1 OVERVIEW

EMTDC and PSCAD are a group of related software packages which provide the user with a very flexible power systems electromagnetic transients simulation tool. EMTDC is the software which actually performs the electromagnetic transients analysis on the user defined power system. The various software modules which comprise PSCAD are the graphical user interface to EMTDC.

The *Tutorial Manual* is provided to guide the novice user of PSCAD/EMTDC through a number of example cases. The documented cases in this manual will lead the user from the most trivial circuit, the voltage divider, to more complex power system models which include HVDC transmission schemes. This manual is intended as a tutorial only, and the user is directed to the other manuals which constitute the full PSCAD/EMTDC Manual set.

It is assumed at this point that the system administrator has already consulted the *Installation & Administration Manual* and that the software has been successfully installed.

All these modules are intended for execution on any Unix based system, and assume the presence of a display server running X Window System, Version 11, Release 4 (or higher).

1.1 THE PSCAD MODULES

Since the user will directly interact with the PSCAD software modules, a synopsis of each module is presented below.

FILEMANAGER

The FILEMANAGER module is the first one to appear when the user starts PSCAD. This module essentially allows the user to organise the many projects and cases which will ultimately be created into a database. It is possible for many users to share simulation cases in their databases. FILEMANAGER also provides convenient backup and restore features.

All other PSCAD modules can be started from within the FILEMANAGER.

DRAFT

The DRAFT module allows the user to graphically sketch the power system circuit to be simulated. The power system components which can be modelled by EMTDC are represented by graphical icons available from a "palette". These icons can be selected and dragged onto the drawing canvas. Individual components are interconnected using the buswork icons. All parameters associated with a particular component are entered into a special menu associated with the component's icon. Once the user has completed the power system model layout, the circuit is analysed for general correctness and the files required by the RUNTIME module are prepared.

T–LINE / CABLE

Two special modules have been written to handle the complex computations which are required in order to generate data for the overhead transmission line models and cable models in EMTDC. The T–LINE and CABLE programs require input of commonly available line data such as the conductor's height, radius, etc. All data required by the EMTDC frequency dependent line models is then generated and can be accessed and used by the DRAFT program.

RUNTIME

The RUNTIME module allows the user to monitor and interact with the power system simulation while the simulation is in progress. Graphical icons of meters, sliders and push buttons along with plots can be created to interactively display various quantities within the power system model as they are being computed. It is also possible for the user to interact with the simulation by initiating a fault sequence through a push button, for example.

MULTIPLOT

A special plotting and analysis package has been provided. Data generated by the EMTDC simulation can be plotted and directly analysed with the MULTIPLOT module. MULTIPLOT allows multiple graphs to be combined and displayed on a common page for direct insertion into a report.

UNIPLOT

The UNIPLOT module is the predicessor to the MULTIPLOT module. It also enables data generated by the EMTDC simulation to be plotted and analysed. All features of this program have been incorporated into the MULTIPLOT module, which in many respects is more "user friendly". Typically, the use of this module is de–emphisized. It has been retained in this release to allow users of the previous PSCAD release a transition period to become accustomed to the MULTIPLOT module.

The general steps that would be required to create a new power system model, perform a simulation and analyse the results are shown below.