

PRESS RELEASE

Illinois Professor Honored for Software Visualizing Dynamic Operation of the Electrical Power Grid

Contacts:

Professor Thomas J. Overbye
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
1406 W. Green St.
Urbana, IL 61801
217-333-4463
Overbye@ece.uiuc.edu

Professor Robert J. Thomas
Director, Power Systems Engineering Research Center
School of Electrical and Computer Engineering
Cornell University
Ithaca, NY 14853
607-255-5083
rjt1@cornell.edu

R. Bruce Thompson
Chair, I/UCRC Association Executive Committee
Center for Nondestructive Evaluation
Iowa State University
515-294-8152
thompsonrb@cnde.iastate.edu

Thomas Overbye, a professor of electrical and computer engineering at the University of Illinois at Urbana-Champaign, has been awarded the first annual Alexander Schwarzkopf Prize for Technological Innovation. The award recognized Overbye's creation, development and technological transfer of the power system visualization software known as PowerWorld Simulator. This tool visualizes the complex processes in which power flows in the nation's electrical grid, allowing engineers to better understand the events associated with its operation and providing managers with a basis for managing and responding to its occasional breakdown. Overbye received the award on January 14 in Arlington, Virginia from the I/UCRC Association, a voluntary, independent organization of past and present members of the National Science Foundation's Industry/University Cooperative Research Center program.

Starting with raw engineering analysis tools and novel ideas for animation, Overbye created a program that presents critical technical information in a manner suitable for anyone interested in the performance of the interconnected electric power grid. The motivation for this program began in the early 1990's when the electric power industry was on the verge of a tremendous upheaval as electric utility systems were being opened to deregulation and competition. The problem was not the lack of excellent power system analysis algorithms but instead one of communication – communicating the requirements imposed on the transmission grid by the

fundamental laws of physics to an audience that viewed laws as something to be over-turned or amended in the next legislative session.

Seeing the need, Overbye took the time-tested engineering approach of combining the best of existing power system analysis with the use of emerging technologies in interactive computer graphics to meet an entirely new need. Through the use of animation, the Simulator software allows economists, lawyers, policymakers, and planners to see exactly how proposed business decisions and regulatory rules interact with the technical/physical constraints of the power system imposed by the laws of physics. As such, it has become a valuable tool for all of the stakeholders in the electricity marketplace.

Simulator is also used to break new research ground in the area of power system visualization and analysis of restructuring issues. New techniques include the mapping of information for rapid identification of potential congestion problems and market power opportunities. These features are providing the critical link between complex technical phenomena and economic/regulatory concerns.

To accomplish these functions, Simulator produces a variety of color graphics to communicate complex engineering information about a power grid. For instance, it can create charts showing specific details of electric power flows within a network, including animated flow, critical loading levels and generation/load patterns. The software can also create contour maps of electrical grids covering large geographical areas, with shading differences indicating levels of electricity prices by region.

The basic software was commercialized in 1996 by the formation of PowerWorld Corporation. Through PowerWorld Corporation, Simulator has been sold to over 180 different corporate entities that collectively span the spectrum of the new electricity industry.

In commenting on the contribution, Robert Thomas, Director of the Power Systems Engineering Research Center (PSerc) and Professor of the School of Electrical and Computer Engineering at Cornell University, said “Tom epitomizes what the Alexander Schwarzkopf Prize is meant to embody. The focus, dedication, and time it takes to create a product out of research and then transfer it from the university environment to industry is substantial. We in PSerc are proud of Tom and what he has accomplished “.

