



UPCOMING TRAINING COURSES

We are currently accepting registrations for the following courses. [Click here for more details and registration.](#)

- **INTRODUCTORY RTDS® SIMULATOR TRAINING**
March 16-20, 2020
Winnipeg, Canada
- **ADVANCED APPLICATIONS TRAINING: POWER ELECTRONICS, HVDC & FACTS**
March 23-27, 2020
Winnipeg, Canada

UPCOMING EVENTS

- **DISTRIBUTECH 2020**
January 28-20, 2020
San Antonio, USA
- **DPSP 2020**
March 9-12, 2020
Liverpool, UK

RUSSIAN STUDENT COMPETITION FEATURES RTDS SIMULATOR

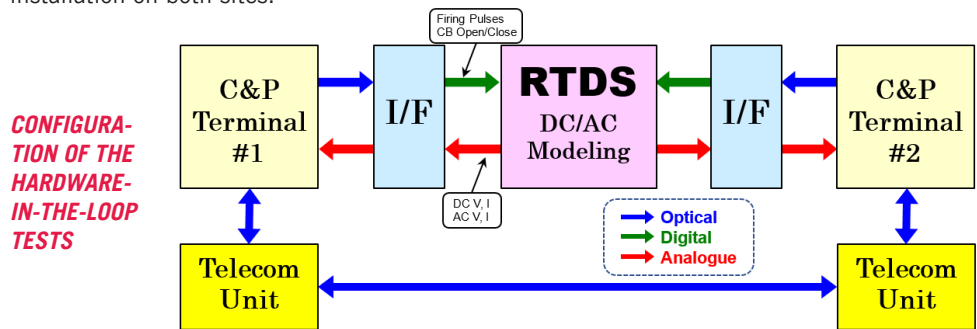
The second all-Russian open competition featuring student qualifications and scientific research works has finished. Thirteen participants — students and aspiring students — from four Russian universities used the RTDS Simulator to explore various research topics. The competition showed students are now applying real-time digital simulation to even more creative and skillful applications than ever before. The event was organized by EnLAB: Russia's exclusive representative for RTDS Technologies.

GUEST ARTICLE

HARDWARE-IN-THE-LOOP TESTING OF THE CONTROL AND PROTECTION SYSTEM FOR HOKKAIDO-HONSHU HVDC LINK REFURBISHMENT // J-POWER, JAPAN

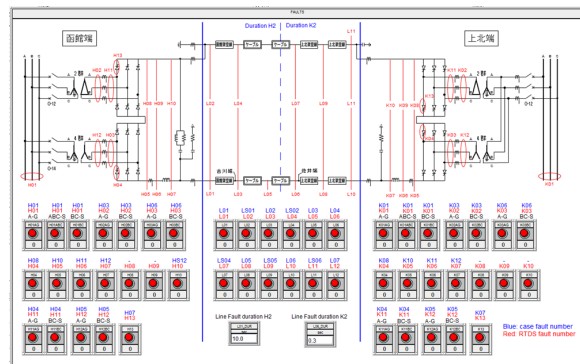
It has been nearly 40 years since the commissioning of the Hokkaido-Honshu HVDC link, which is a bipolar, +/-250kV, 600MW DC system with submarine cables (laid across the Tsugaru Strait) and overhead lines linking Japan's two major islands. The refurbishment of Pole #1 has already been undertaken, with the analogue controller replaced with a digital system in 2008. The control and protection (C&P) system of Pole #2 has since become obsolete since more than 25 years has passed. This article details the upgrading of the Pole #2 system with the support of the RTDS Simulator.

The refurbishment work was awarded to the two major Japanese manufacturers who built the original link. One manufacturer was responsible for the C&P system on the Hokkaido side (Japan's Northern island) and the other was responsible for the Honshu side (Japan's Main island). Because of this unique multi-vendor system configuration, it was very important to test if the new control systems operated properly together before their installation on both sites.



