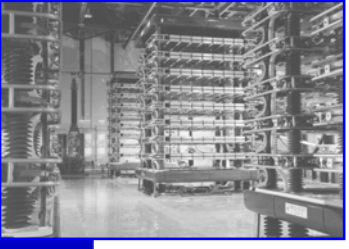


RTDS NEWS

Real time digital simulation for the power industry

January 2005

TU/e technische universiteit eindhoven

TU Delft
Technische Universiteit Delft

Official Opening

On July 14th, 2004 TU Delft and TU Eindhoven celebrated the official opening of their power system simulation laboratory. The centre piece of the laboratory is an eight rack RTDS® Simulator. The system was installed at TU Delft in The Netherlands in April 2004 and has since been in full operation.

After a lengthy and thorough evaluation process, the universities purchased an RTDS Simulator to aid in power system education and research. The tremendous flexibility and versatility of the RTDS Simulator make it the ideal tool for their applications.

The RTDS Simulator can be used for a variety of demonstrations directly from the lecture theatre. Illustrative simulations can be set up and run in real time during presentations. Since the simulator can be accessed via the LAN, it is not necessary to be physically near the system. The LAN connection makes it easy to run and interact with real time simulations even from the lecture theatre. The RunTime environment with on-line metering is very similar to the operation of an actual network using SCADA. Such demonstrations provide valuable insight to students on the operation and behaviour of practical power systems.

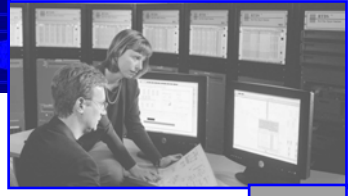
One of the primary areas of research foreseen for the system is the changing topology of The Netherlands and European power systems. Topics of specific interest that will be investigated are the effect of distributed generation and alternative energy. Since wide area aspects are considered critical, the system was designed to simulate networks with upwards of 140 3-phase buses in real time. Because the simulator runs in real time, actual control and protection devices will be included in the investigations as hardware in the loop.

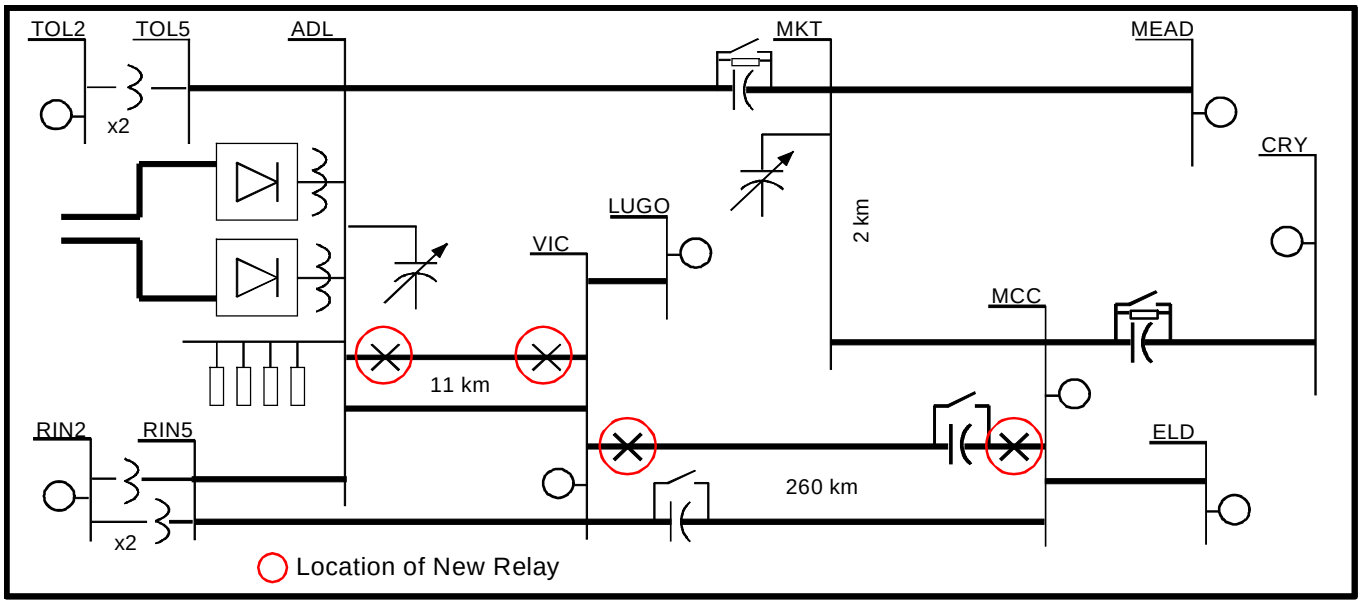
With relatively large power systems being a primary focus, the universities are making good use of the PSS/E to RTDS format conversion facility. This feature allows them to convert systems already available in PSS/E and run them on the RTDS.

The TU Delft and Eindhoven system is the largest real time power system simulator installed at any university in the world and is a key element in their power system education and research activities.

ABB *In 2004, RTDS Simulators were installed at ABB Power Technologies Substation Automation Products and Power Systems HVDC groups located respectively in Västerås and Ludvika, Sweden. The Västerås simulator is primarily used for development and application testing of protective relays, whereas the system in Ludvika is applied to dynamic studies and factory system testing of HVDC control systems.*

RTDS Technologies





GE MULTILIN STUDY FOR LADWP

RTDS Technologies was recently involved in a study together with long standing customer GE Multilin. GE Multilin was contracted by LADWP to test, supply and install protective relays on one of the lines leading away from the Intermountain Power Project (IPP) HVDC system and on a nearby series compensated line. It was expected that the different active components, including SVC's installed in close proximity, would present a difficult operating environment for the protection system.

LADWP wanted proof that the protection would function properly for their unique system conditions. GE Multilin proposed to model the LADWP system in detail using their RTDS Simulator and subsequently contracted RTDS Technologies to construct the simulation model.

RTDS Technologies first evaluated the network to ensure that it could be accommodated by GE Multilin's newly expanded simulator and later implemented the system in the simplified diagram shown above. The system model included a 12-pulse HVDC bipole, two SVC's with detailed controls, several series compensated lines, and detailed CT and CVT models at the relay locations.

The actual tests were conducted at GE Multilin and witnessed by LADWP. The relays were subjected to hundreds of different fault scenarios using the RTDS Simulator's script (batch) mode operation.

The tests ran very successfully and provided LADWP with the confidence required to have the relays installed in their network.

NEW GPC CARD !!

The Giga Processor Card (GPC) is the newest of the RTDS processor cards. It houses two IBM PowerPC 750GX processors, each running at 1 GHz, and is fully compatible with RPC models. In addition to the tremendous computing power, the GPC also provides 24 non-isolated analogue outputs and allows the connection of optically isolated, low latency I/O.

The GPC is opening up exciting new possibilities for flexible multi-level VSC simulation. Look for more details in the next issue of RTDS News.

UPCOMING EVENTS

Power System Conference 2005
Exhibition, March 9-11,2005 in Clemson, USA

Electrimacs 2005
Seminar, April 17-20, 2005 in Hammamet, Tunisia

IPST 2005
Exhibition, June 19-23, 2005 in Montreal, Canada

IEEE/PES General Meeting
Hospitality Suite, June 27-30, 2005 in San Francisco, USA

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