RTDS NEWS

WHAT'S NEW: SEPTEMBER 2014

New Developments: GTNETx2 and MMS

Distribution system load modeling with the RTDS

Inaugural European User's Group Meeting

Don't miss the inaugural European User's Group Meeting!

After the success of our American User's Group Meetings, RTDS Technologies is pleased to announce that we are bringing our popular intellectual forum to Europe! RTDS Simulator users and those interested in real time digital simulation are invited to participate in the 2014 European Users Group Meeting, which will be hosted by the Technical University of Denmark (DTU).

It will be an excellent opportunity for RTDS Simulator users to present and exchange their experiences with the RTDS Simulator.

Several members of the RTDS Technologies staff will be on hand to consult with users and to lead educational tutorials.

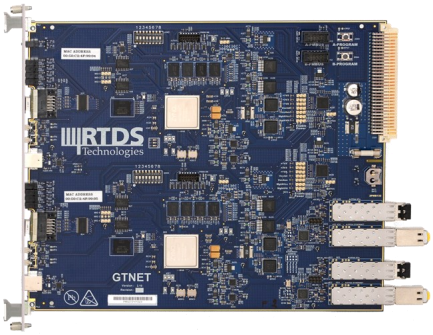
Register today—it's **free** to attend!

To register:
Visit **www.bit.do/ugm**

October 6-7, 2014
DTU
Lyngby, Denmark

Introducing the powerful new GTNETx2

RTDS Technologies continues to enhance hardware performance



The GTNETx2 card, aimed for release this fall, is the latest generation of the Gigabit Transceiver Network Interface System Card (GTNET). Like the pre-existing GTNET card, the GTNETx2 card is used to interface external equipment with the RTDS Simulator via various Ethernet protocols. However, it features significant performance enhancements over the previous version.

The GTNETx2 card is capable of operating 2 network protocols simultaneously. Each card comes loaded with the newly developed Socket protocol, as well as one other protocol of the user's choice. Socket is used to interface with external software and physical equipment over a Local or Wide Area Network connection using Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) sockets. The communication is bidirectional and asynchronous. Socket is capable of sending up to 300 data points per packet, with each point defined over 4 bytes. The data transmitted can be of either integer or floating-point (IEEE 754) type.

In addition to doubling the communication capability of our previous card, RTDS Technologies has greatly increased the processing speed. The GTNETx2 runs 5 to 10 times faster than the GTNET.

Upgrading to the GTNETx2 does not require any extra configuration in the RSCAD configuration file. Firmware upgrades for the GTNETx2 card are achieved directly through the RSCAD interface rather than through Telnet, simplifying the process for users.

The price of the GTNETx2 card is identical to that of the GTNET card. Users who participate in the extended hardware warranty program are encouraged to upgrade their GTNET cards under the RTDS Technologies hardware exchange program. Each GTNET card can be exchanged for one GTNETx2 card at a 50% price reduction.

New in IEC 61850: MMS Voyageur

MMS Voyageur is a new client program that supports IEC 61850 for testing server devices. It allows the user to connect to any IEC 61850 server device, browse its data model, and invoke any available services—including reading, writing, and performing control operations on the server. The continuous innovation of RSCAD, which adds this powerful new feature, is available free of charge as part of our maintenance and support program.

MMS Voyageur enables the user to test all typical communication procedures performed between the SCADA client and the tested server device. The program can maintain connections to many server devices simultaneously, and the user may run multiple instances of Voyageur at the same time on the same host computer.

MMS Voyageur can be executed via scripts in RunTime in order to facilitate automated testing.

RTDS Technologies

Visit us online!

Upcoming Training Courses

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

INTRODUCTORY RTDS SIMULATOR TRAINING

October 27-31 in Winnipeg, Canada

IEC 61850 TRAINING

November 3-7 in Winnipeg, Canada

Upcoming Events

CIGRE Canada • *Booth 13*

Toronto, Canada
September 22-24, 2014

RTDS Technologies European User's Group Meeting

Lyngby, Denmark
October 6-7, 2014

CIGRE US / NASPI

Houston, USA
October 19-24, 2014

GCC Power 2014 • *Booth B12*

November 10-12, 2014
Manama, Bahrain

Visit the RTDS Technologies booth at these events!