Hardware-in-the-loop (HIL) testing of the Pole #2 C&P system was conducted using the RTDS Simulator, which is installed at R&D centre of J-POWER, located in Chigasaki city, Kanagawa Prefecture. In Chigasaki, the new telecommunication scheme was also set up and connected with the control and protection system to establish test conditions which were as close as possible to the real HVDC system in terms of signal flow and transmission time delays.

The simulator represented the main circuit including the AC systems, HVDC overhead lines, cables, valves, and other DC equipment. The tests at Chigasaki were run from July until the middle of September 2019; more than 550 test cases were carried out to verify functions of the C&P system.



RSCAD SCREENSHOT OF FAULT POINTS

Experience from testing Pole #1 in 2008 encouraged J-POWER to take a more sophisticated approach for Pole #2. In addition to the easy handling of the simulator, numerous fault points were prepared in advance in the test system by adding fault switches and triggering buttons.

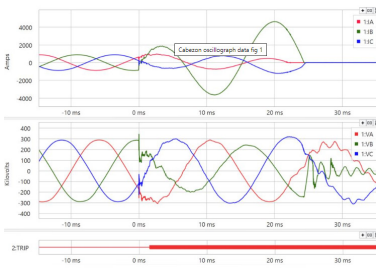
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RTDS-TESTED T-400L TRAVELLING WAVE RELAYS CLEAR FAULT IN THE FIELD IN < 25ms

In May 2018, the Public Service Company of New Mexico energized a transmission line protected by travelling-wave based protection with the trip circuits live to the breakers in a landmark project. [Learn more about that here.](#) The relays were provided by Schweitzer Engineering Laboratories (SEL) and tested using the RTDS Simulator in order to provide the customer with the confidence to deploy the technology.

In September 2019, the installed relays detected a B-phase-to-ground fault, shown below.



Both SEL-T400L relays successfully tripped their respective circuit breakers. The Cabezon SEL-T400L tripped in 1.56 ms, and the fault cleared in 24.36 ms — less than 1.5 cycles. The San Juan SEL-T400L tripped in 2.21 ms, and the fault cleared in 23.53 ms. As a result of the extremely short SEL-T400L trip time, the actual fault-clearing time is essentially the time for the breaker to open, which in this case was under 2 cycles.

[Learn more from SEL.](#)

(Continued)

This scheme greatly accelerated the test procedure, enabling J-POWER to complete all of the planned tests within the limited period. These intensive tests greatly helped to verify the C&P system functionality and contributed to improve system reliability.

In fact, several control and protection operations were improved before sending the equipment to the both converter stations, including parametric adjustment of pole control blocks. The HIL tests greatly saved time and expenditure related to discussions and parameter adjustments that otherwise would have been made across the Tsugaru Strait. The refurbishment works of Pole #2 will be completed by the end of June 2020.



THE RTDS SIMULATOR SETUP AT J-POWER

RSCAD 5.009 IS PACKED WITH NEW FEATURES

- The PMU Test Utility has been enhanced to facilitate comprehensive testing of a PMU's electrical performance (as per test procedures defined in IEEE-ICAP TSS) with minimal new interaction. Please see the graphical user interface for updates.
- A new component establishes a convenient digital interface between the RTDS Simulator and EGSTON COMPISO amplifiers. The component has current sources embedded within the model for ease of use with PHIL based applications.
- A new component can be used to interface the simulator with any external amplifier using the GTAO and GTAI cards. The component includes embedded voltage and current sources for reduced loop delay for PHIL applications.
- NovaCor chassis may now be placed into Low Power Mode.
- All switches (breakers, faults, etc.) can now use 32 bits of a control word (this has been increased from 21).
- A Scott-T transformer model, Rogowski coil model, and small time step current injection model are now available.
- A new Substep environment tutorial manual and cases (simple voltage rectifier and STATCOM) have been added.

[Click here to log in to the RTDS client area where you can access the full RSCAD release notes.](#)



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STAY IN-THE-
LOOP WITH RTDS
TECHNOLOGIES:



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