Overbye’s work was supported by the Power Systems Engineering Research Center, a multi-university member of the National Science Foundation’s Industry/University Cooperative Research Center program. The I/UCRC Program traces its history back to the early 1970s; it is the longest continuously operating cooperative research center program sponsored by NSF. With a modest budget of \$6 million/year, the program currently supports 45 centers involving over 80 universities, 600 member firms, 700 faculty and 850 students. NSF support is leveraged 15-to-1 by other public and private funding sources. Over the years faculty supported by the I/UCRC program have won a long list of scholarly and professional awards and honors for their research. Remarkably most of the 110 centers formed over the past 30 years are still in existence. In 1998 the Technology Transfer Society awarded the I/UCRC Program its coveted *Justin Morrill Award* for excellence in technology transfer. On the occasion of the I/UCRC program’s 30th anniversary, Dr. Rita Colwell, Director of NSF, commented: “It is seldom that a federally funded program is a real pioneer and yet remains vigorous and innovative more than a generation later... The I/UCRC Program continues to be recognized as a model for collaborative research and development between universities and industry, throughout the United States and around the world”

The Alexander Schwarzkopf Prize is awarded annually in the name of Dr. Alexander Schwarzkopf, who established the Industry/University Cooperative Research Centers (I/UCRC) Program at the National Science Foundation (NSF) in 1979 and has managed this unique and remarkably effective program since its creation. His efforts have been recognized by many awards as noted above and have been the catalyst for adoption of the I/UCRC model by a number of states and several other countries, the highest form of recognition.

Note to Editors: Two example color images demonstrating the visualization capabilities of PowerWorld Simulator are shown below. Additional images can be obtained for Overbye at Overbye@ece.uiuc.edu.

