RTDS Technologies

RTDS NEWS

2015 North American User's Group Meeting

WHAT'S NEW: JUNE 2015

Why large-scale simulation is a critical technology for China Southern Grid

A look at our new and improved capabilities within the small timestep subnetworks domain

Upcoming Training Courses

We are currently accepting registrations for the following courses. Please contact **christine@rtds.com** for more details.

INTRODUCTORY RTDS® SIMULATOR TRAINING

October 19 - 23, 2015
Winnipeg, Canada

IEC 61850 APPLICATIONS TRAINING

October 26 - 30, 2015
Winnipeg, Canada

Upcoming Events

PAC World 2015

June 29—July 2, 2015
Glasgow, United Kingdom

2015 IEEE PES General Meeting

July 26—July 30, 2015
Denver, Colorado, USA

2015 CIGRE Canada Conference

August 31—September 2, 2015
Winnipeg, Manitoba, Canada

Visit the RTDS Technologies booth at these events!

GUEST ARTICLE

Real-time simulation methodology and applications for a large-scale AC-DC parallel transmission network at China Southern Grid

Guo Qi and Liao Mengjun — China Southern Grid

The Electric Power Research Institute (SEPRI) of China Southern Grid (CSG) has built the world's largest real-time simulation system for an AC-DC parallel transmission network. The key power system simulation laboratory is able to simulate CSG's entire transmission network above 220kV and includes 8 HVDC systems, 1100 three-phase power system nodes, 1400 transmission lines, and at least 250 generators. The laboratory combines numerous sets of HVDC protection and control devices, system stability control devices, and 33 RTDS Simulator racks.

The simulation system serves as a realistic, reliable, and accurate platform, which is appropriate for power grid operation analysis, system stability control (SSC) testing, dynamic performance testing (DPT) of HVDC projects, and various other applications.

One of the most important benefits of the simulation system is the strong support it provides for CSG's actual network operation. The SEPRI simulation laboratory deals with a number of simulation tasks related to power grid dispatching for CSG, including pivotal stability risk verification, failure analysis, determination of system operation strategy, etc. The power dispatch department takes simulation results seriously and uses them to adjust system operation on a continual basis.

System stability control testing is another key application of the simulation laboratory. SSC devices are used to maintain power grid stability in the face of a variety of contingency scenarios. It is of great importance to CSG that SSC devices are working correctly. Every year, the SEPRI simulation laboratory is used to verify SSC strategies by performing tests with the simulated large-scale AC-DC parallel transmission network.

The simulation laboratory is also used for the dynamic performance testing (DPT) of new HVDC and VSC HVDC projects before the technology is dispatched in CSG's power system. In 2013, the SEPRI simulation laboratory engaged in the development of an interface between the RTDS Simulator and modular multi-level converter (MMC) HVDC devices which are implemented using FPGAs. The simulation laboratory team built a multi-terminal MMC HVDC real-time simulation platform which is able to simulate up to 512 modules in every valve/half-phase (a complete HVDC converter is made up of over 3,000 modules).

RTDS Technologies

Visit us online!

Our North American UGM was a huge success!

We would like to thank all of those who attended the third biennial RTDS Technologies North American User's Group Meeting in San Francisco, California. The event showcased the cutting edge research and work of many of the power industry's best and brightest. We enjoyed two and a half days of presentations from both users and RTDS Technologies staff, as well as stimulating discussion during free periods.

Topics explored include the development of a large scale power system model, black start studies, and power-hardware-in-the-loop testing for distributed energy resources, to highlight a few. Attendees also enjoyed an informative technical tour of Pacific Gas and Electric's world-class Technical Center.

Stay tuned to future newsletters and **our website** for information about upcoming User's Group Meetings around the world. We are looking forward to another successful North American User's Group Meeting in 2017, as well as our next European User's Group Meeting in the summer of 2016!

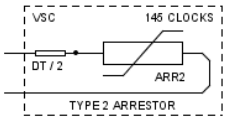
Click here to access presentations from the User's Group Meeting.

Small but mighty: check out the new and improved features of our small timestep subnetworks

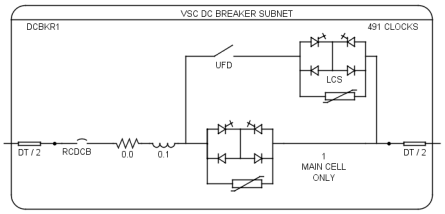
In response to the needs of our customers and to the evolving complexity of the power industry, we've released a suite of all-new capabilities in the small timestep domain

Resistive switching—The new rtds_vsc_BKR_RES1 component is a purely resistive breaker model. Up to 7 single-phase resistive switches may be placed in a tightly coupled area. If areas are decoupled using a travelling wave model, another 7 resistive switches can be added in each area. Compared to the traditional L-C switching method in the small timestep domain, these purely resistive switching elements remove the oscillations that previously occurred due to the switch operation.

Arrestor model—The new arrestor component for the small timestep domain (rtds_vsc_ARR2) is more accurate than the previous two-slope model (ARR1) and is modelled identically to the large timestep arrestor model. The ARR2 model requires 145 clock cycles compared to ~85 for the ARR1.



DC breaker model—The small timestep DC breaker model is based on ABB's DC breaker design. It is the first ever real time DC breaker model and executes at 2.5 µs. The DC breaker includes a travelling wave interface with a half-small-timestep travel time. The DC breaker model allows this ground-breaking technology to be included in real time simulations for the first time ever.



Sub-step three-level VSC—This component can be used to model from 1 to 3 legs of a three-level VSC. It operates in the sub-small-timestep (or "sub-step") region, meaning that it can run at a timestep as small as 1/3 of the small timestep. With up to 3 sub-steps in a regular small timestep, this component reduces switching losses by approximately 50% and allows switching at higher frequencies.

Triangle wave generator—The new triangle wave generator operates in the small timestep at frequencies up to 20 kHz. Resultantly, users can now run pulse width modulation (PWM) at up to 20 kHz without having to place any supporting components in the large timestep domain. Previously, internal switching frequency was limited to ~8 kHz due to this constraint.

a glimpse of our

New Features

- Documentation, including example cases, has been added for our new PMU Test Utility scripting feature.
- Up to 4 conducting layers can now be selected per cable, and the total maximum number of coupled conductors has been increased to 12.
- The contents of a hierarchy box can now be selectively excluded from a Draft circuit.
- Projects can now be easily packaged into a zip file to be sent to the RTDS support team by right-clicking a .dft file and selecting the Zip Files action.
- Version 3 of the GGOV1 generator model was added to the library. This was a substantial re-write of the model—older versions have been obsoleted and should not be used.

Click here to log in to the RTDS client area, where you can access the full RSCAD release notes.

If you have an idea for a new feature, please send it to **feedback@rtds.com**. We want to hear from you!