEW FPGA to find water on the Moon and pioneer the methods that will allow human colonies to survive and thrive in space. Learn how Carnegie Mellon is achieving the first autonomous soft-landing in space in 2015 with hundred-fold acceleration of guidance, navigation, and control algorithms implemented on radiation-hardened FPGAs.

Technical Sessions

Addressing Embedded Device Security in LabVIEW RIO Systems

Thursday, August 8 | 10:30–11:30 a.m. | Room 16B
Sanjay Challa, NI

In the wake of the Stuxnet worm and growing cyber threats, the concern for industrial and embedded device security is growing. Examine best practices for securing development machines and NI reconfigurable I/O (RIO) embedded hardware targets against a variety of threats.

Advanced Motion Control for Machine Automation

Wednesday, August 7 | 4:45–5:45 p.m. | Room 13A/B
Paul Streder, Kollmorgen, and **Nate Holmes**, NI

Servo systems provide fast command response, outstanding disturbance rejection, and highly repeatable motion. At this session, discuss advanced servo algorithms such as observers, high-order filters, and multiple feedforward paths. Also learn how to configure and tune your system including the roles of automatic and manual tuning methods.

Advantages of the LabVIEW RIO Architecture for Motion Control Applications

Wednesday, August 7 | 10:30–11:30 a.m. | Room 13A/B
Jeff Adair and **Nathan Kingsley**, NI

High-performance machines often require specialized control algorithms and advanced synchronization with sensors and vision systems. These requirements can be difficult or impossible to meet with fixed-function motion controllers and drives, and custom design often isn't feasible. At this session, learn how you can use a fully reconfigurable motion control architecture that combines an FPGA, a real-time processor, and modular I/O to implement specialized high-performance systems more effectively than traditional approaches.

A Mobile Robotics Platform Based on the LabVIEW RIO Architecture

Wednesday, August 7 | 2:15–3:15 p.m. | Room 15
Ryan Gariepy, Clearpath Robotics

Available August 7

Best Practices for Data Communication in Embedded Design

Wednesday, August 7 | 3:30–4:30 p.m. | Room 15
Meghan Kerry and **Matt Pollock**, NI

Data communication, a key part of any embedded control and monitoring architecture, is among the most challenging aspects to implement. Get a solid start on your next project by knowing what data communication mechanisms are available (both inter- and intra-target), the trade-offs, and which are the most appropriate for your embedded design.

Embedded Systems

Case Studies in Asset Monitoring

Thursday, August 8 | 1:00–2:00 p.m. | Room 14
Kamalina Srikant, NI

Explore solutions built around NI tools that address online monitoring, diagnostic, and factory test needs that apply to a variety of industries including rail, heavy equipment, power generation, manufacturing machines, and oil and gas.

CompactRIO, Part 1: Programming With LabVIEW Real-Time

Tuesday, August 6 | 2:15–3:15 p.m. | Room 18B
Wednesday, August 7 | 1:00–2:00 p.m. | Room 18B
Ryan Colby, **Humphrey Huang**, and **Carlos Pazos**, NI

Learn how to quickly build and deploy embedded monitoring and control applications using CompactRIO and the LabVIEW Real-Time Module. Also explore LabVIEW Real-Time features that increase flexibility and integration with the FPGA when programming with the RIO Scan Interface (aka Scan Mode).

CompactRIO, Part 2: Programming With LabVIEW FPGA

Tuesday, August 6 | 3:30–4:30 p.m. | Room 18B
Wednesday, August 7 | 2:15–3:15 p.m. | Room 18B
Ryan Colby and **Carlos Pazos**, NI

Take advantage of the power of reconfigurable FPGAs for custom timing/triggering, inline signal processing, and fast closed-loop control. In this hands-on session, explore the basics of customizing CompactRIO with LabVIEW FPGA Module programming. Attendees should have basic LabVIEW and LabVIEW Real-Time knowledge.

Database Solutions for CompactRIO

Wednesday, August 7 | 4:45–5:45 p.m. | Room 14
Wayne Warren, Raima, Inc.

Embedded real-time computers are now more powerful than mainframe computers were when database management technology was first invented and adopted. Examine today's CompactRIO database solutions and the motivations for greater adoption of database management in real-time software. Also view a demonstration of the Raima solution for LabVIEW.

Diagnosing Nonlinear Time-Varying Systems With LabVIEW and CompactRIO

Thursday, August 8 | 2:15–3:15 p.m. | Ballroom F
Jordan McBain, LHP Software

Examine an algorithm implemented in LabVIEW that uses system identification and quadratic-programming-based pattern recognition techniques to monitor and diagnose a gear dynamics simulator under varying load and speed. You can apply this approach beyond gearboxes to other challenging dynamic systems monitoring by implementing an object-oriented programming (OOP) architecture with the Actor Framework and a LabVIEW OOP plug-in architecture for CompactRIO. Also review applications in the mobile underground mining environment and relevant networking standards like IREDES and MIMOSA.

Embedded System Deployment and Management

Tuesday, August 6 | 3:30–4:30 p.m. | Room 13A/B
Sanjay Challa, NI

Looking to scale your embedded solution? Struggling to manage large numbers of embedded systems? Learn the best practices for deploying LabVIEW Real-Time and LabVIEW FPGA applications at this session. Topics covered include deploying applications reliably, preparing targets for deployment, sending application updates to deployed targets, and using common APIs and tools to help with deployment and system replication management.

Enhance Your DAQ Applications With R Series Multifunction RIO

Tuesday, August 6 | 3:30–4:30 p.m. | Room 14
Curtis Mitchell, NI

NI DAQ devices work well for most applications, but advanced monitoring and control applications require more functionality such as custom triggering, multiple timing engines, and closed-loop control. Learn how to use FPGA-enabled NI R Series multifunction reconfigurable I/O (RIO) hardware to move beyond traditional DAQ limitations.

Embedded Systems

Environmental and Power Monitoring With the NI WSN Platform

Wednesday, August 7 | 4:45–5:45 p.m. | Room 15
Jeffrey Frost, Bloomy Controls

Energy management and water conservation are among the biggest challenges the US Army faces. At this session, learn how LabVIEW and NI wireless sensor network (WSN) products were used to create a scalable wireless measurement system that monitored environmental factors, reduced operating costs, and minimized resource consumption in base camps. Also examine network topology, deployment techniques, software architecture, and lessons learned from the application.

From Milliwatts to Megawatts: Measuring Power With LabVIEW

Thursday, August 8 | 10:30–11:30 a.m. | Room 12A
Brett Burger and **Brian Phillippi**, NI

Applications like energy monitoring, smart grid node development, and appliance test share similar hardware measurement and software calculations. At this session, explore how to make power measurements with LabVIEW and NI hardware and view demos featuring CompactRIO, NI CompactDAQ, and the LabVIEW Electrical Power Suite.

Getting Started in LabVIEW With the Next-Generation OPC Protocol

Thursday, August 8 | 1:00–2:00 p.m. | Room 15
Mike Altmann, NI

Explore the benefits of using the open OLE for Process Control Unified Architecture (OPC UA) protocol and discover how to use the new LabVIEW OPC UA API to create a server/client network with both Windows and LabVIEW Real-Time targets such as CompactRIO.

Getting Started With NI SoftMotion

Wednesday, August 7 | 2:15–3:15 p.m. | Room 13A/B
Jeff Adair and **Nathan Kingsley**, NI

NI SoftMotion is a LabVIEW module for motion control built on the LabVIEW RIO architecture (real-time processor, FPGA, modular I/O) to provide a powerful motion control and machine design platform. NI SoftMotion is a full motion control software package that you can program and integrate with vision and I/O at the Windows OS, real-time OS, or FPGA level.

Getting Started With NI SoftMotion

Tuesday, August 6 | 2:15–3:15 p.m. | Room 18D
Wednesday, August 7 | 2:15–3:15 p.m. | Room 18D
Nate Holmes, NI

Learn how you can use the LabVIEW NI SoftMotion Module to implement motion control with the LabVIEW reconfigurable I/O (RIO) architecture-including LabVIEW, the LabVIEW Real-Time Module, and the LabVIEW FPGA Module-across a variety of hardware platforms.

High-Performance Embedded Applications Using NI FlexRIO

Wednesday, August 7 | 1:00–2:00 p.m. | Room 15
Rolando Ortega, NI

NI FlexRIO is one of the most powerful products based on the LabVIEW reconfigurable I/O (RIO) architecture. Learn how you can leverage this architecture to design, develop, and deploy high-performance embedded applications that require the online processing of signals with bandwidths measured in the hundreds of megahertz and beyond. Also discuss design strategies and explore tools to help you reach your time-to-market objectives.

HMI and Display Solutions for Embedded Systems

Thursday, August 8 | 10:30–11:30 a.m. | Ballroom F
Michael Sopko, NI

Interacting with industrial and is an essential task in many applications. But incorporating human machine interfaces and displays into an embedded system can be difficult. At this session, review the different options to effectively display data and/or control NI such as CompactRIO.

Humanoid Robot (Zeno) Helps Autism Treatment

Thursday, August 8 | 2:15–3:15 p.m. | Room 16B
Dan Popa, UT Arlington

Discover how to implement human-robot interaction for Autism Spectrum Disorders (ASDs) treatment. Interaction between Zeno and children with ASDs is accomplished by teaching the children body language to encourage them to engage in social interaction with other humans and improve their motor skills. Review the experimental results obtained with NI Single-Board RIO and LabVIEW.

Embedded Systems

Implementing an Efficient, Moving Average Filter in LabVIEW FPGA

Thursday, August 8 | 1:00–2:00 p.m. | Room 16B
Neville Dholoo, Advanced Measurements Inc.

Many embedded control and monitoring systems suffer from noisy sensor data, putting the functionality and accuracy of the system at risk. Noisy sensor data can be smoothed using moving average filters, but implementing such filters on a CompactRIO system with FPGA and resource constraints can be challenging. Explore the challenges and steps for achieving an efficient FPGA-based moving average filter algorithm. Examine the LabVIEW FPGA code in detail and discuss techniques to aid in resource conservation.

Improving Cost, Throughput, and Resource Use With CompactRIO and Intelligent Software Techniques

Tuesday, August 6 | 1:00–2:00 p.m. | Room 15
John P. Rogers and **Siddharth Shah**, Gyrodata Inc.

Learn how Gyrodata used CompactRIO and intelligent software design techniques to overcome design challenges in a mud-pulse telemetry system, such as fitting six configurable filters on the FPGA. Also hear how CompactRIO improved noisy-data detection, helped reduce false detection while maintaining throughput, reduced CPU use from 95 to 25 percent, and reduced cost by 10X. Discover how you can apply certain design techniques to realize similar improvements.

Improving the Efficiency of Wind Turbines Using LabVIEW and CompactRIO

Thursday, August 8 | 10:30–11:30 a.m. | Room 14
Lasse Damso and **Anders Meister**, CIM Industrial Systems

Walk through some of the challenges in developing an advanced and versatile measurement system to control the behavior of a wind turbine blade.

