OPAL-RT TECHNOLOGIES

AGENDA

RT17
INNOVATE BEYOND

OPAL-RT's 9th International Conference on Real-Time Simulation

September 5 – 8, 2017

Diamond Sponsors

Hydro Québec · NATIONAL INSTRUMENTS · triphase

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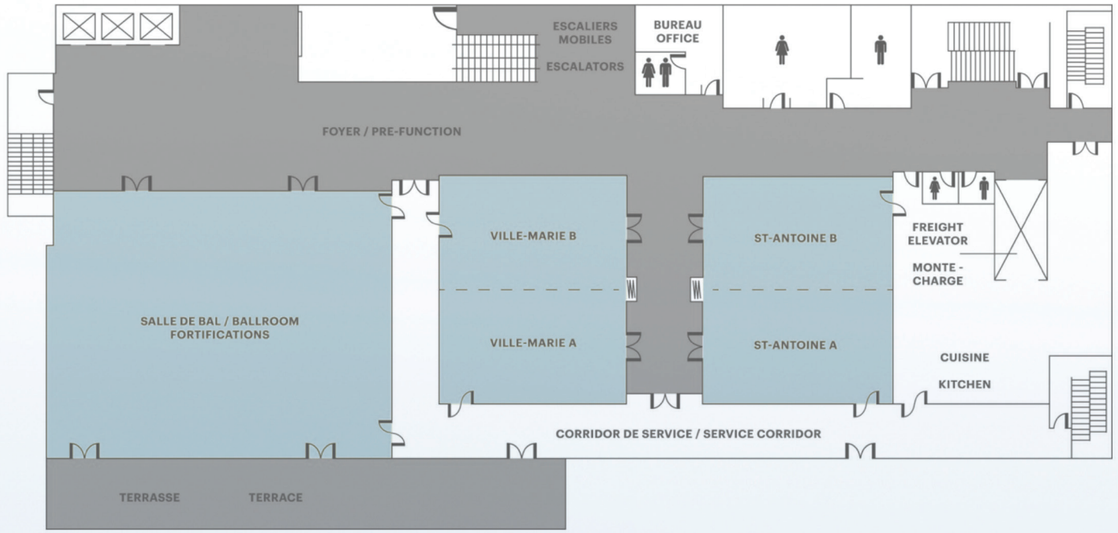
WWW.OPAL-RT.COM/RT17

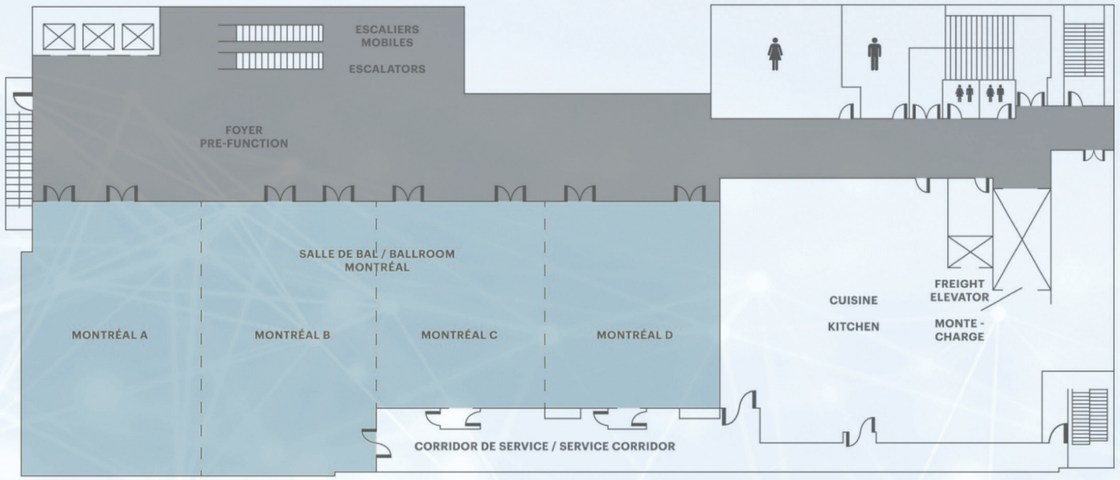
Floor plans

OPAL-RT's 9th International
Conference on Real-Time Simulation
September 5 – 8, 2017

