

RTDS NEWS

June 2001

Real time digital simulation for the power industry



The World's Largest Power System Simulator installed in Korea

After more than two years of development and testing, the large-scale RTDS[®] Simulator was successfully installed and commissioned on schedule earlier this year for the Korea Electric Power Corporation. As part of the *KEPS Power System Analysis Center*, this RTDS unit represents the *world's largest and most powerful* real time simulator.

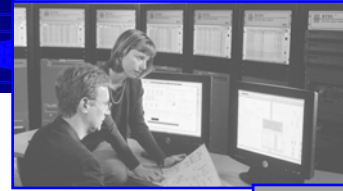
Success of KEPS can be attributed to careful and coordinated efforts from several parties. LG Industrial Systems (LGIS), the Korea Electric Power Research Institute (KEPRI), the Korea Electrotechnology Research Institute (KERI), and RTDS Technologies have all played important and distinct roles during this project.

KEPRI will use the real time simulator to perform detailed digital simulation studies of electromagnetic / electromechanical transient phenomena, as well as, dynamic phenomena in their power network. Interactions between equipment such as protective relays, controllers and power electronic devices will be studied in detail. KEPRI will test and investigate the performance and correct operation of protection systems, regulators, stability control devices and various advanced FACTS systems. It is

also expected that the KEPS facility will serve as a training and education tool for KEPRI engineers and operators.

Although the KEPS Center will include a wide variety of traditional power system simulation and analysis tools, the RTDS Simulator is the cornerstone of this facility. This simulator consists of 26 racks of RTDS hardware, each containing 13 *3PCs*, 1 *WIF*, 2 *IRCs* and various auxiliary components (i.e. *ODAC16*, *OADC*, *DITS*), installed in several labs: the System Simulation lab, the Relay / HVDC test lab, SVC / FACTS test lab and the Training lab. Although the RTDS racks are physically located in three rooms, they remain permanently connected so that they can be used together for large simulations (i.e. all 26 racks) when necessary.

The final acceptance program required successful representation of KEPCO's Largest Equivalent System (LES) model including: 160 – 3 phase buses, 41 generators, 131 single and twin circuit lines, 78 transformers, and more than 60 controlled load models. Continuous, real time operation was achieved for the LES with a simulation timestep of 50 microseconds.



To satisfy KEPS requirements, many significant enhancements and improvements were made to RTDS hardware and software. In addition to the introduction of new hardware components by RTDS Technologies, a number of joint software developments were undertaken.

Data Conversion Program

Converts existing PSS/E files to RTDS/Draft file (including initial system conditions).

Multi-console Operating Mode

Allows operation from 2 independent computer workstations (i.e. instructor and trainee).

Multiple Monitor Display

Allows display on multiple monitors to increase the operating flexibility for very large simulations.

Additional developments lead by LGIS for the overall project include:

System Reduction Techniques

Evaluate existing and create custom techniques used to reduce large systems, but maintain system dynamics.

3-Dimensional Visualization Program

Helps display results from large simulations.

Database Program

Develop and populate parameter database for the KEPCO system.

During the course of the project, comparisons were made between the RTDS results and those from PSS/E and EMTDC. These comparisons between different solution algorithms provide a high degree of confidence that the RTDS results are accurate and valid. Intensive training was considered by KEPCO to be a critical requirement of the KEPS project. The training program included formal classroom instruction by both in-house specialists and by invited industrial and academic experts. In addition, KEPRI and LGIS personnel were assigned specific development tasks necessary to successfully complete the project. This training lasted 14 months and involved more than 10 representatives from KEPRI and LGIS.

Interested in testing a new Arc Furnace model or Flick Meter – please contact us!

After completion of the project, LG will provide frontline support for the KEPS simulator with continued background support from RTDS.

The KEPS project represents significant engineering accomplishments by RTDS Technologies. The developments made to the RTDS Simulator will benefit all RTDS Simulation users now and in the coming years.

For more information such as technical papers - please contact RTDS.

Upcoming Events

IEEE/PES Summer Meeting
Hospitality Suite July 15-19, 2001 in Vancouver, Canada

IEEE Porto Power Tech 2001
Exhibition September 10-13, 2001 in Porto, Portugal

WPRC
Hospitality Suite October 22-25, 2001 in Spokane, USA

IEEE/PES T&D
Exhibition October 29 – November 1, 2001 in Atlanta, USA



PSCAD for RTDS – V2.2 Release !

PSCAD for RTDS, V2.2, was released this month. The release includes new features and enhancements to the GUI and new simulation components and completely revised documentation. Some examples include:

- Larger Draft canvas - now 146x100 grids
- Color meters with initial value indication
- RMS meters set to Line-Line or Line-Ground
- Colour printing directly from RunTime
- X-Y plots
- Fast download
- New components include:
 - V3 Machine Frequency Dependent T-Line
 - Dynamic Load Generic Machine Controls
 - Unified T/Cable Many Controls Components

SEL – Up and Running !

Schweitzer Engineering Laboratories of USA is the latest protective relay manufacturer to adopt the RTDS Simulator for development and type testing. Look for a feature article about this new innovative user in the next RTDS News.