Integrating NI Components With Other Products and Existing Systems

Wednesday, August 7 | 2:15–3:15 p.m. | Room 14
Joachim Kurpat, Comsoft GmbH, and **Michael Sopko**, NI

NI embedded systems are used in applications that require interoperability with existing equipment, including programmable logic controllers, enterprise networks, machinery, and I/O systems. At this session, copresented by NI Alliance Partner Comsoft, explore different industrial protocols including PROFIBUS, PROFINET, Foundation Fieldbus, EtherNet/IP, CANopen, DeviceNet, IEC-61850, DNP3, and IEC-60870-5. Watch a demonstration that showcases programming best practices for connectivity and data transfer between a third-party device and CompactRIO.

Introducing the Newest Member of the CompactRIO Family

Tuesday, August 6 | 4:45–5:45 p.m. | Room 13A/B
Eric Myers, NI

Available August 6

Introduction to CompactRIO and the LabVIEW RIO Architecture

Tuesday, August 6 | 1:00–2:00 p.m. | Room 14
Arves Stolpe, NI

Explore the LabVIEW reconfigurable I/O (RIO) architecture and the many hardware targets that NI offers based on this architecture. Also learn about the tradeoffs for each hardware target and get guidance on choosing the right CompactRIO, NI Single-Board RIO, and expansion I/O system options for your next application.

Introduction to the KUKA API

Thursday, August 8 | 2:15–3:15 p.m. | Room 14
Kyle Hartley, NI

Get an overview of the KUKA API bundled with the LabVIEW 2013 Robotics Module. Also see the youBot, powered by CompactRIO, in action.

Embedded Systems

ITER Remote Handling: From Viewing and Image Processing to Virtual Reality and Motion Control

Thursday, August 8 | 10:30–11:30 a.m. | Room 15

Ignazio Piacentini, ImagingLab Srl

ITER (the "way" in Latin) is a thermonuclear fusion experiment of unprecedented scale and complexity. Maintenance of this large Tokamak requires a set of complex mobile devices and manipulators that is based on the principle of "man in the loop" and collectively known as a remote handling system. Viewing is essential for operation, and hundreds of cameras are required. The ITER Viewing Demonstrator (IVD) integrates CompactRIO, PXI, and FPGA in LabVIEW; was delivered and installed in March 2013; and will be presented with further activities spanning from virtual reality to motion control targeting a prototype.

LabDRONE

Tuesday, August 6 | 4:45–5:45 p.m. | Room 14

Adam Amos, Rescue Robotics

Discover how to develop a high-performance autopilot system for competition use.

Managing Big Data

Thursday, August 8 | 1:00–2:00 p.m. | Ballroom G

Stuart Gillen, NI

Aggregating, storing, and sharing large amounts of data from multiple locations is often extremely challenging, especially for condition monitoring systems deployed in remote or inaccessible locations, like inside a wind turbine, on a pipeline, or within the chassis of an industrial earth mover. Learn about NI tools to address these challenges and the future role of the cloud.

Move Beyond Your Chassis With C Series Expansion

Wednesday, August 7 | 1:00–2:00 p.m. | Room 14

Brandon Treece, NI

Learn how you can add industrial, signal-conditioned I/O to a new or existing system using NI C Series expansion options. Also explore how you can design a fully distributed monitoring and control system with NI reconfigurable I/O (RIO) systems.

Moving From Windows-Based to Real-Time Control With CompactRIO

Wednesday, August 7 | 10:30–11:30 a.m. | Room 15

William Schramm, PVI Systems Inc.

As chemistry and speed requirements have increased, machines have evolved from "soft real-time" control on a Windows PC to true real-time control with embedded systems like CompactRIO. Learn about the challenges of migrating from a Windows-based system to CompactRIO, the benefits of using a true real-time control system, and the design decisions and selection criteria used to make this migration.

NI Stepper Drives and Motors

Wednesday, August 7 | 3:30–4:30 p.m. | Room 13A/B

Nate Holmes, NI

This year, NI released new stepper hardware including integrated steppers, DC and AC stepper drives, and NEMA 8 through NEMA 34 sized stepper motors. Explore the actual hardware during this session, which also features product overviews, example applications, and system configurations.

PACs, PIDs, and P&IDs: Large-Scale Industrial Automation and Process Control in LabVIEW

Thursday, August 8 | 2:15–3:15 p.m. | Room 15

Robert Hoffman and **John Niezgoski**, Signal.X Technologies

Explore best practices for large-scale industrial automation systems that require high uptime and reliability, have no tolerance for failure, and involve a configurable logic-based control and user interface. Hear from Signal.X staff about some of the unique technologies applied to a distributed high-channel-count process control system as an example of their use in a real-world setting.

Proven Architectures for Machine Control Applications

Wednesday, August 7 | 1:00–2:00 p.m. | Room 13A/B

Christian Fritz, NI

To enable intelligent factories, leading machine and device builders design smart machines that take advantage of measurement technology, advanced control, signal processing, and real-time math to operate more autonomously than ever before. At this session, review recommended architectures for the development of high-performance machine control systems based on NI reconfigurable I/O (RIO) architecture.

Embedded Systems

RMC Design for NI Single-Board RIO

Tuesday, August 6 | 2:15–3:15 p.m. | Room 13A/B

Blayne Kettlewell and **Eric Myers**, NI

The RIO Mezzanine Card (RMC) provides custom expansion to unique, application-specific I/O. At this session, examine the best practices and resources available for RMC hardware design and LabVIEW FPGA driver development. This is a must-attend session for those developing custom RMCs.

Rugged By Design: How NI Builds Products to Withstand Extreme Conditions

Wednesday, August 7 | 10:30–11:30 a.m. | Room 14

Jim Berry, **Jared Harlan**, **Jeremy O'Rarden**, **Vance Toth**, and **Kevin Wills**, NI

Many system integrators praise the ruggedness of the NI C Series platform. But how are specifications like operating temperature and vibration durability achieved, tested, defined, and maintained? And how do you attain a similar level of ruggedness when developing with a board-only product? At this session, get answers from the mechanical designers of NI CompactRIO, NI Single-Board RIO, and NI CompactDAQ.

Science and Engineering of Biorobotics

Tuesday, August 6 | 2:15–3:15 p.m. | Room 14

Paolo Dario, Scuola Superiore Sant'Anna

With robotics technology, we build new machines that are smart and helpful in real-life scenarios. With robotics science, we use robotic systems to validate scientific models or even generate new scientific knowledge. At this session, explore biorobotics, which offers an integrated approach to the study of robots and biological systems.

The Art of Motor and Drive Sizing

Thursday, August 8 | 1:00–2:00 p.m. | Ballroom F

Erik Brewster and **Gordon Ritchie**, Kollmorgen

Correctly sizing motors is one of the most important decisions in any machine design because it directly impacts machine performance. Additionally, 97 percent of operating costs over a motor's lifetime can result from energy consumption rather than the cost of the motor itself. Despite this, most motors are oversized. At this session, discuss the proper techniques for sizing drives and motors including topics such as inertia mismatch, tuning tolerance, gearing, continuous and peak specifications, and bus power implications.

The Power User's Guide to NI Linux Real-Time (Part 2 of a 2-Part Series)

Wednesday, August 7 | 3:30–4:30 p.m. | Room 14

Sanjay Challa, NI

> ### Available August 7

Tuning Deployed LabVIEW Real-Time Applications

Thursday, August 8 | 2:15–3:15 p.m. | Room 18D

Kris Quillen, NI

If you distribute LabVIEW Real-Time applications, attend this session to explore tools for managing real-time software deployments, run-time variable settings, and fault logs and learn about a LabVIEW Real-Time toolkit for creating your user interface without stopping or opening the real-time code.

Universal Robot Controller Based on PACs and Machine Control Architecture

Thursday, August 8 | 2:15–3:15 p.m. | Ballroom G

Francisco Mota, Universidad Politécnica de Guanajuato

Explore the implementation of a universal robot controller based on a programmable automation controller (PAC) and machine control architecture. The controller works with a robot arm by means of its kinematic model and proper I/O modules to update systems in good mechanical condition and customize them for industrial or educational applications.

Wireless Sensor Networks

Tuesday, August 6 | 10:30–11:30 a.m. | Room 18D
Wednesday, August 7 | 10:30–11:30 a.m. | Room 18D

Nick Butler, NI

Discover the latest advancements in NI wireless sensor network (WSN) technology and create a WSN from scratch. Also learn how to embed intelligence into deployed WSN nodes with the LabVIEW WSN Module.

Software Development Techniques

Architecting Embedded Control and Monitoring Applications
Thursday, August 8 | 2:15–3:15 p.m. | Room 19B
Meghan Kerry, NI

Picking the right architecture will help you increase the robustness and maintainability of your application. Get a solid start on your next project by applying the NI-recommended architecture for control and monitoring applications using CompactRIO. This session reviews the architecture of the LabVIEW for CompactRIO Sample Projects included in LabVIEW 2012 and later.

At Your Fingertips: Creating a Touch Screen UI for Embedded LabVIEW Apps
Thursday, August 8 | 10:30–11:30 a.m. | Room 17A
Eric Graham, **Tomi Maila**, and **Jim Kring**, JKI

Learn how to improve your application's usability and wow your users by building touch panel user interfaces for your LabVIEW applications. LabVIEW Champion Tomi Maila and Certified LabVIEW Architect Eric Graham show you step-by-step how they build cheap, reusable touch interfaces for JKI customers' LabVIEW projects. Examine how to build a touch UI for LabVIEW and to create a portable, custom touch interface for your projects.

Best Practices for Saving Measurement Data
Tuesday, August 6 | 3:30–4:30 p.m. | Room 16B
Stephanie Orci, NI

You collect data to make decisions. However, an inefficient file format may cause problems when you analyze your data. The key to choosing the right file format for your application involves considering your current system requirements as well as ways you can adapt the file for future application needs. At this session, hear how to select a file format; organize metadata; and analyze, report, and share your results.

Bookmark API in LabVIEW 2013
Wednesday, August 7 | 1:00–2:00 p.m. | Room 16A
Christina Rogers, NI

One of the many new features in LabVIEW 2013 is the ability to bookmark labels on your VI block diagrams. At this session, discuss this feature with the NI R&D developers who created it and learn how you can integrate bookmarks into your own tools and processes or create your own Bookmark Manager.

Bringing Order: Implementing Software Reuse on Legacy Projects
Thursday, August 8 | 10:30–11:30 a.m. | Room 19A
Becky Linton, V I Engineering

Hear from Certified LabVIEW Architect Becky Linton and how she helped her LabVIEW development team overcome reuse nightmares and successfully migrate multiple legacy projects to a common reuse platform without breaking any code. Learn how to develop and deploy a similar system in your organization using VI Package Manager, VI Scripting, and a variant attribute database.

Code Review Best Practices
Wednesday, August 7 | 2:15–3:15 p.m. | Room 18C
Thursday, August 8 | 10:30–11:30 a.m. | Room 18C
Nancy Hollenback and **Brian Powell**, NI

LabVIEW R&D engineers review all (yes, all) code that goes into the product and encourage you to do the same, but how? In this session, two NI field architects (and 20-year NI veterans) share their best practices and explain how you can use these ideas in your own team.

Software Development Techniques

Collaborative Opportunistic Navigation
Wednesday, August 7 | 4:45–5:45 p.m. | Room 19B
Zak Kassas, University of Texas at Austin

Discover how you can use LabVIEW to build an RF environment simulator to assess the feasibility of solutions for enabling resilient navigation anytime, anywhere, despite the vulnerability of global navigation satellite system (GNSS) signals to spoofing and jamming. With the NI-RFSA Soft Front Panel, you can simultaneously downmix and synchronously sample GPS and CDMA signals fused to improve navigation resiliency.