9th floor



11th floor



Agenda

TUESDAY, SEPTEMBER 5th

REGISTRATION & BREAKFAST — ROOM: BEAVER HALL

7:30 AM - 8:30 AM — Breakfast **sponsored by** ABB

TRAININGS

	ROOM: RAMEZAY	ROOM: VIGER	ROOM: PALAIS
8:30 AM - 10:15 AM	TRAINING Bringing Your Model Into Real Time	TRAINING The Behind-The-Scenes of Inter-FPGA Communication Using High Speed Serial Links	TRAINING Using HYPERSIM Advanced Features - Part I
10:15 AM - 10:35 AM	*BREAK*		
10:35 AM - 12:00 PM	TRAINING Achieving Test Automation With eMEGASIM	TRAINING How to Use State Space Nodal Efficiently	TRAINING Using HYPERSIM Advanced Features - Part II
12:00 PM - 1:00 PM	*LUNCH* **Sponsored by** ABB		
1:00 PM - 2:45 PM	TRAINING Large Grid Model Import Made Easy	TRAINING A New Way of Interacting with Your RT-LAB Model	TRAINING Power System Protection, Control and Monitoring Applications - Part I
2:45 PM - 3:05 PM	*BREAK*		
3:05 PM - 4:30 PM	TRAINING ePHASORSIM: User Defined Modeling	TRAINING Integrating your Controller with our Multi-Level Modular Converter (MMC)	TRAINING Power System Protection, Control and Monitoring Applications - Part II

REGISTRATION — ROOM: REPORTER

4:00 PM - 6:00 PM — Registration period

WELCOME COCKTAIL — ROOM: REPORTER

6:00 PM - 10:00 PM — *WELCOME COCKTAIL**
**BUSINESS CASUAL ATTIRE PROPOSED*

Evening **sponsored by** triphase

WEDNESDAY, SEPTEMBER 6th

REGISTRATION & BREAKFAST — ROOM MONTREAL C-D

7:30 AM - 8:30 AM — Breakfast **Sponsored by** National Instruments

PRESENTATIONS — ROOM: MONTREAL A-B

8:30 AM - 9:15 AM — Welcome to RT17! A New Era of Real-Time Simulation at OPAL-RT TECHNOLOGIES

9:15 AM - 10:40 AM — Power Systems Keynote
by Étienne Leduc, OPAL-RT
INCLUDING SPECIAL PRESENTATIONS:
The Role of Microgrids in Grid Modernization Initiatives by Sima Seidi, TetraTech, Canada

10:40 AM - 11:10 AM — ***BREAK*** **Sponsored by** intel

11:10 AM - 12:00 PM — Digital Transformation - Disrupt or Be Disrupted!
by Denis Gaudreault, INTEL, Canada