GUEST ARTICLE

A Study on the Effect of Distribution Circuit Loading on Air Conditioner Motor Stall using a Real Time Simulator

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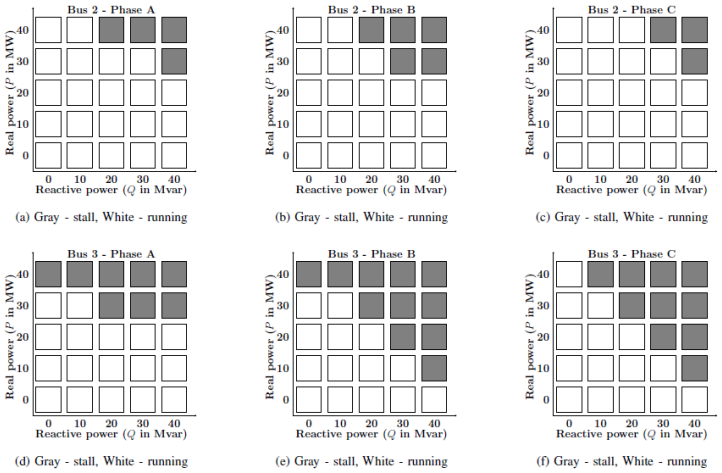
For the full article:
Visit **www.bit.do/ACmotor**

As the penetration of A/C units has continued to grow worldwide, the incidence of fault induced delayed voltage recovery (FIDVR) events has increased. The FIDVR phenomenon occurs when there is a voltage sag on a sub-transmission system due to a fault. When this voltage reduction reaches 30% or greater, we observe stalling of the compressor motors of high seasonal energy efficiency ratio A/C units. As a result, the motors draw 2 to 3 times more current and reactive power than their rated values. This, in turn, reduces the system voltage even more and results in delayed voltage recovery [1]. FIDVR typically occurs during the summer, during peak A/C load.

In this study, the RTDS Simulator is used to simulate the A/C compressor motor stalling which is associated with the FIDVR phenomenon. The RTDS Simulator was also used to analyze the effect of varying distribution system loads on FIDVR.

In this study, a three bus system is used, with three single phase induction machine (SPIM) models connected to each bus (one per phase). Each bus is connected to the secondary of the distribution transformer with an RL branch to provide electrical distance. A three-phase fault is then applied at the system generator terminals. The results indicate that only the motors located at bus 3 experience voltages low enough to stall—and furthermore, only the phase B and C motors on bus 3 actually stall. The motors that do not stall will improve the stability of the system. As the number of motors that stall increases, the amount of current and reactive power drawn from these motors increases and there is more stress on the system.

End-user loads present in the distribution system are usually classified as ZIP—constant impedance (Z), current (I), power (P), motors, and/or a mix of these loads. In order to understand the effect of ZIP loads on FIDVR, these loads are modeled in RSCAD and installed alongside the SPIMs. In our case study, we varied the active (P) and reactive (Q) power components of the ZIP loads. It was found that the number of motors stalling on the network increases as the P and Q values of the connected loads increase. Another observation that was made is that the motors at bus 1, due to its close proximity to the substation transformer, did not stall at all, so bus 1 is not shown in the results.



(a) Gray - stall, White - running (b) Gray - stall, White - running (c) Gray - stall, White - running

(d) Gray - stall, White - running (e) Gray - stall, White - running (f) Gray - stall, White - running

It was thus concluded that more motors stall when there is increasing penetration of ZIP loads, and that uneven stalling of motors at buses can be observed. The model shown in this paper could be useful for observing FIDVR phenomenon and determining mitigation solutions. The model also works well to show the impact of varying load compositions on FIDVR behavior in the system. Not only can the SPIM model be used to observe FIDVR and load composition impacts, but also, it could be used to develop and test prototype relay control logic in the future.

Bibliography

[1] B. R. Williams, W. R. Schmus, and D. C. Dawson, "Transmission voltage recovery delayed by stalled air conditioner compressors," Power Systems, IEEE Transactions on, vol. 7, no. 3, pp. 1173–1181, 1992.