Controlling a Nuclear Fusion Particle Accelerator
Tuesday, August 6 | 10:30–11:30 a.m. | Room 19A
Casey Lamers, Phoenix Nuclear Labs

A nuclear fusion particle accelerator demands a complex and critical control system. Phoenix Nuclear Labs developed a system to safely and remotely operate a nuclear fusion particle accelerator using modular NI hardware and software to break down the machine into testable pieces. Phoenix engineers used the Actor Framework to write actors that use equipment in a 300 kV dangerous neutron environment, interface with the FPGA, and log data. Attend this session to see how it was done.

Create High-Performance FPGA Designs With LabVIEW FPGA IP Builder
Wednesday, August 7 | 2:15–3:15 p.m. | Room 19B
Alejandro Asenjo, NI

Take advantage of state-of-the-art high-level synthesis technology from Xilinx to create and reuse resource- and timing-optimized FPGA IP without the need for advanced optimization tricks.

Deployment Automation and Release Engineering for LabVIEW
Wednesday, August 7 | 10:30–11:30 a.m. | Room 16A
Jack Dunaway, Wirebird Labs

Is your application deployment tedious or brittle? How is your customer's installation UX? And how's your DevX creating a release? Hear from a LabVIEW Champion about the business and human benefits of automating your deployment process for LabVIEW applications. Explore specific technical tips to improve your deployment strategy and leave with a template to kick-start your deployment automation.

Designing a Framework in LabVIEW: Borrow or Build?
Tuesday, August 6 | 2:15–3:15 p.m. | Room 16B
Nancy Hollenback, NI

With larger and more complex applications using LabVIEW, designing a scalable framework that simplifies modification and facilitates team development is important. Many frameworks are emerging in the LabVIEW community. In this session, consider several aspects of framework design to help you decide between using an existing framework or building one.

Designing an Intelligent Navigation Algorithm With LabVIEW Robotics
Tuesday, August 6 | 1:00–2:00 p.m. | Room 19A
Tim Ancarrow, NI

Explore robotic navigation, mobility, and localization using LabVIEW. This presentation focuses on applications in Peter Corke's book *Robotics, Vision and Control* that are solved using LabVIEW.

Software Development Techniques

Everything You Ever Wanted to Know About Functional Global Variables

Thursday, August 8 | 1:00–2:00 p.m. | Room 17A
Nancy Hollenback, NI

As a longtime foundational design pattern in the LabVIEW community, the functional global variable (FGV) meets many common challenges but can also be overused. Join this discussion of best practices for global data storage and the transition from FGVs to data value references.

Explore the New LabVIEW SCADA Sample Project

Tuesday, August 6 | 1:00–2:00 p.m. | Room 16A
Jonah Paul, NI

Tour the new LabVIEW Supervisory Control and Data Acquisition sample project in the LabVIEW 2013 DSC Module, which provides an architecture to supervise a system with I/O from a variety of data sources, log the I/O to disk, and visualize data and alarms through a client HMI application.

Extending Your LabVIEW Skills to LabVIEW Real-Time and LabVIEW FPGA

Tuesday, August 6 | 3:30–4:30 p.m. | Room 19B
Deborah Yagow, NI

Have you used LabVIEW for your desktop and considered using LabVIEW Real-Time or LabVIEW FPGA for your next project? Learn the skills you need, what to expect when making the transition, and how to avoid common pitfalls.

Graphical Programming for Advanced Robotics: From Digital Reality to Factory Floor

Tuesday, August 6 | 4:45–5:45 p.m. | Room 19A
Maxim Soroka, ImagingLab GmbH

Advanced robotics might be the next candidate for the graphical programming revolution. Learn how you can use ImagingLab Robotics Libraries with LabVIEW to create a powerful integrated environment for complete robot cell programming and use the VisualComponents 3D factory simulation suite for the deployment of LabVIEW (including LabVIEW Real-Time) applications to factory floor targets.

Hierarchical Control and Simulation

Wednesday, August 7 | 1:00–2:00 p.m. | Room 19B
Jeannie Falcon, NI

Discover how to use the LabVIEW MathScript RT and LabVIEW Control Design and Simulation modules with the LabVIEW Real-Time and LabVIEW FPGA modules for hierarchical control and simulation. Explore a design flow for measurement and model-based design and watch hierarchical control and simulation demonstrations for an electro-hydraulic control system.

How to Polish Your Software and Development Process to Wow Your End Users

Wednesday, August 7 | 1:00–2:00 p.m. | Room 19A
Fabiola De la Cueva, Delacor

Hear from LabVIEW Champion and LabVIEW Architects Forum Founder Fabiola De la Cueva about five "little things" that can improve your application's usability and create happier, more productive end users. From easy ways for your app to look and feel like a "real Windows application" to subtle features that can make every application template easier for developers to use, explore the secrets that professional LabVIEW developers use to make their lives, and their users' lives, easier.

Introduction to Automating Stand-Alone Instruments

Wednesday, August 7 | 10:30–11:30 a.m. | Room 19B
Katie Collette and **Adri Kruger**, NI

Every day, engineers work with a variety of bench top instruments from oscilloscopes to more specialized instruments such as radiometers. Explore connectivity options including GPIB, USB, and Ethernet and learn how to get started automating multiple measurements quickly with LabVIEW and certified instrument drivers.

Software Development Techniques

Introduction to Basic Object-Oriented Design Patterns

Tuesday, August 6 | 4:45–5:45 p.m. | Room 18D
Wednesday, August 7 | 4:45–5:45 p.m. | Room 18D
Elijah Kerry, NI

Examine the basics of creating and using classes in a LabVIEW system to extend the capabilities of an existing system. Explore how to create and add a class, define inheritance, and define data members and methods. Then implement a command pattern and factory pattern. Attendees should be familiar with basic LabVIEW design patterns such as a queued message handler.

Introduction to NI LabVIEW

Tuesday, August 6 | 10:30–11:30 a.m. | Room 19B
Grant Heimbach, NI

LabVIEW is a comprehensive development environment that contains all the tools engineers and scientists need to design and deploy measurement and control systems. In this session, explore the fundamentals of graphical system design and discover how LabVIEW can benefit your applications by providing diverse real-world measurements; signal processing and analysis; advanced control; and desktop, embedded, and industrial deployment.

Introduction to the Data Dashboard for LabVIEW Mobile App

Wednesday, August 7 | 4:45–5:45 p.m. | Room 16B
Grant Heimbach, NI

Do you need to monitor or control your deployed system while on the go? With the Data Dashboard for LabVIEW mobile app, you can remotely access NI systems from your tablet or smartphone. Learn about the Data Dashboard for LabVIEW, the different supported platforms, new features in the app, and how to integrate it into your systems

Introduction to the LabVIEW FPGA Module

Tuesday, August 6 | 2:15–3:15 p.m. | Room 19B
Meghan Kerry, NI

Explore how you can use the LabVIEW FPGA Module to take advantage of reconfigurable hardware with graphical programming. Also review application examples and NI FPGA hardware targets.

Introduction to the LabVIEW Real-Time Module

Tuesday, August 6 | 1:00–2:00 p.m. | Room 19B
Carlos Pazos, NI

Learn how you can use LabVIEW Real-Time to create reliable, stand-alone monitoring and control systems. Also find out more about real-time OSs and key concepts such as jitter.

Introduction to LabWindows™/CVI

Tuesday, August 6 | 10:30–11:30 a.m. | Room 18C
Wednesday, August 7 | 1:00–2:00 p.m. | Room 18C
Darren Biel and **Anna Kozminski**, NI

Discover how C programmers performing instrument control, DAQ, and control design are using LabWindows/CVI to create their applications. Also learn how you can use built-in LabWindows/CVI engineering and scientific tools to be a more productive C programmer.

LabVIEW Application Builder: Tips and Tricks for Deploying Desktop Applications

Tuesday, August 6 | 3:30–4:30 p.m. | Room 19A
Elijah Kerry, NI

How many times have you created an executable and wondered what was going on behind the scenes? After reviewing basic steps, this session covers advanced lessons on creating simple executables in LabVIEW and offers tips and tricks for configuring a build specification. Learn what makes up an executable, how to include code that is not a dependency, and how to change and add components after an executable has been deployed.

LabVIEW Data Management and Postprocessing

Tuesday, August 6 | 4:45–5:45 p.m. | Room 18B
Stephanie Orci, NI

Explore DIAdem and improve your postprocessing productivity by using data management techniques to quickly locate and load data from any file format. Also graph and visualize data without the limitations of software such as Microsoft Excel, perform interactive engineering analysis, export professional reports, and automate repetitive processing tasks.

Software Development Techniques

LabVIEW FPGA Design Flow

Wednesday, August 7 | 3:30–4:30 p.m. | Room 16B

Alejandro Asenjo and **Ben Weidman**, NI

Examine the stages of the LabVIEW FPGA design flow and gather best practices for using the tool.

LabVIEW GUI Design: Moving Beyond the Palettes

Tuesday, August 6 | 1:00–2:00 p.m. | Room 16B

Jon McBee, Bloomy Controls, Inc.

A successful GUI is intuitive and user friendly, and it makes users more efficient when interacting with the system. At this session, learn how to use third-party tools to design professional GUI elements as well as how to import these elements into the LabVIEW environment. Study real-world examples and discuss the methods used to create them. Also explore the techniques you need to create streamlined, intuitive, and elegant LabVIEW user interfaces.

Making the Most of New User Event Features in LabVIEW 2013

Wednesday, August 7 | 4:45–5:45 p.m. | Room 16A

Michael Aivaliotis, JKI

Event-based programming is a recognized best practice in software development, and it is particularly important in LabVIEW, where nearly every significant application uses multiple loops and multiple pieces of hardware. Watch a Certified LabVIEW Architect and LabVIEW Champion demonstrate how User Events work, how JKI uses them in every project, and how they are even better in LabVIEW 2013. Also explore Version 2 of the famous JKI State Machine featuring dynamic event registration.

Managing Large-Scale Application Development

Tuesday, August 6 | 2:15–3:15 p.m. | Room 19A

Eric Simon and **Samuel Taggart**, Westinghouse

Learn how Westinghouse engineers transitioned from single-developer medium-sized application development to team-based large application development. Explore the process they follow and how they use NI resources to help.

Mobile Microrobotics Challenge 2013

Thursday, August 8 | 2:15–3:15 p.m. | Room 11A/B

Nahum Torres, UTA Research Institute

The National Institute of Standards and Technology created this challenge to motivate researchers to accelerate the development of microrobots featuring microelectromechanical systems; reveal the most pressing technical challenges; and evaluate the most successful methods for locomotion and manipulation at the microscale. Learn how the UT-Arlington Microrobotics Team has successfully competed twice in this event by actuating its microrobots with LabVIEW.

Networked Data Routing Architecture

Thursday, August 8 | 10:30–11:30 a.m. | Ballroom E

Justin Fuller and **Christopher Osiecki**, Southwest Research Institute

Explore the design and implementation of a networked data routing architecture. Also review design considerations for the use of TCP/IP, LabVIEW events, and queues to pass data between processes in a networked environment.