12:00 PM - 1:00 PM — ***LUNCH*** **Sponsored by** triphase

TECHNICAL PRESENTATIONS

	ROOM: VILLE MARIE TRACK 1 - LARGE POWER SYSTEMS	ROOM: ST-ANTOINE TRACK 2 - POWER ELECTRONICS & ELECTRIC DRIVES	ROOM: MONTREAL A-B TRACK 3 - MICROGRID & CYBERSECURITY
1:00 PM - 1:30 PM	HQ Experiences in Case of Using Control System Replica Interfaced With HYPERSIM Real-Time Simulator in Recent HVDC Upgrade Projects by Alpha Oumar Barry, IREQ, Canada	ETAP – OPAL-RT Integrated Platform, by Fabian Uriarte & Shervin Shokooh, ETAP, USA	OPAL-RT/Scalable Integration, by Lloyd Wihl, Scalable Network Technologies, USA
1:30 PM - 2:00 PM	HIL-Grid Model on OPAL-RT for Testing Future Grid Control Centers by Eric Glende, OVGU University Magdeburg, Germany	Model-Based Systems Engineering of Synchrophasor Systems and Technologies, by Luigi Vanfretti, ALSETLab, USA	Real-Time Simulation of Predictive Control of DC Vehicular Microgrids by Ali Mehrizi-Sani, Washington State University, USA
2:00 PM - 2:30 PM	The Use of Real-Time Simulation to De-risk and Manage HVDC and FACTS Schemes - Experiences on the French Transmission Grid by César Martin, RTE, France	Real-Time Control of Doubly Fed Induction Generator, by Kader Chaker, SCAMRE Laboratory, ENPOran Algeria	Real-Time Co-Simulation for Microgrids With OPAL-RT by Quoc Tuan Tran, CEA-INES, France
2:30 PM - 3:00 PM	New Travelling Wave Fault Location at SEL and the Need for Advanced HIL Solutions, by Armando Guzman, SEL Inc., Canada	How to Use Real-Time Simulation for a Better, Modern and Interactive Teaching Experience for Power System and Electric Motors by Danielle Nasrallah, OPAL-RT TECHNOLOGIES, Canada	Real-Time Hardware-in-the-Loop Co-Simulation Platform for Microgrid Analysis by Martine Chlela, McGill University, Canada
3:00 PM - 3:30 PM	***BREAK*** **Sponsored by** AMETEK		
3:30 PM - 4:00 PM	Assessment of the Mexican Interconnected Electric Power System Operation considering Non-Conventional Renewable Energies by Dr. Arturo R. Messina, Mexico	OPAL-RT Simulators in ABB MV Drives: Overview of Usage and Latest Developments by Mathieu Giroux, ABB, Switzerland	Proven Strategies and Key Concepts to Develop Successful Microgrid Control Systems by Abdel Rahman, SEL, USA
4:00 PM - 4:30 PM	AC Power Systems for Grid Simulation, by Mahesh Thaker, Ametek Programmable Power, USA	Automatic Verification Test Bench for MV Drives Based on "HIL" Simulation by Alain Dutrey, Schneider Electric, France	Modeling and Real-Time Simulation of Wind Power Systems Using RT-LAB Platform by Mounir Khiat, ENPOran, Algeria
4:30 PM - 5:00 PM	Design and Implementation of a Modular Multilevel Converter Supported by HIL Simulation by Frédéric Colas, L2EP Ensam, France	High-Fidelity Power Motor Emulator for Testing Inverter and Control by Danielle Nasrallah, OPAL-RT TECHNOLOGIES, Canada	Shared Power System Models: Accelerating Microgrid Testing and Integration by Christopher Smith, MIT-LL, USA

COCKTAIL AND DINNER — ROOM: FORTIFICATION

6:00 PM - 7:00 PM — ***RECEPTION COCKTAIL***

7:00 PM - 10:00 PM — ***GALA DINNER****
**FORMAL ATTIRE PROPOSED*

Evening **sponsored by** National Instruments

THURSDAY, SEPTEMBER 7th

BREAKFAST — ROOM: MONTRÉAL C-D

7:30 AM - 8:30 AM — Breakfast **Sponsored by** Hydro Québec

PRESENTATIONS — ROOM: MONTREAL A-B

8:30 AM - 8:40 AM — Welcome!

