Real time digital simulation for the power industry

RTDS Technologies

Working round the clock to produce better products more efficiently

ALSTOM

ALSTOM T&D Protection & Control Ltd.

Relay Development and Testing at ALSTOM
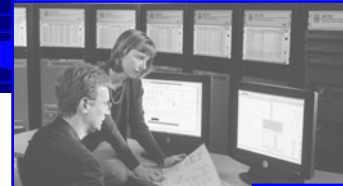
In 1997, an RTDS® Simulator System was installed at ALSTOM T&D Protection and Control Ltd. in Stafford, England. ALSTOM has a strong history in the utilization of digital simulation and were the first major relay manufacturer to install a fully digital real time simulator in their facility. The Simulator has been integrated into ALSTOM's development and testing programs, to the point where today it is run 24 hours a day on most days (the system gets some rest on the weekends). Throughout the intense usage, the Simulator system has proven itself as an essential and valuable tool.

In addition to the Simulator, the package delivered by RTDS Technologies to ALSTOM also included power amplifiers. Analogue Associates was engaged to modify and configure the amplifiers to meet the stringent requirements specified by ALSTOM.

ALSTOM's testing can be split into two main categories, development testing and customer specific testing, each taking advantage of the system's real time operation in a different manner.

For development testing, it is the sheer speed and flexibility of the RTDS Simulator that provides the greatest advantage. In this situation, the Simulator is most often operated in *Automated Batch Mode* using *Script* files. The Script files, created by the User, allow customization of automated test programs and reporting. ALSTOM often runs over 5000 cases during an 8 hour shift, complete with a concise report of the relay operations for further analysis. The form of the results output from the Simulator, are well suited to further analysis using features of the RTDS Script language, other PSCAD software packages (e.g. MultiPlot), and third party software packages, such as Microsoft Excel.

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When performing customer or application specific simulations, the flexible configuration, the setup speed, and the closed loop performance are of most interest. With the RTDS Simulator, ALSTOM is able to quickly enter the customer specific power system topology and component characteristics via the Graphical User Interface (GUI). Thus, they can accurately and efficiently satisfy the customer's requirements by testing their relays in closed loop on a simulated power system.

From the beginning, RTDS Technologies has looked to ALSTOM for input on ways to improve the Simulator for the application of relay testing. Several new features such as Automated Batch Mode Operation enhancements and COMTRADE playback have already been incorporated as a result of ALSTOM's requests. Currently a joint research project together with the University of Manitoba, is underway to develop more accurate CT algorithms for differential protection testing.

The installation at ALSTOM has conclusively proven the benefits of the RTDS Simulator to the protective relaying industry. Furthermore, we intend to continue our cooperation with ALSTOM and other customers to constantly improve the Simulator for this and other applications.

ICDS '99 - Västerås

We will be taking part in the 3rd International Conference on Digital Power System Simulators. We will be demonstrating a powerful single rack RTDS Simulator. The rack will contain thirteen TPC and five 3PC cards. Even using this relatively small simulator, we will be able to demonstrate the following:

- ♦ 6-pulse monopolar HVDC system with improved firing and internal faults
- ♦ new TCSC model with improved firing and internal faults
- ♦ new SVC model with improved firing
- ♦ two Real Time Network Solutions on one rack (max. capability 42 nodes and 56 switches)
- ♦ three terminal relay test circuit

Dr. Trevor Maguire will be presenting the paper entitled "The Implementation of the Cholesky Factorization Routine in the RTDS Real Time Network Solution". As well, numerous other papers from RTDS users have been accepted for presentation at the conference.

The conference will provide an excellent opportunity for us to show you *What's New* with the RTDS Simulator. If you can not make it to Sweden, we hope to give you this opportunity at one of the other conferences listed below.

Give Us Your Thoughts

We are continually looking for new venues and vehicles to promote the RTDS Simulator. If you know of conferences or exhibitions in your area that may be of interest, please contact us.

Conferences

ICDS - Int'l Conference on Digital Simulation
We will participate in the next ICDS to be held in Vasteras, Sweden May 25 – 28, 1999.

IEEE/PES Summer Meeting
We invite you to visit our hospitality suite during the IEEE/PES Summer Meeting in Edmonton, Alberta July 18 - 22, 1999.

WPRC – Western Protective Relay Conf.
We invite you to visit our hospitality suite during the WPRC in Spokane, Washington October 25-28, 1999.

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