New Features for ANSI C Programmers in LabWindows™/CVI 2013

Tuesday, August 6 | 2:15–3:15 p.m. | Room 16A

Anna Kozminski and **Jonathan Newton**, NI

NI LabWindows/CVI provides ANSI C programmers with a powerful and flexible integrated development environment for efficiently writing test and measurement applications. It continues to evolve as NI strives to advance usability, performance, and platform support. At this session, learn about this tool, explore the new feature improvements in LabWindows/CVI 2013, and discover NI's vision for the future of this software.

NI VeriStand

Tuesday, August 6 | 10:30–11:30 a.m. | Room 18A
Wednesday, August 7 | 10:30–11:30 a.m. | Room 18A

Nicholas Keel, NI

Examine how to use NI VeriStand real-time testing software through a hands-on tutorial that covers creating a hardware-in-the-loop test system to validate an embedded control device.

Software Development Techniques

Object-Oriented Design

Wednesday, August 7 | 3:30–5:45 p.m. | Room 18B

Nancy Hollenback and **Brian Powell**, NI

The best way to learn object-oriented (OO) design is to try it. At this session, split into groups to work on a real OO design problem and then share and discuss your designs to learn from other participants as well as field architects and OO experts at the session. Beginner through advanced designers are welcome.

Optimizing Performance in LabVIEW Real-Time

Thursday, August 8 | 2:15–3:15 p.m. | Room 16A

Deborah Yagow, NI

Gain insight from National Instruments experts on how to improve reliability, reduce jitter, and optimize performance in your real-time systems.

Options for Integrating IP Into Your LabVIEW FPGA Design

Thursday, August 8 | 10:30–11:30 a.m. | Room 19B

Alejandro Asenjo, NI

Avoid reinventing the wheel by taking advantage of the available formats, sources, and mechanisms for integrating existing FPGA IP into LabVIEW FPGA.

Order Out of Chaos: Agile Management of LabVIEW Projects in a Large Organization

Wednesday, August 7 | 3:30–4:30 p.m. | Room 19A

Erik Disler, General Motors, and **Becky Linton**, V I Engineering

Need to rein in your developers? Stuck behind the firewall? No problem! Learn how Software Development Manager Erik Disler and Certified LabVIEW Architect Becky Linton worked together with their team to internally implement distributed version control, project and issue tracking, and code quality systems. Discover how to set up an affordable, agile development project management infrastructure with integrated source code control and see how smart commits can save time and money for your organization.

Overcoming Microsoft Excel Limitations for LabVIEW Data Analysis and Reporting

Wednesday, August 7 | 10:30–11:30 a.m. | Room 16B

Ryan Parkinson, Siemens, and **Stephanie Orci**, NI

If you're frustrated with Microsoft Excel's slowness or inability to handle the size or format of your data file, learn how to use a tool designed for engineers instead of being limited by one designed for accountants. Also discover how Siemens used NI DIAdem to determine the root cause of damaging high-voltage transients.

Queued Message Handler: Caveats and Design Decisions

Thursday, August 8 | 10:30–11:30 a.m. | Room 16A

Darren Nattinger, NI

The Queued Message Handler (QMH) project template is an architecture used in many different LabVIEW applications and is one of the easiest starting points when developing a multiloop application. Get a detailed look at all of the design decisions, like handling errors and maintaining state between loops, that went into the QMH project template updated in LabVIEW 2013.

Real-Time Testing With NI VeriStand

Thursday, August 8 | 2:15–3:15 p.m. | Room 19A

Nicholas Keel, NI

NI VeriStand is a software environment for configuring real-time testing applications. No programming knowledge is required for NI VeriStand, and you can use a variety of NI and third-party environments to add custom functionality. Get an introduction to NI VeriStand and learn how you can use it to create real-time testing applications more efficiently.

Remote Connectivity and Remote User Interface Options With LabVIEW Systems

Thursday, August 8 | 1:00–2:00 p.m. | Room 19B

Grant Heimbach, NI

Discover the different technologies that make remotely monitoring and controlling your LabVIEW application possible. View demonstrations that walk through technologies like web services, remote front panels, the Data Dashboard for LabVIEW mobile app, and third-party options that enable remote connectivity in LabVIEW.

Software Development Techniques

Robust Robotic Teleoperation With High Communication Latency

Wednesday, August 7 | 1:00–2:00 p.m. | Room 16B

John Arakaki, **Andrew Bennett**, **Silas Hughes**, **Murphy Kitchell**, **Jing Li**, and **Chani Martin**, Olin College

Examine an experimental platform capable of maneuvering with a simulated communication latency of five seconds. To address the large time delay, Olin College engineers developed a robotic platform and an intuitive control interface. They tested the system with operators at the Jet Propulsion Laboratory in California navigating a robot in Massachusetts using a two-way artificial time delay between the operator and the robot.

Signal Processing With LabVIEW

Tuesday, August 6 | 4:45–5:45 p.m. | Room 19B

Courtney Lessard, NI

LabVIEW offers hundreds of native analysis functions and several native and third-party math nodes that you can use to incorporate text-based math scripts into your graphical code. Discover how to add inline analysis to your acquisition system, review the different options for text-based math in LabVIEW, and discuss in-depth how to use the LabVIEW MathScript RT Module.

Slaying the LabVIEW Interoperability Beast

Thursday, August 8 | 1:00–2:00 p.m. | Room 19A

Jeannie Falcon and **Adri Kruger**, NI

LabVIEW offers unprecedented integration with a wide variety of languages, including C, .NET, and .m scripts. Learn how to make the most of LabVIEW and save time and money by integrating existing code into your applications.

Source Code Control and Software Engineering

Tuesday, August 6 | 1:00–2:00 p.m. | Room 18D
Wednesday, August 7 | 1:00–2:00 p.m. | Room 18D

Elijah Kerry, NI

Explore topics ranging from source code control to regression testing frameworks that you can use with LabVIEW.

Testing Medical Devices With LabVIEW and NI TestStand

Thursday, August 8 | 2:15–3:15 p.m. | Room 12A

Albert DeWeese, Good Automation

NPS SOPs. TMVs. WIs. QSR. IQ/OQ/PQ. V vs. V. What does it all mean? Why is there so much process? How can you get anything done under these burdens? Discover how to tackle the highly regulated medical industry when using NI products.

The Essentials of File Management With LabVIEW

Tuesday, August 6 | 10:30–11:30 a.m. | Room 16B

Courtney Lessard, NI

Discover how to identify and avoid common pitfalls when developing a LabVIEW code base and examine best practices for managing LabVIEW applications. Also, discover how to effectively use the LabVIEW Project Explorer to organize code, documentation, and build specifications as well as increase dependency control and apply software configuration management strategies, such as implementing source code control, to improve team development. Finally, discuss recommended solutions for distributing and deploying reuse libraries in LabVIEW using the VI Package Manager.

The Power User's Guide to NI Linux Real-Time (Part 1 of a 2-Part Series)

Wednesday, August 7 | 2:15–3:15 p.m. | Room 16A

Sanjay Challa, NI

Learn all about this exciting new operating system supported by the LabVIEW 2013 Real-Time Module running under the hood of the next generation of CompactRIO. From the new scheduler to file system permissions and real-time benchmarks, this session will cover all of the important details. Attend to find out about these new improvements and changes through comparisons that will be provided to the real time OSs used on today's CompactRIO systems. Refer to page 53 for information on Part 2.

Tips and Tricks to Speed LabVIEW Development

Thursday, August 8 | 2:15–3:15 p.m. | Ballroom E

Darren Nattinger, NI

Hear from Darren Nattinger, world's fastest LabVIEW programmer and NI senior software engineer, about some simple techniques that can help you code more quickly. Learn about little known LabVIEW features, advanced functions, and other tools that can help you save development time.

Software Development Techniques

UI Design Best Practices

Wednesday, August 7 | 2:15–3:15 p.m. | Room 16B

Joe Silva, NI

User interface design focuses on the user's experience and interaction with the design of a machine or software application. To make this interaction as simple and efficient as possible, good user interface design facilitates finishing the task at hand without drawing unnecessary attention to the design itself. At this session, explore the basic principles, best practices, and practical applications of UI design from a designer's perspective—without delving into code.

UI Design in Visual Studio

Wednesday, August 7 | 10:30–11:30 a.m. | Room 19A

Aaron Cederquist and **Jonathan Meyer**, NI

Explore Measurement Studio and the benefits of Microsoft Windows Presentation Foundation (WPF) for test and measurement application software. WPF is a next-generation presentation system for building Windows client applications in .NET with visually stunning user experiences.

Under the Hood of LabVIEW Web Services

Wednesday, August 7 | 3:30–4:30 p.m. | Room 16A

Paul Spangler, NI

Applications often require networking interfaces so that a system can be remotely monitored or controlled. LabVIEW web services are the best and most secure way to add this functionality to your system. Learn how LabVIEW 2013 revamped LabVIEW web services to be more intuitive than ever with this demo-heavy session led by NI R&D staff.

User Events, Tips, Tricks, and Sundry

Wednesday, August 7 | 3:30–4:30 p.m. | Room 19B

Jack Dunaway, Wirebird Labs

Didn't make it to Paris for the European Certified LabVIEW Architect Summit this year? Catch the domestic reprise of this session to hear from a LabVIEW Champion about the key principles that make Events the primary transport mechanism for product design and application architecture at Wirebird Labs. Leave with nearly a dozen downloadable code snippets, featuring practical event-driven design patterns, and focus on the powerful yet simple semantics of the Events API.

Using LabVIEW Templates and Sample Projects for Desktop Applications

Thursday, August 8 | 10:30–11:30 a.m. | Room 18D

Adri Kruger, NI

Learn how to get ahead in your application development using LabVIEW templates and sample projects. These well-architected solutions are ready to run and flexible so you can customize solutions to meet your development needs. This session examines common extensions and customizations that you can make to LabVIEW sample projects.

Using .NET Tools and FPGAs to Test Einstein's Theories

Wednesday, August 7 | 2:15–3:15 p.m. | Room 19A

Erik Swanson, University of Washington, and **Anna Kozminski**, NI

See a full spectrum of NI technologies used for precision measurements in academic research. Learn how you can use NI Measurement Studio tools for .NET with DAQ and FPGA hardware to search for violations of the equivalence principle, a cornerstone of general relativity. Also discover how to integrate the rich functionality of Visual Studio .NET and the power of LabVIEW FPGA programming to control and monitor the measurement of gravity.

What a Software Architect Needs to Know Before Using the Actor Framework

Wednesday, August 7 | 4:45–5:45 p.m. | Room 19A

Dave Snyder, Endeavor Engineering, and **David Staab**, Staab Engineering

NI's Actor Framework (AF) is a powerful tool for managing concurrent processes, but it requires a principled approach to design and implementation. Learn the right approach to actor-oriented programming—what defines an actor in LabVIEW, how to develop AF applications quickly, how to simulate and test AF components, and how to deploy binaries successfully on the first try. Attendees need to be comfortable with LabVIEW object-oriented programming and be familiar with AF.

Software Development Techniques

What's New in LabVIEW 2013

Tuesday, August 6 | 4:45–5:45 p.m. | Room 16A

Thursday, August 8 | 1:00–2:00 p.m. | Room 16A

Grant Heimbach, NI

Attend this staple NIWeek session to learn about new LabVIEW features designed to accelerate your success, and take a demo-heavy tour through the latest version of LabVIEW.