8:40 AM - 9:40 AM — Power Electronics and Power-Hardware-in-the-Loop Keynote by Christophe Brayet, OPAL-RT

9:40 AM - 10:10 AM — Innovating in a IoT, IoP World by Greg Farthing, ABB, Canada

10:10 AM - 10:40 AM — ***BREAK*** **Sponsored by** etap

10:40 AM - 11:20 AM — Automotive Keynote by Herve Pollart, OPAL-RT

11:20 AM - 12:00 PM — Aerospace & Defense Keynote by Alexandre Leboeuf, OPAL-RT

12:00 PM - 1:00 PM — ***LUNCH*** **Sponsored by** National Instruments

TECHNICAL PRESENTATIONS

	ROOM: VILLE MARIE TRACK 2 - POWER-HARDWARE-IN-THE-LOOP	ROOM: ST-ANTOINE TRACK 3 - AERO, AUTO, MARINE & AUTOMATION
1:00 PM - 1:30 PM	Vehicle-Grid Integration HIL for Designing Advanced Ancillary Services for Power Systems by Yutaka Ota,Tokyo City University, Japan	Presentation by Amine Smires, CS Canada, Canada
1:30 PM - 2:00 PM	Power-HIL and the KIT Energy Smart Home Lab Environment by Sebastian Hubschneider, Karlsruhe Institute of Technology, Germany	Real-Time Cooperative Localization With Extended and Unscented Kalman Filters for Intelligent Vehicles by Farid Bounini, Université de Sherbrooke, Canada
2:00 PM - 2:30 PM	@NREL Using OPAL-RT, by Przemyslaw Koralewicz, NREL, USA	Describing the NCREPT Test Facility and Research With Regards to the Dyno and the Associated Driving Schedules by Chris Farnell, University of Arkansas, USA
2:30 PM - 3:00 PM	A Power-Hardware-in-the Loop Test Bench for Electric Machine Emulation by Amitkumar K. S., Concordia University, Canada	Real-Time Application of Proprioceptive Tactile Sensing With Robotic Graspers by Bruno Belzile, McGill University, Canada
3:00 PM - 3:30 PM	***BREAK*** **Sponsored by** gentec	
3:30 PM - 4:00 PM	Status of Energy Lab 2.0 and Overview of PHIL Activities by Jörn Geisbüsch, Karlsruhe Institute of Technology, Germany	A Novel Parallel Robot for Fast Pick-and-Place-Operations by Peyman Karimi Eskandary, McGill University, Canada
3:30 PM - 4:00 PM	Testbed for Power System Stabilizer Tuning Using Synchrophasor Measurements and eMEGAsim by Jaime Cristóbal Cepeda, CENACE, Ecuator	The Importance of Electrical Fault Insertion in HILS Applications by Brennan Caissie, Pickering, USA
4:00 PM - 4:30 PM		Model-Based Design Using Substation Hardened Universal Relay by Jean Philippe Gagnon, GENTEC, Canada