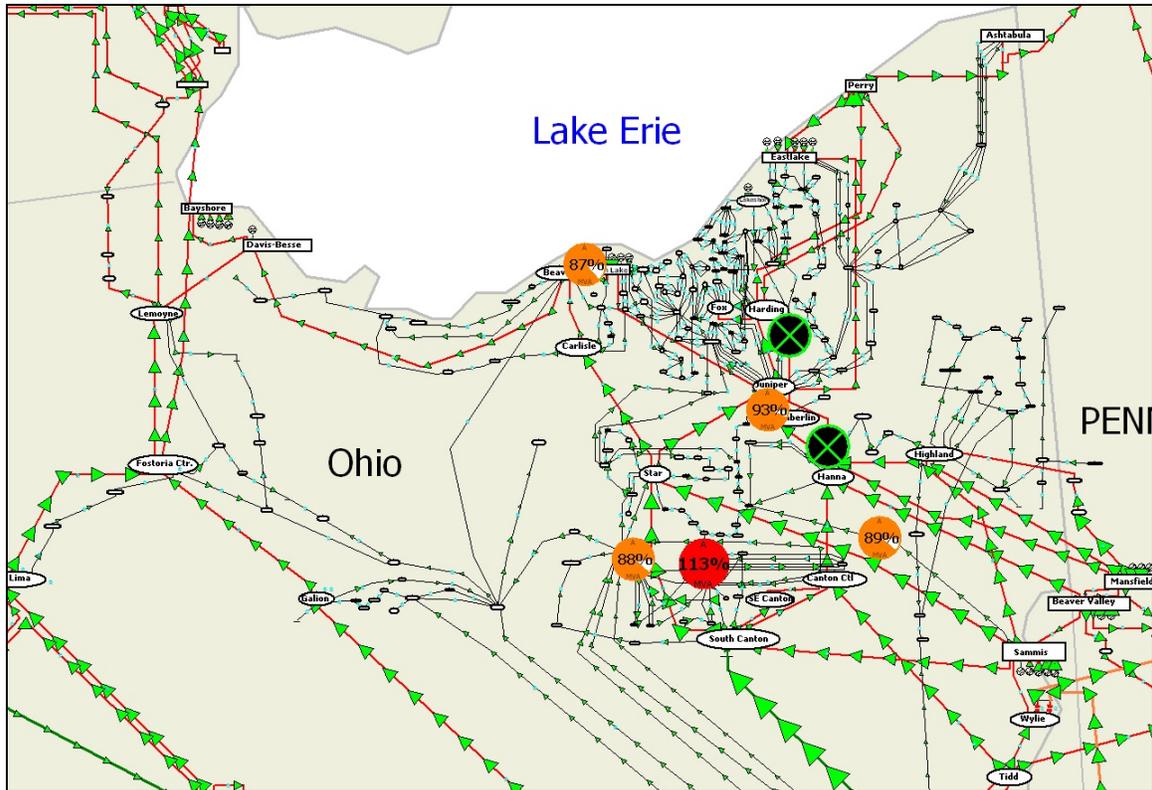


Figure 1 shows a simulation of the flow of electric power on the high voltage transmission grid in Northern Ohio at about 15:33 EDT on August 14th 2003, a time when emergency control may have been able to prevent the East Coast blackout.

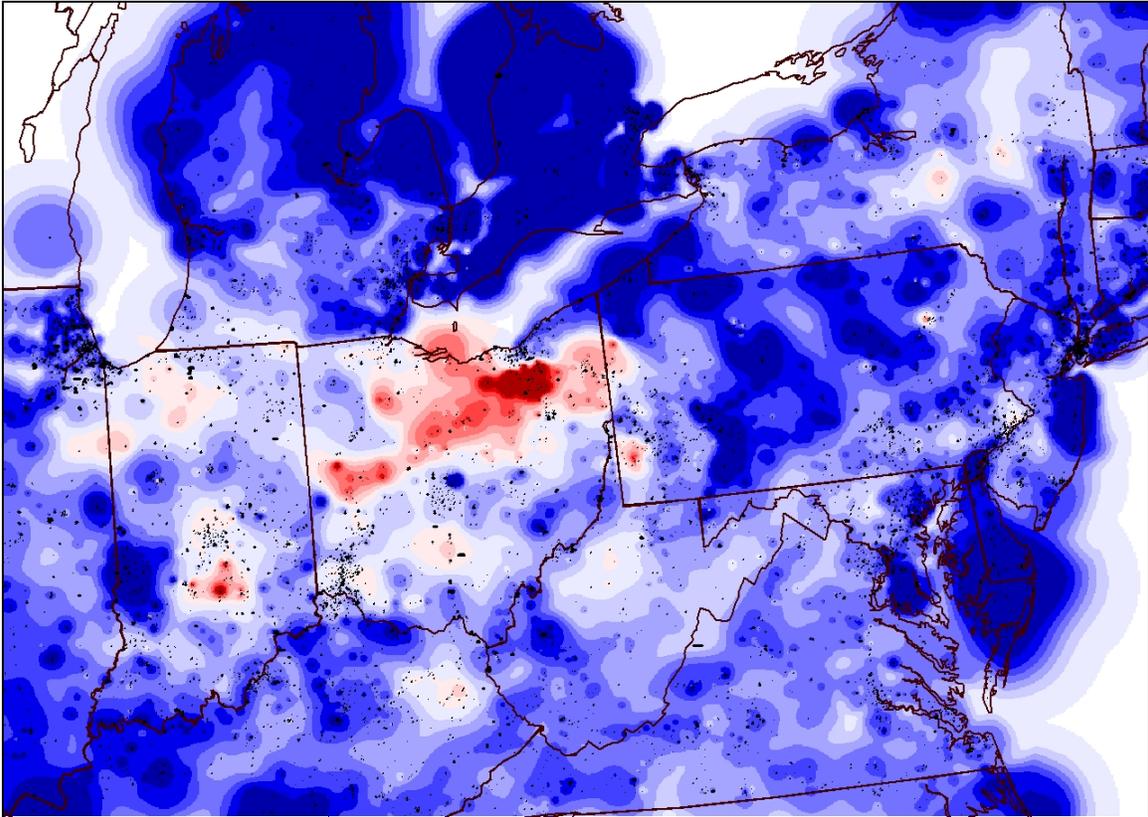


Figure 2 shows a contour of the voltages in the electric power grid during the August 14th blackout. The red areas in Northern Ohio are used to vividly show the low voltages in that area.