What's New in LabVIEW Real-Time and FPGA

Tuesday, August 6 | 3:30–4:30 p.m. | Room 16A

Jonah Paul, NI

Review the latest improvements, watch engaging demos, and learn how you can take advantage of new features to improve productivity and add new capabilities to your systems based on LabVIEW reconfigurable I/O (RIO) architecture.

What's New in NI TestStand 2013

Tuesday, August 6 | 10:30–11:30 a.m. | Room 16A

Lars Lindstrom, NI

Examine the new features of NI TestStand 2013 test management software. Learn how deployment patching can simplify the maintenance of existing deployments and how new engine optimizations can increase your available memory and improve overall run-time performance.

Zero to Hero: Designing the LabVIEW Drivers for Your Instrument

Tuesday, August 6 | 4:45–5:45 p.m. | Room 16B

Jim Cavera, AIM USA

There are right ways and wrong ways to go from a DLL to a complete suite of LabVIEW VIs. In this session, examine the correct way to drive your custom hardware (as well as a few of the wrong ways) and learn what it takes to keep both National Instruments and the LabVIEW programmers of the world happy.

2013 LAVA/OpenG NIWeek BBQ
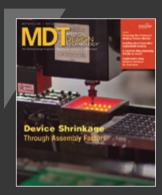
Tuesday, August 6 | 7:00 p.m. | Scholz Garten, 1607 San Jacinto Blvd., Austin
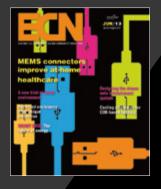
This yearly event brings together LabVIEW R&D engineers and our online and real-world friends from the LAVA and OpenG forums. Step away from the hustle and bustle of the NIWeek expo floor and enjoy good BBQ and awesome door prizes with your fellow wire workers. Tickets are $30 USD per person. Learn more at lavag.org/bbq.
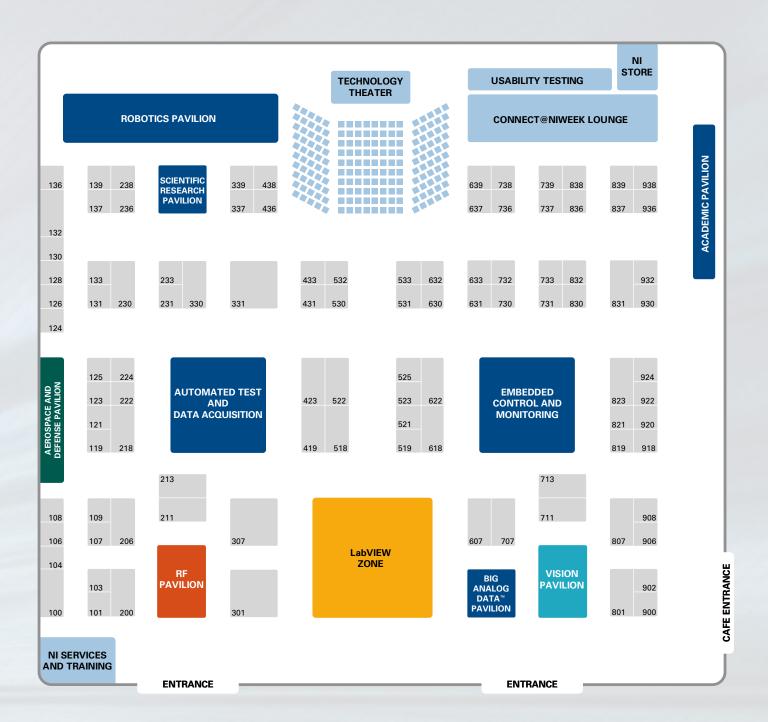
Exhibition Quick Reference Guide

Exhibition Hall

Exhibition Hall Hours

Monday, August 5 | 5:30–7:00 p.m.

Tuesday, August 6 | 10:00 a.m.–7:00 p.m.

Wednesday, August 7 | 10:00 a.m.–6:00 p.m.

Thursday, August 8 | 10:00 a.m.–1:00 p.m.

Product Showcase

Visit the NI Product Showcase to see demonstrations of the latest NI hardware and software products, talk to NI developers, and discover ways to incorporate NI products into your test, monitoring, and control applications.

LabVIEW Zone

Discover what's new in LabVIEW and get a close-up look at demos featured in the conference. Along with learning about new programming resources, you can interact with other LabVIEW users as you try some of the fun and exciting demos powered by LabVIEW. See what amazing things LabVIEW can do.

Automated Test and Data Acquisition

Check out the latest data acquisition and automated test applications ranging from a single-channel thermocouple device, to high-channel-count structural test, to multidevice semiconductor test systems based on industry-leading PXI technology.

Automated Test and Data Acquisition Exhibitors
PVI Systems

Embedded Control and Monitoring

Explore how graphical system design is benefiting areas such as life science, next-generation power electronics, the electrical power grid, condition monitoring, oil and gas, and machine control as well as see demos of the latest products and features based on the LabVIEW reconfigurable I/O (RIO) architecture.

External Exhibitors
Cyth Systems
Dell
Lime Instruments
LocalGrid Technologies
Master Machinery

Connect @NIWeek Lounge

Take a break and relax in the Connect @NIWeek Lounge in the back of the Exhibition Hall. Enjoy comfortable couches, free WiFi, and charging stations so you and your devices can recharge throughout the conference.

Get Social

Grab a spot on our sofas and follow conversations and photos via social media. Include #NIWeek in any of your tweets and updates, and you might see them on the jumbo screen before NIWeek keynotes and during the NIWeek conference party. "Like," "Follow," or "Friend" National Instruments to get official conference information in real time and participate in fun social media activities.

NI Store

Take the NIWeek experience home with you. Visit the NI Store to purchase NI-branded merchandise, including stylish T-shirts, polos, and other apparel. The store accepts American Express, MasterCard, and VISA. It is open during Exhibition Hall hours.

Technology Theater

Located in the Exhibition Hall, the Technology Theater features technology presentations and focused product and service demonstrations from exhibiting and partner companies as well as NI developers. These sessions are open to all NIWeek attendees.

Tuesday, August 6	11:00–11:30 a.m.	Test System Hardware Abstraction Using LabVIEW Object-Oriented Programming and NI TestStand
	Noon–12:30 p.m.	Enhancing the Classroom Through Modeling and Simulation
	1:00–1:30 p.m.	Building Smarter Systems With All Programmable SoCs
	2:00–2:30 p.m.	Engine Combustion Control With NI Real-Time, FPGA, and DAQ Systems
	3:00–3:30 p.m.	How to Become a *FIRST* Mentor
	3:30–4:00 p.m.	Copy Protection of LabVIEW Applications
	4:00–4:30 p.m.	The Broadest Range of Real-World Sensors and Devices Attached to NI RIO
	5:45–6:15 p.m.	Challenge the Champions
	6:15–7:00 p.m.	User Group Awards Ceremony
Wednesday, August 7	11:00–11:00 a.m.	Developing a Scalable and Open Automation System Based on LabVIEW DSC
	Noon–12:30 p.m.	Global Lab Automation at Texas Instruments Using Perforce, LabVIEW, and NI TestStand
	12:30–1:00 p.m.	Integrating Test With Product Lifecycle Management
	1:00–1:30 p.m.	End-to-End Synchrophasor Data Management
	2:00–2:30 p.m.	PXI-Based Noise Figure Testing
	3:00–3:30 p.m.	Gracious Professionalism: A Core Value of *FIRST*
	4:00–4:30 p.m.	Improvement and Optimization of Electric Power Generation
Thursday, August 8	11:00 a.m.–Noon	Why Dataflow Works: Explained With a Potato and Candy Bars
	Noon–1:00 p.m.	LabVIEW Coding Challenge Finals

Technology Theater

Building Smarter Systems With All Programmable SoCs
Xilinx Inc.

Learn how All Programmable systems on a chip (SoCs) infuse intelligence into today's embedded systems including NI solutions powered by LabVIEW. With the Xilinx SoC platform, you can enhance and expand the life of your system while lowering bill of materials cost, increasing system performance, and reducing overall system power.

Challenge the Champions

Watch pillars of the LabVIEW community battle each other for bragging rights as the most knowledgeable about LabVIEW.

Copy Protection of LabVIEW Applications
WireFlow

Explore different use cases to learn about the technology behind the new hardware-based WireFlow Security Suite for LabVIEW. Also examine crypto algorithms.

Developing a Scalable and Open Automation System Based on LabVIEW DSC
University of Helsinki

The University of Helsinki developed a large automation system based on the LabVIEW Datalogging and Supervisory Control (DSC) Module and LabVIEW object-oriented programming tools. It controls the particle accelerator, which leads to a variety of instruments. Learn how LabVIEW was selected because it's open and scalable to implement most measurements and control.

End-to-End Synchrophasor Data Management
Intel

Dell, Intel, NI, and OSIsoft developed an end-to-end synchrophasor data management solution that combines high-performance computing, networking, and storage to provide real-time, actionable data and help utilities improve efficiency. This cost-effective, scalable solution is based on an open, nonproprietary architecture that increases compatibility and speeds up integration with legacy systems.

Engine Combustion Control With NI Real-Time, FPGA, and DAQ Systems
University of Windsor

The University of Windsor Clean Diesel Research group built a comprehensive experimental control system based on NI DAQ, real-time, and FPGA systems incorporating over 100 units of sensors, drivers, and actuators to implement model-based combustion control strategies. The flexible platform and in-house LabVIEW program suite eliminate the research-limiting boundaries of commercial ECUs and software.

Enhancing the Classroom Through Modeling and Simulation
Maplesoft

Explore how you can reinforce engineering concepts using a combination of theory, simulation, and hardware and how you can teach students to use math in a more meaningful way. Also view education-focused demonstrations featuring Maplesoft MapleSim and NI LabVIEW software along with Quanser hardware.

Global Lab Automation at Texas Instruments Using Perforce, LabVIEW, and NI TestStand
Perforce Software and Texas Instruments

Join Perforce Software and Texas Instruments to learn how TI is delivering a global lab automation methodology by combining the power of the Perforce Software Version Management system with the virtual instrumentation and automated test capabilities of LabVIEW and NI TestStand.

Gracious Professionalism: A Core Value of *FIRST*
Linn-Mar High School

Gracious Professionalism is part of the fundamental ethos of *FIRST*, and it's what makes *FIRST* unique. It promotes win-win solutions, encourages high-quality work, and emphasizes the value of others. Learn how Gracious Professionalism is applicable to everyone and can improve day-to-day interactions with people.

Technology Theater

How to Become a *FIRST* Mentor
Linn-Mar High School

Discover how to change kids' lives through *FIRST*, a program that equips students with the necessary skills to become the leaders of tomorrow. You don't have to be a techie to make a lasting impact on kids' lives.

Improvement and Optimization of Electric Power Generation
Estácio

The Electric Power Generation, Transmission, and Distribution/Renewable Energy and Energy Efficiency Laboratory of Estácio was based on dedicated hardware with a high degree of obsolescence. Learn how optimizing this laboratory using NI technologies cut costs by more than $120,000 USD per lab.

Integrating Test With Product Lifecycle Management
IBM

At the NIWeek 2012 keynote, NI and IBM showcased how NI test applications can be linked to IBM tools for requirements and quality process management to provide previously unavailable traceability and collaboration between design and test teams. In this session, see the released integration product in action.