COCKTAIL AND DINNER — TERRACE OF THE PALAIS DES CONGRÈS OF MONTREAL

6:00 PM - 10:00 PM — ***CLOSING CEREMONY AND OPAL-RT'S 20th ANNIVERSARY CELEBRATION!****
**FORMAL ATTIRE PROPOSED*

Evening sponsored by: Hydro Québec

20 ANNIVERSARY OPAL-RT TECHNOLOGIES

FRIDAY, SEPTEMBER 8th

BREAKFAST — ROOM: REPORTER

7:30 AM - 8:30 AM — Breakfast **Sponsored by** triphase

VISITS *(GROUP #1)* — Westin lobby

8:00 AM - 8:05 AM — **Bus #1 pick-up of group #1**

9:00 AM - 10:00 AM — **Hydro-Quebec Research Institute (IREQ) Visit – Group #1**

11:00 AM - 12:00 PM — **OPAL-RT Headquarters Visit & Poster Sessions**

VISITS *(GROUP #2)* — Westin lobby

9:00 AM - 9:05 AM — **Bus #2 pick-up of group #2**

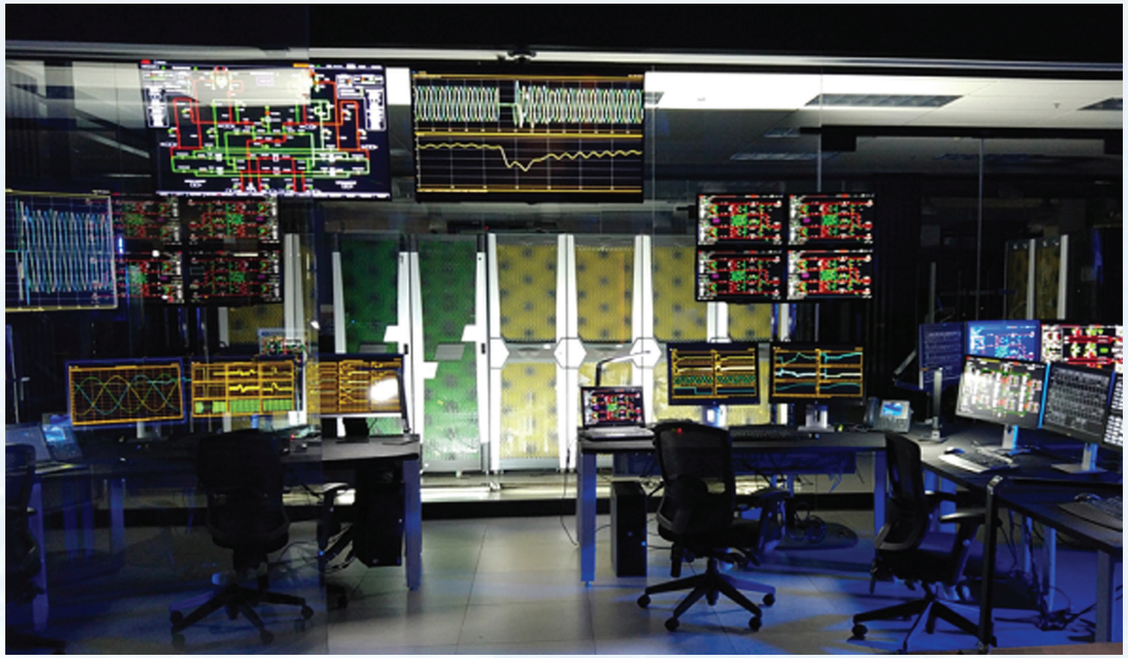
10:00 AM - 11:00 AM — **Hydro-Quebec Research Institute (IREQ) Visit – Group #2**

12:00 PM - 1:00PM — ***LUNCH*** **Sponsored by** Hydro Québec

1:00 PM - 3:00 PM — **OPAL-RT Headquarters Visit & Poster Sessions continue**

3:00 PM - 3:30 PM — **Buses drive out, back to Le Westin, end of RT17**

Take advantage of this exclusive opportunity to visit IREQ's freshly renovated test area for their long-distance high-voltage direct current (HVDC) line (RMCC), explore their facilities and speak with onsite experts.



Diamond sponsors

Hydro-Québec generates, transmits and distributes electricity. Its sole shareholder is the Québec government. It uses mainly renewable generating options, in particular large hydro, and supports the development of other technologies—such as wind energy and biomass. A responsible corporate citizen committed to sustainability, Hydro-Québec carries out construction projects to prepare for the future. It also conducts R&D in energy-related fields, including energy efficiency. The company has four divisions.

Triphase is the number one company for real-time signal processing, networking and interfacing technologies for large-scale power electronics measurement and control. Their technologies are open, intuitive and robust. They offer best-in-class performance.

Triphase technologies connect software to power electronics sensors and actuators. As such, they connect their customers and their engineering partners to power electronics component manufacturers.

NI provides powerful, flexible technology solutions that accelerate productivity and drive rapid innovation. From daily tasks to grand challenges, NI helps engineers and scientists overcome complexity to exceed even their own expectations. Customers in nearly every industry—from aerospace and automotive to consumer electronics and advanced manufacturing—use NI's integrated hardware and software platform to improve our world.

Gold sponsors

You may know Intel for its processors. But they do so much more. Intel invents at the boundaries of technology to make amazing experiences possible for business and society, and for every person on Earth.

