RTDS Banshee Model documentation

Real-time Simulator Computer Aided Design (RSCAD®) software is used to build the RTDS model. In the RSCAD Draft module, the MITLL Banshee system is modeled graphically and data is assigned to points. A completed model, with graphics and data, is then designated as a "Case." In this draft model, or Case, the power systems are laid out into a subsystem, which corresponds to one rack of hardware for real-time computations.

The input/output (I/O) modules on each of the RTDS racks allows SEL to interface the POWERMAX® system with the RTDS, and perform closed-loop validation. Once a power system Case is built, the Case is compiled on the RTDS hardware and then executed in the RTDS Technologies' RunTime module.

The RTDS files shared with MITLL consists of the following files

- Draft file (.dft)
- Runtime file (.sib)

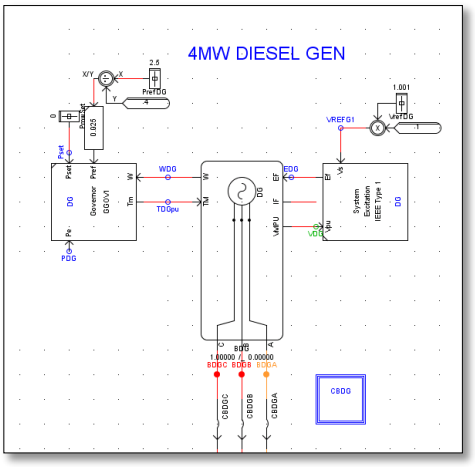
Draft File

The. dft file consists of the distribution network of the Banshee system along with Diesel and Natural Gas CHP asset information. The model also consists of the critical, priority and Interruptible loads as suggested in the ICD documents. Interruptible loads have been modeled with 3 cycle breaker.

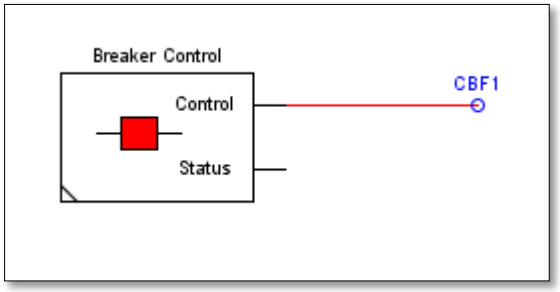
Electrical impedances and time constants representing the Generator characteristic are modeled based of data available from MITLL. Mechanical data pertaining to Inertia constant and damping constants are also programmed within the generator model. Governors exhibiting Droop control and Exciter exhibiting Voltage control are modeled. For the Governor model, IEEE GGOV1 model has been implemented and for exciter model IEEE Typ1 Exciter model has been implemented. Ideal step down transformer with appropriate leakage reactance represent Banshee transformers are also present in the draft file.

Generator system with Governor and Exciter

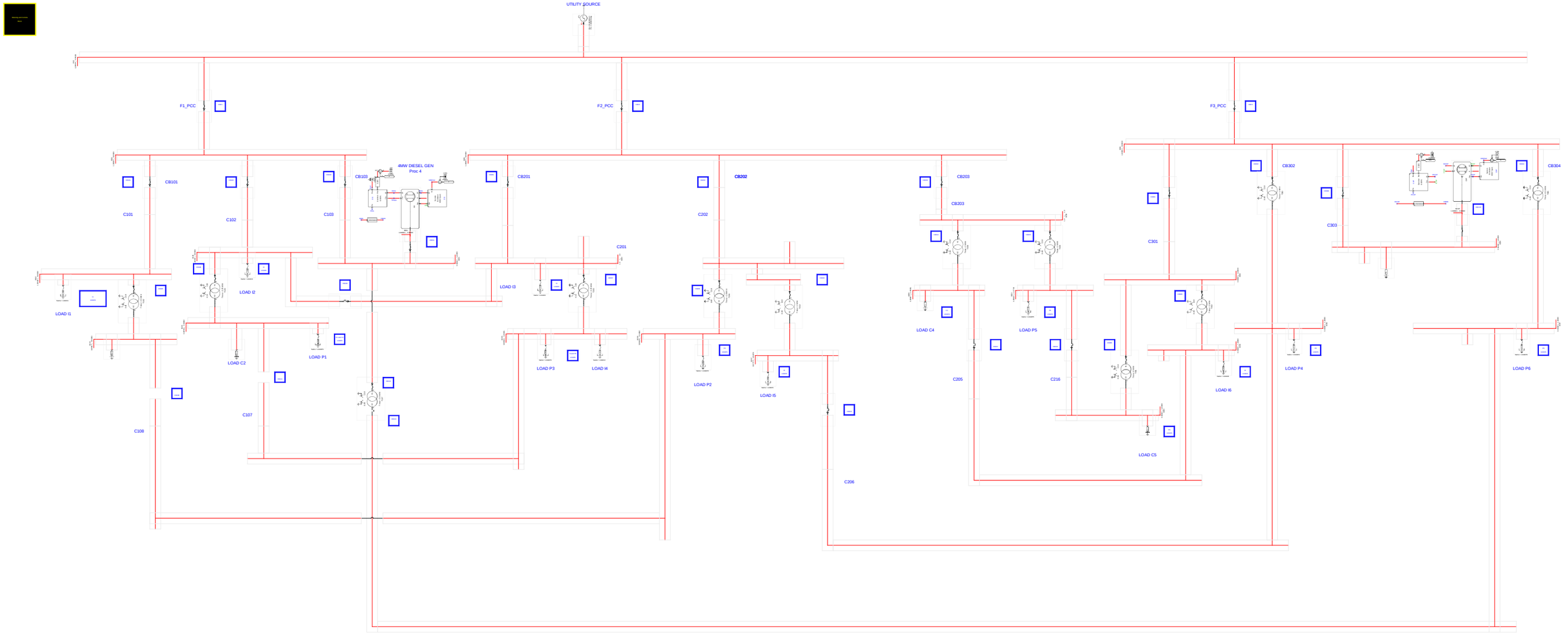
Governor/ Exciter time constants are available. Synchronous reactance, transient and subtransient reactance are modeled in the generator model.



Breaker Controls



Breaker operation time, and three pole/single pole tripping information is available


UTILITY SOURCE
F1_PCC
F2_PCC
F3_PCC
CB101
CB103
CB201
CB202
CB203
CB302
CB304
4MW DIESEL GEN
Proc 4
C101
C102
C103
C201
C202
C203
C301
C303
C205
C216
C306
C107
C108
LOAD I1
LOAD I2
LOAD I3
LOAD I4
LOAD I5
LOAD I6
LOAD C2
LOAD C4
LOAD C5
LOAD P1
LOAD P2
LOAD P3
LOAD P4
LOAD P5
LOAD P6

Runtime File

In RSCAD RunTime, the SEL engineer has access to fourteen different racks of RTDS equipment. All the controls for interfacing with the model in real-time are placed here. This includes, however is not limited to, sliders for changing set points, raise and lower controls, breaker controls, fault controls, and plots for capturing data. The data captured from testing can be downloaded and saved for later analysis.

BANSHEE GENERATION