LabVIEW Coding Challenge Finals

Watch the highest scorer in the weeklong LabVIEW Coding Challenge compete against a LabVIEW R&D engineer in a live coding competition.

PXI-Based Noise Figure Testing
Johns Hopkins University Applied Physics Lab

Noise figure (NF) testing is key to understanding the sensitivity of receivers from both the system and component levels. It often is conducted using expensive stand-alone NF systems with limited flexibility that are difficult to integrate with other tests. Examine a PXI-based solution that resolves most of these issues by using existing NI RF modules.

Test System Hardware Abstraction Using LabVIEW Object-Oriented Programming and NI TestStand
SSBV Space & Ground Systems UK

The capabilities of NI TestStand are well known—in particular, its ability to manage hardware resources among multiple tasks and parallel test sequence execution. Discover how you can use NI TestStand with object-oriented LabVIEW programming to achieve hardware abstraction in your automated test solutions.

The Broadest Range of Real-World Sensors and Devices Attached to NI RIO
Cyth

From controlling galvanometers to motors to syringe pumps, Cyth offers connectivity to the broadest range of sensors and devices to help you increase efficiency and achieve shorter time to market. With nearly every prototype requiring multiple sensors and devices, Cyth has a complete library of built-in modules and software for reconfigurable I/O (RIO) connectivity and integration.

Why Dataflow Works: Explained With a Potato and Candy Bars

With one possibly nonexistent potato and a sack full of candy bars, Stephen Mercer of LabVIEW R&D examines some of the principles that make dataflow such an effective paradigm in today's modern computing world. You know how dataflow works. Now learn why it works.

Aerospace and Defense Pavilion

Visit the Aerospace and Defense Pavilion to learn about the latest technologies for engineering, research, and test. See demonstrations of National Instruments hardware and software platforms for solutions in RF, hardware-in-the-loop, and structural test applications.

Flight Simulation Using NI VeriStand and NI Single-Board RIO

Use a flight simulation created with the NI VeriStand real-time test framework and an NI Single-Board RIO device functioning as an avionics control module to demonstrate the rapid prototyping capability of these NI platforms.

Fatigue Testing Using SC Express and LabVIEW Real-Time

Learn how you can use NI's PXI and LabVIEW platforms for structural component fatigue testing and obtain reliable and repeatable data using the accuracy and synchronization capabilities of NI SC Express products and the determinism of LabVIEW Real-Time.

Spectrum Monitoring and Signal Detection With NI USRP

The NI USRP™ is useful for a wide variety of spectrum monitoring and communications applications. LabVIEW and USRP enable rapid prototyping for research areas including detection and algorithm explorations for decoding 802.11b WiFi signals and ADS-B signals used for collision avoidance by commercial aircraft.

Blind Single- and Multi-Carrier Signal Classification

Discover how you can use the PXI platform and FPGA-based instrumentation to perform spectrum scanning to detect and classify multiple signals using blind signal classification algorithms.

Real-Time RF Spectrum Modification Using a VST

See how the world's first vector signal transceiver (VST) with software-designed instrument capability performs real-time radar object generation with DRFM capabilities.

Academic Pavilion

This interactive exhibit showcases the latest technologies for educators, researchers, and students. Through live product demonstrations, learn how NI's industry-standard tools accelerate advanced research projects as well as deliver complete hands-on teaching solutions for students to "do engineering." Visit the NI LabVIEW Campus Tour to learn how you can accelerate innovation and discovery in your research and prepare your students with an engaging, real-world learning experience in the classroom.

Featured Demonstrations for Educators

Teaching Measurements With NI myDAQ and NI miniSystems
Explore the variety of platforms educators can use to give students hands-on experience with sensors, measurements, and instrumentation concepts. Using NI myDAQ and the miniQuake NI miniSystem, see how students can complete hands-on exercises to measure and analyze structural design by recreating earthquake and seismic activity.

Teaching Circuits and Electronics With NI ELVIS
Discover how students can build expertise through practical applications for designing, prototyping, and testing electrical circuits. With the NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS), LabVIEW, and Multisim, you can teach power electronics concepts like a single-phase H-bridge inverter.

Teaching Controls and Mechatronics With NI CompactRIO
Learn how you can help students grasp the classic pendulum control problem with the inverted pendulum and self-erecting inverted pendulum. Using LabVIEW, CompactRIO, and the Quanser Rotary Inverted Pendulum experiment, students can quickly design, simulate, and implement a variety of real-time controllers to balance and swing up a pendulum.

Teaching Communications With NI USRP
Examine a hands-on RF and communications teaching and research platform featuring NI USRP™ (Universal Software Radio Peripheral) hardware and LabVIEW software for designing, hardware prototyping, and implementation. See how you can experiment with practical applications of the real-world signals behind the RF and communications theory presented in the classroom.

Academic Pavilion

Featured Demonstrations for Researchers

RF and Microwave Design
See how you can use PXI RF instruments to extract power amplifier behavioral models of nonlinear RF devices for use in AWR Microwave Office design software.

Structural Testing
Discover how using the PXI platform with SC Express modules can make any test from static strain to impact and vibration possible anywhere regardless of channel count or location.

Power Electronics
Explore how you can implement FPGA-based power electronics control systems using a complete tool chain from design to test with LabVIEW, Multisim, and the NI Single-Board RIO General Purpose Inverter Controller (GPIC).

Active Suspension
Develop control algorithms to improve the performance of a vehicle using CompactRIO and the Quanser Active Suspension plant. Investigate, design, and optimize the ride comfort, suspension travel, and road handling by controlling the vertical movement of the vehicle using an actively controlled actuator placed on the suspension axis.

Wireless Measurements
Learn how wireless measurement devices can provide test and monitoring systems with increased flexibility and lower costs. Explore how different wireless technologies can meet a variety of remote application challenges where a cabled solution may be impractical or impossible.

Academic Exhibitors at NIWeek

DeVry University

Emona Instruments

Ettus Research

Maplesoft

Quanser

Texas Instruments

Big Analog Data™ Pavilion

Big Analog Data™ themes are a common thread across many data acquisition, test and monitoring applications, as engineers and scientists are acquiring measurement data more voluminously, in a variety of forms, and at high velocities. Learn how greater value is being extracted from this measurement data through multiple solutions spanning a variety of industries and uncover considerations for managing large amounts of data and systems in end-to-end sensors to IT solutions.

Measurement, Diagnostics, and Control to Meet the World's Toughest Challenges

- *Learn about NI's intimacy with end-to-end solutions and how you can reduce integration risk and time to value*
- *Explore advanced and innovative techniques for data transfer, data management, systems management, and solution architecture approaches*
- *Discover end-to-end solution implementations from sensors to IT across industries from medical to automotive to power generation*
- *Talk with knowledgeable partners including IT partner Ciber and multiple integration partners*

Meet the Experts

Speak with experts from a variety of industries to see how they are using NI platforms and server software and hardware in Big Analog Data™ applications. Discover the partners who can help you implement your entire end-to-end solution.

Big Analog Data™ Solution Exhibitors at NIWeek

Averna	Nexjen
ITM	V I Engineering
Bloomy Controls	Ciber

Scientific Research and Lead User Pavilion

Visit this pavilion to discover how NI platforms are being used to meet some of the toughest leading-edge challenges in the areas of Big Physics and RF communications.

Featured Demonstrations

- *Control and diagnostics for the world's largest fusion reactor*
- *Muon particle tracker for research of cosmic ray muon flux*
- *Prototypes for 5G mobile communications technologies such as mmWave*
- *Particle beam diagnostics for the tuning of linear accelerators*
- *Timing and carrier synchronization for LTE-Advanced*
- *Pulsed power and diagnostic solutions for Big Physics applications*

Scientific Research Exhibitors at NIWeek

BiRa	National Security Technologies
Eagle Harbor Technologies	NYU-Poly
Georgia Tech	

RF and Wireless Pavilion

Learn more about how NI is redefining RF test with the latest software-defined instrumentation to address the ever-increasing challenges of working with the newest RF and wireless technologies.

Reduce the Cost of RF Test With the PXI Platform

PXI instruments use high-performance, multicore processors and user-programmable FPGAs to dramatically reduce test times and lower test costs. View demonstrations of test systems that feature software-defined instrumentation to meet your time-sensitive validation and production test needs. Also watch demonstrations that showcase how the high-speed PXI Express data bus, multicore processors, and FPGAs can deliver test times 10 times faster than traditional instruments.

Prototype, Validate, and Test on a Single Platform

With the flexibility and accuracy of PXI RF instruments, you can use the same instrumentation platform as a phase-coherent MIMO transceiver, a GPS simulator, and a wireless communications tester for protocols such as WLAN 802.11ac, LTE, Bluetooth, GSM/EDGE, WCDMA, GNSS, and more. At this pavilion, see how the software-defined NI PXI platform can meet the fast-evolving needs of the wireless industry with the following demonstrations and more:

- *Mobile Device Test Systems With Industry-Leading Speed and Measurement Quality*
- *High-Performance Power Amplifier Characterization Test Using Software-Designed Instrumentation*
- *RF Soft Front Panels to Expand the Capabilities of NI RF Instruments*
- *Direction Finding Using the NI Software Defined Radio Platform*
- *RF MEMS Testing Capability With the Latest NI PXI Vector Network Analyzer*
- *Testing of Remote Radio Heads as Part of Wireless Infrastructure Measurements*

Robotics Pavilion

This interactive exhibit demonstrates how LabVIEW software and NI embedded hardware platforms are used in robotics from K–12 to rocket science. Visit the pavilion to learn how the NI robotics platform helps students, engineers, and scientists rapidly design and prototype their designs for every robotics application.

Robotics in Action

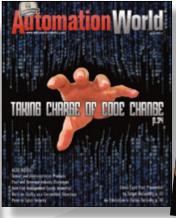Stop by this pavilion to see how LabVIEW and NI hardware are used in a range of robotics applications:
- *LEGO® EV3 Robots*
- *Your Favorite Childhood Games Played Against the KUKA youBot Robot*
- *A Future Mars Rover Robot Designed by Olin College*
- *The Latest LabVIEW Robotics Module Features Including the New Robotics Simulator*

LabVIEW Robotics

NI offers tightly integrated hardware and software tools for developing a wide array of robotics applications. The LabVIEW Robotics Module helps roboticists prototype complex applications from physics simulation to final design. The LabVIEW Robotics Module provides ready-to-use drivers and algorithms for sensor communication, obstacle avoidance, path planning, kinematics, steering, and more. Check out the latest LabVIEW Robotics software at the Robotics Pavilion.

Vision Pavilion

Stop by to see machine vision solutions and the latest vision tools in action. Speak with vision industry experts, component providers, and systems integrators to get your vision applications up and running.

See New Vision Technologies in Action

Discover cutting-edge vision technologies and how you can use them with NI vision products for complete, real-world solutions through these entertaining and informative demonstrations:

- *FPGA Versus CPU Image Acquisition and Processing*
- *Advanced Image and I/O Synchronization for Part Inspection and Handling*
- *Using Color 3D Inspection to Generate Data Not Available With Other Imaging Solutions*
- *New Vision Hardware and Software Algorithms in Action*

Meet the Experts

Speak with experts from many of the world's leading vision companies about how you can successfully use NI vision hardware and software in your applications. Talk to NI engineers about the new features in the NI Vision Development Module and how to integrate them in your current and future projects.