Harnessing the capability of the cloud, the ubiquity of the Internet of Things, the latest in memory and programmable solutions, and the promise of always-on 5G connectivity, Intel is disrupting industries and solving global challenges. Leading on policy, diversity, inclusion, education and sustainability, we create value for our stockholders, customers, and society.

ABB is a pioneering technology leader that is writing the future of industrial digitalization. For more than four decades, we have been at the forefront, innovating digitally connected and enabled industrial equipment and systems. Every day, we drive efficiency, safety and productivity in utilities, industry, transport and infrastructure globally. With a heritage spanning more than 130 years, ABB operates in more than 100 countries and employs around 132,000 people.

Gentec designs, manufactures long-lasting and reliable solutions and customized products in the state-of-the-art electronics, power and energy management sectors. Gentec also offers services in research and development as well as electronic manufacturing to its various customers.

Since 1959 and largely thanks to the skill of its highly-skilled employees, Gentec has maintained its position as the market leader by working closely with its customers and imparting its expertise.

The company has been powering success for over 30 years by providing the most comprehensive and widely-used enterprise solution for generation, transmission, distribution, industrial, transportation, and low-voltage power systems.

Founded in 1986, ETAP is headquartered in Irvine, California, USA, with offices around the world.

Our mission is to provide state-of-the-art products and superior engineering services by combining advanced technologies with the highest standard in quality to achieve overall customer satisfaction.

Founded in 1986, ETAP is headquartered in Irvine, California, USA, with offices around the world.

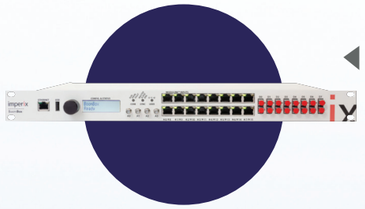
AMETEK, Inc. is a leading global manufacturer of electronic instruments and electromechanical devices with annual sales of approximately $4.0 billion. AMETEK has over 15,000 colleagues at more than 150 manufacturing locations around the world. Supporting those operations are more than 100 sales and service locations across the United States and in 30 other countries around the world.

Silver sponsors

imperix

Imperix ltd. is a company established in Sion, Switzerland. Its name is derived from the Latin verb imperare, which stands for controlling – or ruling – and refers to the company's core business: the control of power electronic systems. It is a spin-off of the Swiss Federal Institute of Technology, Lausanne (EPFL).

Incorporated in 2013, the company is essentially a manufacturer of cutting-edge laboratory equipment, tailored for engineers active in the field of power electronics and smart grids.



HIGHLIGHTED PRODUCT:
Simple is beautiful is the guideline behind the BoomBox's operating system! It contains just what is needed to control your converter, including protection, communication and real-time supervision. By avoiding the usual burden of conventional operating systems, control and interrupt frequencies up to several tens of kHz can be achieved, which brings high performance controls within everyone's reach, including for the most complex converter topologies.

EGSTON

Wherever methods based on experience and innovation are put into action, where customers have high expectations regarding materials and technology and where European know-how blends with global structures, you will find Egston.

pickering

Pickering Interfaces designs and manufactures modular signal switching and simulation for use in electronic test and verification. They offer the largest range of switching and simulation products in the industry for PXI, LXI and PCI applications. Their products are specified in test systems installed throughout the world and have a reputation for providing excellent reliability and value.

HIGHLIGHTED PRODUCT:
Modular Breakout System - The Modular Breakout System is designed to simplify HILS (Hardware In the Loop Simulation) Applications. This low-cost system combines a BoB (Breakout Box) feature set with the added flexibility of an FIU (Fault Insertion Unit). By mating the FIU chassis directly to the BoB, cabling is minimized, creating a more compact reliable design and improving signal integrity. In addition, all cables to the simulation system and the UUT are located behind the front panel of the BoB. This creates a simpler front panel that is less prone to damage.

