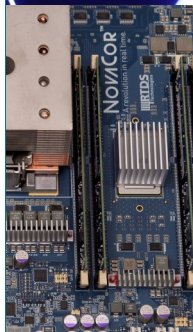the power industry's innovators
depend on the **RTDS Simulator**

RTDS Technologies

about the RTDS® Simulator

The RTDS Simulator is the world standard for real time power system simulation. It is used by all of the world's major protection and control equipment manufacturers, as well as by leading electric utilities, educational institutions, and research facilities around the world.

The RTDS Simulator is a tool used worldwide for the closed-loop testing of protection and control equipment, HVDC and FACTS scheme testing, wide area protection and control system testing, power electronics simulation, distributed generation studies, and more.

● Custom hardware and software

The RTDS Simulator's custom hardware and all-in-one software, RSCAD, have been specifically designed to perform real time electromagnetic transient (EMT) simulations.

● The advantage of real time

The RTDS Simulator operates continuously in real time. Complex networks are simulated using a typical timestep of 25-50 μs. Small timestep subnetworks operating with timesteps in the range of 1-4 μs simulate fast switching power electronic devices.

about the NovaCor
hardware platform

NovaCor is the newest generation of simulation hardware for the RTDS Simulator. Based on a powerful multicore processor, it is faster and more capable than ever before.

Timesteps reduced by

25-50

percent

Each chassis has

2-3x

the simulation capacity of a fully-loaded PB5-based rack

● ACCESSIBILITY

NovaCor allows an entire power system simulation to be run on a single core, making the world standard for real time power system simulation more accessible than ever before.

● SCALABILITY

NovaCor allows scalable access through the licensing of 1 to 10 cores per chassis. Full connectivity of up to 60 chassis is supported.

● COMPATIBILITY

NovaCor can be connected to GTWIF-based RTDS Simulator racks containing PB5 and/or GPC cards. It is compatible with the Global Bus Hub, IRC Switch, and all GTIO hardware.

Based on IBM's POWER8 processor

closed-loop testing of protection and control equipment

The RTDS Simulator offers the most advanced and effective means available for testing protection and control systems.

Protection Testing

The closed-loop interaction of the protection system with the network model provides insight on both the performance of the relay scheme and its effect on the power system.

● Analogue and digital I/O

Secondary voltage and current signals from instrument transformer models are provided to protection equipment via D/A converters. The RTDS Simulator's analogue output card operates over a range of +/- $10V_{peak}$. A power amplifier can be used to provide secondary-level signals to the protection equipment. Breaker commands can be imported into the simulation via digital input card.

● IEC 61850

The RTDS Simulator can be interfaced with IEC 61850-compliant devices. A network interface card is used to stream Sampled Values data and GOOSE messages out of and into the simulated environment.

Controls Testing

The RTDS Simulator has been successfully used to test a wide variety of control systems around the world:

HVDC
FACTS
SVC
TCSC
AVR
PSS

Governors
Exciters
Renewables

and many more

HVDC and FACTS simulation and testing

The RTDS Simulator is used worldwide for the simulation and testing of HVDC and FACTS. All of the major manufacturers use the RTDS Simulator to test their HVDC and FACTS controls during Factory Systems Testing. Systems successfully tested include LCC– and VSC-based HVDC, modular multilevel converters, SVCs, STATCOM, and more.

The controls for the Rio Madeira system—the longest transmission link in the world—were tested on the RTDS Simulator.

Replica simulators for utilities

Many electrical utilities around the world have purchased an RTDS Simulator to connect to replica controls for HVDC and FACTS projects. A duplicate set of controls (supplied by the manufacturer) are delivered to the utility along with a Simulator to represent the power system and create a closed-loop interface. These systems are used to investigate proposed network changes and control modifications, to test scheme upgrades and refurbishment, and to train utility personnel on theory and operation.

Trans Bay Cable
First MMC-based HVDC project in the world. Controls tested with the RTDS Simulator.

Rio Madeira
Longest HVDC link in the world. Controls tested with the RTDS Simulator.

North-East Agra
Multi-terminal UHVDC link with the world's largest capacity. Controls tested with the RTDS Simulator.

smart grid and distributed generation

The RTDS Simulator is equipped with many features allowing the modelling and testing of smart grid and distributed generation elements in real time. Users worldwide use the Simulator to perform renewable energy integration studies and wide area measurement, protection, and control scheme simulation and testing.

Models for wind turbines, photovoltaics, fuel cells, and other power sources are available in RSCAD. The associated VSC converters can be simulated at frequencies up to ~40 kHz.

PMU simulation and testing

The RTDS Simulator's network interface card allows IEEE C37.118 synchrophasor data to be output from the simulation in order to test physical phasor data concentrators in real time. RSCAD also includes a utility for testing the vector and frequency error of a physical PMU.

Power hardware in the loop (PHIL)

In PHIL, the simulated environment exchanges power with real, physical power hardware, such as renewable energy hardware, electric vehicles, batteries, motors, and loads. A four quadrant power amplifier must be used to achieve a PHIL interface. PHIL is often used for studying the impacts of integrating distributed energy resources onto the grid.

watch a video showing the development of a PHIL interface at www.rtds.com/PHIL-video

about RTDS Technologies

The RTDS Simulator was originally developed from research done at the Manitoba HVDC Research Centre in the 1980s. The founding members of RTDS Technologies introduced **the world's first real time digital power system simulator** in 1989.

Over

1300

units installed globally

Customers in over

40

countries

● **World-class simulation support**

Our in-house simulation support team is comprised of highly specialized power system engineers with extensive experience with the RTDS Simulator. User inquiries are responded to within 24 hours and with a high level of detail. Our dedicated support team has helped to ensure the success of countless simulation projects.

● **The advantage of zero third-party products**

Every aspect of the RTDS Simulator is designed, developed, assembled, serviced, and supported entirely by RTDS Technologies. This allows us to maintain the highest quality of equipment and support in the industry, and eliminates the difficulties often encountered when using a system containing multiple third-party products.

learn more at www.rtds.com

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digital power system simulation