Complete Your Vision System

View product demonstrations and speak with vision exhibitors about lighting, cameras, optics, and systems integration. Visit with partners and integrators about how their products and services can make your vision application come to life when combined with NI vision products.

Vision Exhibitors at NIWeek

Advanced Illumination	Graftek Imaging Inc.	ProPhotonix
Basler Vision Technologies	ImagingLab	PVI Systems Inc.
Chromasens	JENOPTIK	Schneider Optics
e2v	moviMED	
Edmund Optics	NET USA	

NI Services and Training Booth

National Instruments provides global services and support as part of our commitment to your success in efficiently building and maintaining high-quality measurement and control systems using graphical system design.

Visit the NI Services and Training Booth to learn about a variety of services, training options, and certification programs to meet your needs at every stage of the application life cycle—from planning and development through deployment and ongoing maintenance.

NI Services and Training Solutions Ensure Your Success

- *Identify and obtain the technical skills you need to shorten your application development time by half*
- *Stay up to date with the latest LabVIEW features*
- *Reduce your total cost of ownership with calibration and maintenance*

NI Offers a Wide Range of Services

- *Hardware services—assembly, installation, repair, calibration, and maintenance*
- *Software services—software support, maintenance, and volume licensing*
- *Training and certification—training on key software and hardware offerings at multiple certification levels*

Exhibitors

6TL Engineering
632

6TL redefines the way ATE integrators build systems. Using off-the-shelf hardware and software blocks, integrators can shorten project delivery and build cost-effective, reliable solutions.

6tlengineering.com

Advanced illumination
711a

An LED lighting solutions provider, Advanced illumination designs and manufactures versatile lighting for the machine vision industry, including standard and customized LED fixtures and electronics.

advancedillumination.com

Alfamation
132

Founded in 1991, Alfamation is a solutions provider that challenges traditional approaches to functional test applications in the automotive, consumer electronics, telecom, and medical industries.

alfamationglobal.com

Allied Vision Technologies Inc.
711b

Allied Vision Technologies is one of the world's leading manufacturers of high-performance digital cameras for industrial image processing.

alliedvisiontec.com

AMETEK Solartron Metrology
631

In the laboratory, on the shop floor, or in the field, Solartron Metrology's products provide precise linear measurements for quality control, test and measurement, and machine control.

solartronmetrology.com

Amfax Ltd
131

Amfax designs, manufactures, and supports functional and special-to-type solutions from fixtures and cable assemblies to large-scale ATE systems. Amfax has over 20 years' experience supplying to the aerospace, defense, RF, and automotive markets.

amfax.co.uk

ARC Technology Solutions
124

ARC is an engineering services company and trusted supplier to the defense and aerospace industry. Services include test system design and build-to-print manufacturing.

arcserv.com

ARM
938

ARM designs the technology that lies at the heart of today's advanced digital products. ARM's comprehensive product offering includes IP, tools, and much more.

arm.com

Artisan Technology Group
121

Artisan Technology Group buys and sells obsolete and legacy National Instruments and other commercial off-the-shelf equipment, extending the life cycle of your critical systems.

artisantg.com

Averna
301, 307

Averna is a premier manufacturing solution provider for communications and electronics device makers worldwide, helping them deliver a better end-user customer experience.

averna.com

Avionics Interface Technologies
137

AIT is a leading designer and manufacturer of high-performance flight modules, test and simulation modules, embedded solutions, data bus analyzers, and support systems.

aviftech.com

B&A Engineering Systems Inc.
906

BAENG is a vibrant, growing business with its primary focus and core business centered around developing space flight and avionics systems and instrumentation.

baengineering.com

Bare Board Group
126

Bare Board Group specializes in providing quality, high-mix, low- to high-volume circuit boards at offshore prices with the ease of domestic purchasing.

bareboard.com

Basler Vision Technologies
836

Basler Vision is a leader in digital cameras for demanding applications. Area and line scan cameras use CCD, CMOS, and CMOSIS sensors and multiple interfaces.

baslerweb.com

BiRa and BiRIO Systems
530

BiRIO Systems is a collaborative design, software, and hardware company specializing in RIO applications for industries including big physics, military, oil and gas, and worldwide smart grid power transmission.

bira.com or biriosystems.com

Bloomy Controls Inc.
519, 618

Bloomy Controls specializes in high-performance automated test, DAQ, and control systems for research, validation, and manufacturing for the energy, medical, mil/aero, and semiconductor industries.

bloomy.com

Exhibitors

Bruel & Kjaer
633

Bruel & Kjaer offer acoustic and vibration transducers including specialty microphones, high-temperature IEPE accelerometers, signal conditioning, vibration test solutions, and an audio analyzer based on LabVIEW.

bkhome.com

Cal-Bay Systems Inc.
419

Cal-Bay is a recognized leader for test and measurement solutions when product quality is critical, serving leading companies in biomedical, mil/aero, semiconductor, and power generation.

calbay.com

CertTech
231

CertTech provides innovative tools, products, and services to help develop advanced technology. Our team of engineering professionals offers design, prototyping, development, verification, validation, support, and more.

certtech.com

Chroma Systems Solutions Inc.
125

Chroma manufactures advanced power electronics and safety test instrumentation and automated systems backed by unmatched service and support.

chromausa.com

Chromasens GmbH
807

The German company Chromasens designs, develops, and produces innovative image capturing and optical measurement systems. Our product portfolio features standard and customized cameras, light, 3D, and spectral imaging.

chromasens.de

Circuit Check Inc.
206

CCI/Cimtek is the leading total test solutions provider including test fixtures, complex product interfaces, and full turnkey automated test solutions.

circuitcheck.com

Clemessy
128

Clemessy a NI solution integrator for test rig turn key solution, mainly in Aeronautics & Automotive.

clemessy.com

Connection Technology Center
920

CTC Vibration Analysis Hardware such as accelerometers and cables, introduces the PRO Instrumentation line of proximity probes, signal conditioners, relays, and loop power sensors. Lifetime Warranty included.

ctconline.com

DENSO Robotics
339

DENSO offers a range of compact, four-axis SCARA and six-axis articulated robots for payloads up to 20 kg and reaches from 350 to 1,300 mm.

densorobotics.com

DeVry University
730

DeVry University provides on-site and online high-quality, career-oriented associate's, bachelor's, and master's degree programs in technology, health-care technology, engineering technology, science, business, and the arts.

devry.edu

E.I.SOL CO. LTD
331

E.I.SOL CO. LTD, an MCM solution specialist, provides FPGA-based sound vision systems with the industry's fastest frame rate at 25 fps to help visualize and identify noise sources in applications from industrial to electronics.

e2v
823

e2v offers technology solutions for high-performance systems and delivers high-reliability solutions, subsystems, and components to advanced systems companies.

e2v.com

Edmund Optics
711c

Edmund Optics is a leading producer of optics and imaging products. EO's vast offering of machine vision products provide a variety solutions for any application.

edmundoptics.com

Emona Instruments PTY Ltd
830

Emona Instruments manufactures add-on boards and student course material for NI ELVIS II/II+ and NI myDAQ, covering topics such as wireless telecoms, DSP, fiber optics, green energy, signals, and systems.

emona-tims.com

Ettus Research, a National Instruments Company
109

Ettus Research, a National Instruments company, is the world's leading supplier of software defined radio platforms, including the Universal Software Radio Peripheral (USRP) products.

ettus.com

Exhibitors

FineTest
902

FineTest is a manufacturer of functional ATE and power supply testers, ITA/test fixturing, and TPS/test programs. Software platforms include NI LabWindows/CVI, LabVIEW, and NI TestStand.

finetest.com

FunctionSIM-ExpertControl
523

FunctionSIM is a dedicated group of engineering professionals committed to providing computer-aided solutions to mechanical and control systems product design and development.

functionsim.com

G Systems
522

G Systems is a leading provider of solutions for automated test and measurement, DAQ, and control systems. Services range from consulting to complete systems.

gsystems.com

G.R.A.S. Sound & Vibration
531

G.R.A.S. offers a wide range of acoustical devices—standard measurement microphones, preamplifiers, simulators, and accessories—all designed and manufactured in accordance with international standards.

gras.dk

GDCA
108

GDCA's Proactive Legacy Management (PLM+) delivers peace of mind and reduces the long-term support costs of legacy embedded systems for the defense, medical, and industrial manufacturing industries.

gdca.com

Graftek Imaging
801

Graftek Imaging provides machine vision components and solutions for the industrial, medical, and scientific imaging markets.

graftek.com

GuideTech
133

Since 1988, GuideTech has been the leading innovator of time and frequency continuous time interval analysis (CTIA) instruments, delivering superior performance at installations worldwide.

guidetech.com

Hiller Measurements
103

Hiller Measurements develops PXI-based RF and microwave test systems, custom PXI modules, and PXI Express carrier/development modules.

hillermeasurements.com

IBM
831

The IBM Rational Solution for Systems and Software Engineering provides tools and best practices to improve traceability, collaboration, and quality.

ibm.com

IEEE Central Texas
821

The world's largest technical professional association is dedicated to advancing technology for the benefit of humanity. Through its publications, conferences, technology standards, and professional and educational activities, IEEE is the trusted voice.

ewh.ieee.org/r5/central_texas

ImagingLab Germany GmbH
337

LabVIEW robotics libraries make the integration of DENSO, Epson, Kawasaki, KUKA, Mitsubishi, Toshiba Machines, and YASKAWA MOTOMAN robotics into the LabVIEW world as simple as any other hardware compatible with LabVIEW.

imaginglab.de

Integrated Test & Measurement
918

ITM provides test, measurement, and automation services including measurement system integrations, software development, asset monitoring, structural testing and analysis, and unattended testing.

un-yah.com

Intel
607

Manage today's challenges while addressing tomorrow's opportunities. Intel brings the ecosystem relationships, reliability, and technology expertise to help you confidently innovate and grow your business.

intel.com

iWorx Systems Inc.
932

iWorx introduces the Bioinstrumentation Breadboard for NI ELVIS to help teach BME circuit design as well as a selection of signal conditioners and sensors for NI myDAQ.

iworx.com

Japan Pavilion
331

Learn about the latest Japanese technologies from these five exhibitors: Matsuura Denkosha Co. Ltd., NF Corporation, E.I.SOL CO., MAC Systems Corporation, and Keisokugiken Corporation.

Jenoptik
119

As an integrated optoelectronics group, Jenoptik divides its activities into five divisions: Lasers and Material Processing, Optical Systems, Industrial Metrology, Traffic Solutions, and Defense and Civil Systems.

jenoptik.com/us-defense

JGB Consulting
233

For over 20 years, JGB has been specializing in test and control solutions. Our engineers are experts in LabVIEW, LabWindows/CVI, NI TestStand, and Microsoft C#.

jgbconsulting.com

JKI
630

An innovator in the world of LabVIEW, JKI provides expert consulting services, commercial-grade LabVIEW add-ons, and unsurpassed leadership in the LabVIEW community.

jki.net

JMAG Division, JSOL Corp.
532

The JMAG Group provides leading-edge simulation software for electromechanical design and development. JMAG is a new standard in performance and quality worldwide.

jmag-international.com

JOT Automation Ltd.
230

JOT Automation is a global test and production solution supplier for several leading companies in industries including telecom, automotive, and life science.

jotautomation.com

Keisokugiken Corporation
331

Keisokugiken Corporation provides complete test and control systems specializing in automotive test cells, rapid control prototyping, and HIL. We also offer custom hardware for the NI FlexRIO and CompactRIO platforms.

kgc.co.jp/index-en.html

Konrad Technologies
123

Konrad Technologies builds custom test solutions used in the automotive, aerospace, semiconductor, electronics, and medical industries. Test technologies include semiconductor test, PCB test, AOI, RF, and radar test.

konrad-technologies.com

Korea Pavilion
330

Learn about the latest Korean technologies from these three exhibitors: ONTEST Co. Ltd., SM Instruments Inc., and Unmanned Solution Co.