With an original position combining Production and Service R&D, expertise in the fields of power electronics, analog, measurement, digital and programming, Puissanc+ has been affirming itself for more than 20 years as a reference in the fields of: design of electronic equipment, energy conversion, instrumentation in power electronics, and integration of emulation systems.

Its industrial know-how is exercised within the framework of the business of critical systems and services. Its equipment are integrated into: production bench, on ground and embedded test equipment, system integration benches, testing laboratories, and tools for testing and maintenance.

Chroma
Systems Solutions

Chroma supplies precision power conversion test instruments and automated systems to suit a variety of applications. From utilities, renewable energy, research and test facilities, Chroma products are trusted by the world's leading R&D labs to provide consistent, fast and accurate measurements and tests. Chroma is well known for their programmable Regenerative Grid Simulator which has been designed to provide full 4 quadrant, fully regenerative, grid simulation with advanced features for PHIL, product verification, safety and compliance testing. With offices and manufacturing facilities located worldwide, Chroma is renowned for its commitment to excellence in product, service, and innovation.

plexim
electrical engineering software

Plexim specializes in solutions for the design and testing of power electronic systems with associated thermal management and controls. The company's electrical engineering software PLECS provides a complete power conversion simulation platform that runs natively within MATLAB/Simulink, or as a standalone package. PLECS features a comprehensive library, with components from the electrical, thermal, magnetic, mechanical and control domains. Plexim's portfolio also includes the PLECS Coder, RT Box and PLECS Processor-in-the-Loop (PIL) module.

Bronze sponsors

We are one of the worldwide leading manufacturers for analogue linear transistor amplifiers, AC/DC current and voltage power supplies for industrial measurement and testing systems.

Our services extend from single amplifiers for AC and DC mains simulation to complex completely computer controlled testing and measurement systems. Based on our 4-quadrant linear power amplifiers we are able to simulate all supply voltages from DC to several hundred kHz with power up to the megawatt range.

HIGHLIGHTED PRODUCT:
The new APS amplifier series is a modern style 4-quadrant power amplifier with thecapability to operate as source and as sink. In both conditions it can simulate a voltage as well as a current source. From 1kW up to 1MW – a wide power range is available. The linear design causes a very fast slew rate >52V/µs, a very low internal resistance and very high peak-load ability. The harmonic distortion is extremely low, even under high nonlinear conditions.

FMTP Power provides products, training and consulting that increases control over the network and thereby profitability for the power industry.

HIGHLIGHTED PRODUCT:
GridEx® is your personal assistant for Smart Grid networks and sets you in control of your IEC 61850 networks. It is a digital multimeter and analyzer for Smart Grids designed to support you when performing commissioning, troubleshooting and maintenance. GridEx® bridges the gap between the traditional power technology and the digital communication. Network digital data is translated into upfront and intuitive information to support decisions for increased reliability and improved system utilization. Entirely embedded stand-alone solution for secure connection to your IEC 61850 network, easy to use, versatile connections, instant start-up, error and inconsistencies detection, warning explanation, proactive analysis. The evolutionary tool in IEC 61850 testing. www.fmtppower.com

Based in Culver City, California, SCALABLE provides network design, modeling and analysis tools, cyber training systems and engineering support services to commercial enterprises, government and defense agencies, research organizations and educational institutions around the world. SCALABLE solutions integrate simulated virtual network models with physical hardware and applications, allowing users to reduce the time, cost and risks of developing, testing and deploying large, sophisticated wired and wireless networks and new communications equipment, and train personnel on cyber defense. More information on the company is available at scalable-networks.com.

HIGHLIGHTED PRODUCT:
EXata is a high-fidelity network emulation tool used to simulate and predict the behavior of networked environments based on various operational scenarios, including cyber-attacks. The emulation runs in real-time and models connections, computers, protocols, firewalls and other defenses. EXata provides a cost-effective and easy-to-use alternative to physical testbeds that typically have high equipment costs, complex setup requirements and limited scalability.