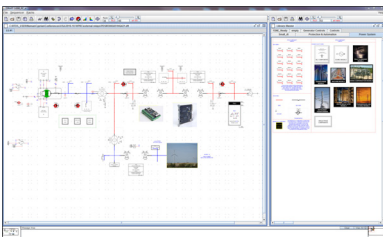
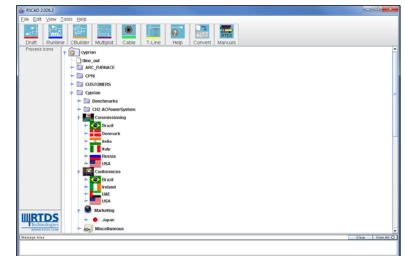


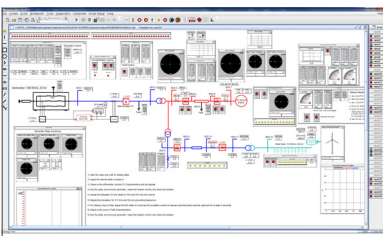
RTDS[®] Simulator Software—RSCAD

The RTDS Simulator has an advanced and easy to use graphical user interface - *RSCAD*. RSCAD is comprised of several modules designed to allow the user to perform all of the necessary steps to prepare and run simulations and to analyze simulation output. All modules provide a graphical interface to the simulator in an environment familiar to the power system engineer. The modules of RSCAD include: FileManager, Draft, RunTime, TLine, Cable, MultiPlot, and CBuilder.

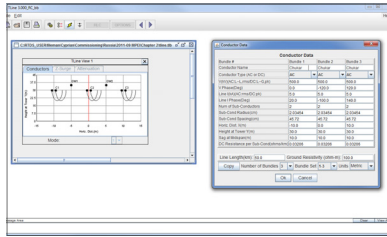
FileManager Organization and sharing of simulation projects and cases is done from the RSCAD/FileManager module. Users can access their simulation files from anywhere on the LAN plus multiple users can share access to projects and cases, depending on permission settings. All other RSCAD modules are launched from FileManager and a link is provided to a complete documentation set (i.e. hardware, software and tutorial manuals).



Draft Users graphically assemble a schematic diagram of the system to be simulated using the RSCAD/Draft module. The right side of the Draft screen contains comprehensive libraries of power system, control, protection and automation component models. To create a schematic, icons are simply copied from the library and pasted onto the Draft canvas on the left side of the screen. Model parameters are entered through a menu window to customize their behavior. Features such as, copy, paste, group/ungroup commands are provided for easy on-screen arrangement and speed of operation. Once the circuit drawing is completed it can be compiled for the RTDS Simulator. The compile process creates the execution code for the simulator hardware and provides preliminary error checking of component and simulation parameters. Several advanced Draft features such as hierarchy components, single-line diagram mode, and load flow initialization are detailed below.

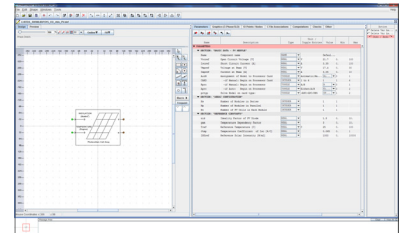


RunTime Loading, running, and controlling simulations is done entirely from the host computer via the RSCAD/RunTime module. This module is also known as the Operator's Console because it allows the user to interact with the real time simulation. The canvas is customized for each simulation by creating meters, plots, sliders, buttons, dials, switches, etc. The user is able to control and interact with the simulation through this graphical environment. Components can be grouped and minimized for efficient use of the space available on the canvas. RunTime automatically triggers plot updates when the user interacts with the simulation. Calculation functions are available to condition plots. As well, text, annotation and time stamps can be added to document simulation results. Plot data can be saved for post processing in MultiPlot or report-ready plots can be printed directly from RunTime. Plots can be saved in MultiPlot, COMTRADE, PDF, JPEG and EMF format.

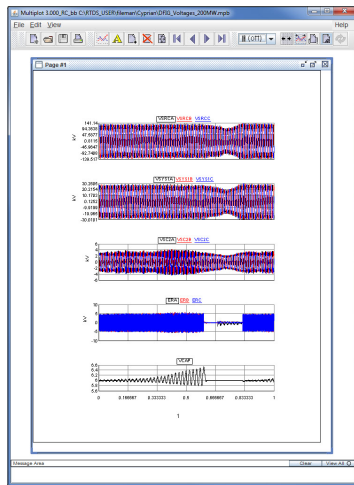


TLine Physical AC and DC transmission line data is entered into the RSCAD/TLine module that converts it into a form usable in the circuit assembly module (RSCAD/Draft). Parameter for both Bergeron and frequency dependent traveling wave models can be calculated. Alternatively the line sequence impedance data can be used to generate Bergeron line data.

Cable Similar to the RSCAD/TLine module, the RSCAD/Cable module provides the conversion of physical cable data into a form usable in the RSCAD/Draft module. Both Bergeron and Frequency data can be generated.



CBuilder Occasionally advanced users want to implement customized components and run them in real time on the RTDS Simulator. The RSCAD/CBuilder module facilitates this by providing an environment in which the user draws the icon for the new component, defines the parameters, the input/output nodes and writes the code. The code for CBuilder components is based on ANSI C.



MultiPlot Advanced data analysis, conditioning, and plotting functions are available in RSCAD/MultiPlot for post-processing, analysis and printing of results captured from the RTDS Simulator. Data can also be exported for post processing in other application software (Matlab, Mathcad, Excel, etc.)

Additional Features

Automated batch operation makes it possible to run a series of simulations completely without user interaction. A script file can be created by record/replay, or through an editor, to describe a sequence of events (starting/stopping cases, initiating events, changing setpoints, saving results, printing, etc.). Even circuit parameters can be changed through the use of Draft Variables. Therefore thousands of cases can be run and a summary report created without the need for user interaction.

Single line diagram (SLD) format in Draft provides the flexibility to toggle between single line or three-phase format for viewing and printing. The SLD viewing mode provides an easy to understand circuit overview while the three-phase mode allows details such as unsymmetrical loading to be implemented.

Load-flow initialization provides the ability to calculate the load-flow for the Draft circuit prior to starting the simulation. By first initializing the simulation, the start up transient is minimized.

Hierarchy allows portions of a Draft circuit to be collapsed into a hierarchy box.

Multiple RSCAD Software Installations can be placed on any number of computers at a customer site. This allows different groups to work on real time simulation, circuit construction, post-processing, etc. all at the same time.

SCD Editor embedded in the RSCAD software suite can be used to edit/create the SCL files necessary to configure the IEC 61850 communication