LHP Software LLC
832

LHP Software is a software engineering company specializing in model-based design and embedded controls.

lhpsoftware.com

LocalGrid Technologies Inc.
431

LocalGrid Technologies Inc. delivers turnkey packaged solutions for utilities that are deploying microgrid topologies.

localgridtech.com

Logic Instrument USA Inc.
104

Logic Instrument supports commercial and US military applications (PCI, PCI Express, PXI, PXI Express, CompactPCI) with rugged, expandable and customized portable computing platforms and display solutions.

logic-instrument.com

M+P International Inc.
900

M+P International provides turnkey DAQ, vibration and acoustic analysis, modal analysis, rotating machinery and sound quality, acoustic intensity, and pass-by noise applications on NI hardware.

mpihome.com

MAC Panel Co.
213

MAC Panel offers modular Mass Interconnect solutions for ATE systems. Our high-performance SCOUT interface has become the benchmark interface for PXI-based ATE globally.

macpanel.com

MAC Systems Corporation
331

MAC Systems Corporation is an automotive systems integrator, specializing in real-time simulation of electric motors. Visit us to see the latest in electric motor HILS technology.

macsystems.com

Maplesoft
521

Maplesoft is the leading provider of advanced engineering software that applies mathematical principles to solve any engineering problem, no matter the complexity or domain.

maplesoft.com

Matsuura Denkosha Co. Ltd.
331

Matsuura Denkosha Co. Ltd. offers complete test and measurement systems. We are a leading provider of machine vision systems such as LCDs or display panel quality inspections.

denkosha.net

Meggitt Sensing Systems
436

Meggitt Sensing Systems, a Meggitt group division, is a leading supplier of high-performance sensing and monitoring systems for physical parameter measurements in extreme environments.

endevco.com

Mouser Electronics
438

Mouser Electronics is one of the fastest growing, customer-focused global catalog/e-marketing - online semiconductor and electronics distributors; supplying the newest products and leading-edge technologies.

mouser.com

Exhibitors

National Technical Systems
218

NTS provides integrated engineering services, technical solutions, product testing, compliance design, regulatory standards compliance testing, evaluation, project management, technical resources, engineering solutions, and managed services.

nts.com

Neo-Coulombic
922

Neo-Coulombic is a small private research group specializing in "long shot" technology involving methods of thermal energy generation using hydrogen and metals.

physicsandbeyond.com

NETUSA
525

NET USA supplies high-quality cameras such as GimaGO GigE Vision, FOculus IEEE 1394, and iCube USB 2.0 as well as OEM boards and camera heads for medical and industrial applications.

net-usa-inc.com

Nexjen Systems
106

Nexjen Systems is a system integrator that specializes in customer-defined test, measurement, and automation systems for product development, production test, and monitoring and control.

nexjen.com

NF Corporation
331

NF Corporation is providing measurement instruments, power source/power control products, and customized products using proprietary technologies.

nfcorp.co.jp/english

NI RF/Communications Lead Users
1000

Visit the RF and Communications Lead User booth Monday evening only to see live research demonstrations from lead user projects and view a variety of posters featuring projects at participating universities and research centers.

OMNI Engineering Services Inc.
736

OMNI provides turnkey functional test and product design services. Our experienced staff has delivered solutions for industrial and medical applications for over 20 years.

npaomni.itechra.net

ONTEST Co. Ltd
330

ONTEST Co. Ltd. offers the fastest testing solutions in the smartphone, photovoltaic, and electric vehicle industries. Provide precise tests like "Just turn on your test system."

on-test.co.kr

Optimation Technology
211

Optimation provides solutions and services for industrial and manufacturing applications, including process and mechanical engineering, automation, systems integration, test systems, fabrication, installation, construction, and maintenance.

optimation.us

PCB Piezotronics Inc.
533

PCB Piezotronics is a global leader in the design and manufacture of microphones, vibration, force, torque, load, strain, and pressure sensors as well as the pioneer of ICP technology.

pcb.com

PFC Flexible Circuts Ltd.
837

PFC designs, manufactures, and assembles flexible circuits: single- and double-sided, multilayer, and rigid. Specializes in Fine Line and Impedance control .

pfcflex.com

Phase Matrix Inc.
200

Phase Matrix manufactures RF and microwave T&M instruments, subsystems, and components. Products include PXI synthetic instruments (downconverters/local oscillators) and instrument-grade, fast-switching QuickSyn synthesizer modules.

phasematrix.com

ProPhotonix
924

ProPhotonix designs and manufactures LED line scan Illumination products, machine-vision structured light lasers, and custom OEM solutions for a range of industrial and other applications.

prophotonix.com

PVI Systems Inc.
707

PVI Systems, a Certified Alliance Partner, offers custom and turnkey systems for DAQ, vision, and process control applications

pvisys.com

Quanser
518

Market leader Quanser offers universities worldwide captivating, hands-on experiments for students and researchers. Stop by to learn about our exciting collaborations with National Instruments.

quanser.com

Ridgetop Group Inc.
139

Ridgetop Group Inc. is the world leader in providing advanced electronic prognostics and health management built-in self-test solutions.

ridgetopgroup.com

Exhibitors

Real-Time Innovations
433

RTI offers communications software to efficiently connect distributed systems, including both LabVIEW and native applications, using the Data Distribution Service standard.

rti.com

SafeNet, Inc.
238

SafeNet's Sentinel Solutions protect and manage software embedded within hardware. With SafeNet, device and equipment manufacturers can prevent tampering and reverse engineering while maximizing profitability.

safenet-inc.com

S.E.A. Datentechnik GmbH
731

S.E.A. provides CompactRIO modules for GPS, mobile communications, encoders, bus interfaces, single-board embedded control and acquisition devices for LabVIEW, LabVIEW add-on toolkits, language translation, GPS synchronization, and CompactRIO displays.

sea-gmbh.com

Scadata Inc.
130

Scadata synthesizes the latest in communication and data transfer technologies. We manufacture products to deliver information and critical data to wherever the user needs that information.

scadata.net

Schneider Optics Inc.
711d

Schneider manufactures high-performance I/O lenses (visible through near IR and SWIR) and ultrahigh-performance lenses/filters for machine and robotics vision, documentation, parcel scanning, industrial inspection, and gauging.

schneideroptics.com

Sixclear
819

Sixclear delivers world-class training and development services ranging from LabVIEW fundamentals to diverse industry verticals. Our training is innovative and modern, with both online and classic training offerings.

sixclear.com

SM Instruments Inc.
330

SM Instruments is an expert in sound and vibration that provides professional sound and vibration test solutions. Our innovative main products include sound cameras, BSR scanners, and a wind turbine CMS.

smins.co.kr

Solution Sources Programming Inc.
107

Solution Sources Programming is a global test and measurement provider that specializes in designing and implementing turnkey test solutions tailored to customers' needs throughout the product life cycle.

ssprog.com

SVTronics Inc.
236

By outsourcing your electronic design and manufacturing to SVT, you can develop the technology, experience, flexibility, and time to market to be a leader in today's competitive marketplace.

SVTronics.com

TDK-Lambda Americas
637

TDK-Lambda offers Genesys programmable AC/DC power supplies: high-power-density, low-ripple, and complete user-friendly interfaces from 750 W to 15 kW with outputs to 600 VDC and 1,000 A.

us.tdk-lambda.com/hp

Teclution
737

Teclution, the turnkey measurement and automation systems provider in the Middle East, offers innovative control experiments, customer-specific products and solutions, and complex system integration projects.

teclution.com

Teledyne Microelectronics Technologies
713

TMT is a DOD trusted source for microelectronics and a leader in innovative, custom high-density, high-reliability microelectronics packaging solutions for the instrumentation, aerospace, and defense markets.

teledynemicro.com

Teledyne Microwave Solutions
713

TMS is a worldwide leader in the design, development, and manufacture of microwave components, integrated microwave assemblies, and subsystems for the instrumentation, communications, aerospace, defense, and aviation markets.

teledynemicrowave.com

Teledyne Relays
713

Teledyne Relays offers subminiature, high-performance RF electromechanical relays from DC to 10 GHz and coaxial switches from DC to 40 GHz for instrumentation, test, measurement, and industrial applications.

teledynerelays.com

TestEquity LLC
732

TestEquity specializes in the sale and rental of new and used test and measurement equipment. It also offers a full line of environmental chambers.

testequity.com

Exhibitors

Texas Instruments
222

Texas Instruments, a global semiconductor company, helps customers solve problems and develop new electronics that make the world smarter, healthier, safer, greener, and more fun.

ti.com

Trescal/Dynamic Technology Inc.
100

As an A2LA-accredited metrology lab, NI Alliance Partner, and NI Certified Calibration Center, we provide electronic, physical, and dimensional instrumentation as well as calibration, instrument repair, and on-site service.

dtical.com

Unmanned Solution Co.
330

Unmanned Solution has developed many innovations in robotics, educational control kits, and UGV platforms powered by all electric and hybrid fuel cell technology and has modified commercial vehicle platforms.

usol.es

UT Austin—Master of Science in Technology Commercialization Program
733

The University of Texas Master of Science in Technology Commercialization Program is a one-year master's degree program focused on the early stages of product development.

texasmstc.org

Verivolt LLC
930

Verivolt develops advanced sensing platforms for energy related applications. We specialize on delivering solutions that address not only the sensing aspects, but also deployment, timing, system architecture and low cost targets.

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VI Service Network Co. Ltd.
101

VI Service Network provides high-quality professional services for virtual instrumentation by leveraging its expertise in digital signal processing, radio frequency, sound and vibration, and photonics.

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Virginia Panel Corporation
423

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Wineman Technology Inc.
622

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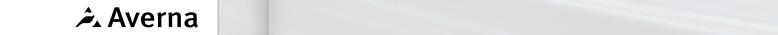
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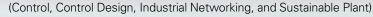
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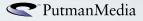
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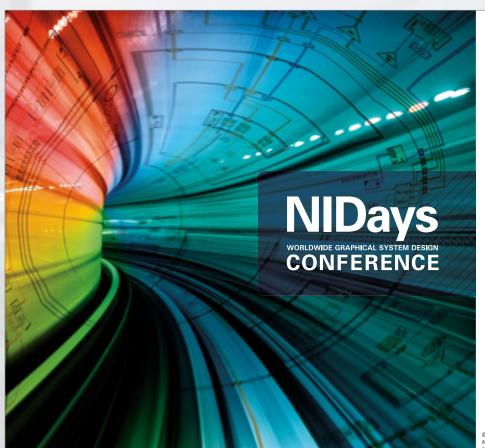# Thank You for Attending NIWeek 2013

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