minsait ACS

An Indra company

DASmap™ Model Builder

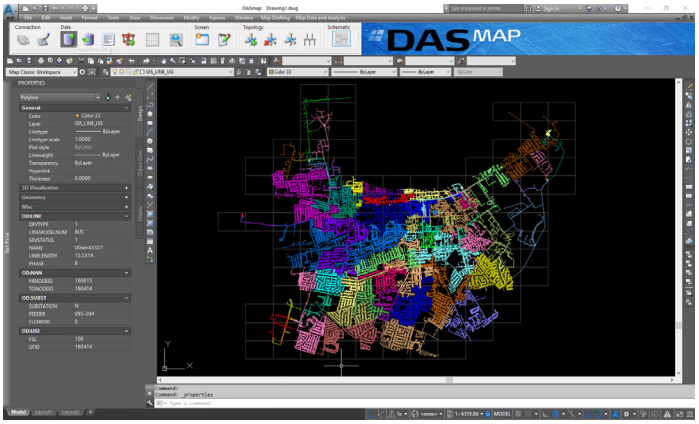
DASmap is an Autodesk Map™ Distribution System editing solution, which imports and creates the electrical feeder network, digitizes, and edits the network displays, performs network tracing, and builds and colorizes the Network Topology Model. Because it was built specifically to interface with your PRISM™ SCADA system, DASmap supports automatic conversion of the network model into PRISM SCADA run time displays. The DASmap package includes:

- DASmap Editor
- DASmap conversion tools
- Real-time PRISM Topology Processor (TP)

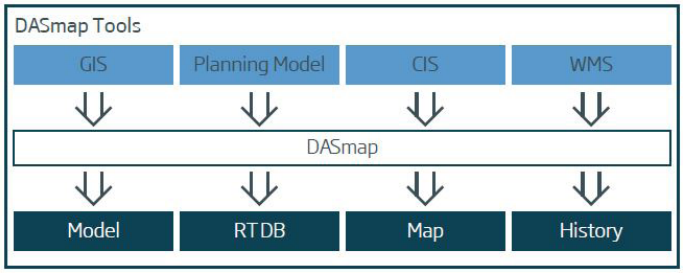
DASmap supplies a full set of GIS drawing tools that, in addition to network digitization, can automatically extract and create the topology model from the "drawing" process. This topology model will be used by the PRISM Topology Processor for colorization, etc.

DASmap digitizes the electrical network by one of two methods:

- It digitally traces the imported GIS file, complete with the network elements and digitizes the feeder network. For example, the tools automatically replace "rubber-banded" static drawing line segments with "digitized" segments, complete with a database entry and automatic "to and from" node assignments. Proximity searches automatically find and connect section nodes to device objects, such as switches and transformers.
- If a network model with geographic device references and network connectivity is available, it can be imported. DASmap will automatically draw the network devices on the geographic "Land" map.



DASmap Editor



DASmap Converter builds Operational Datasets from Source Files

DASmap Model Builder

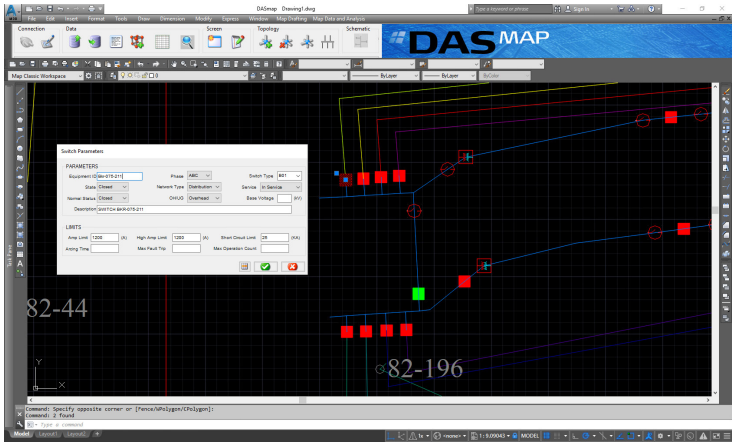
Map Conversion to PRISM

The DASmap output is a dynamic SCADA display with graphical representation of the electrical system network. The resulting display is performance-enhanced as a run-time PRISM display. This geographical representation of the network coexists with background information (streets, lot lines, etc.) organized into various layers and zoom levels.

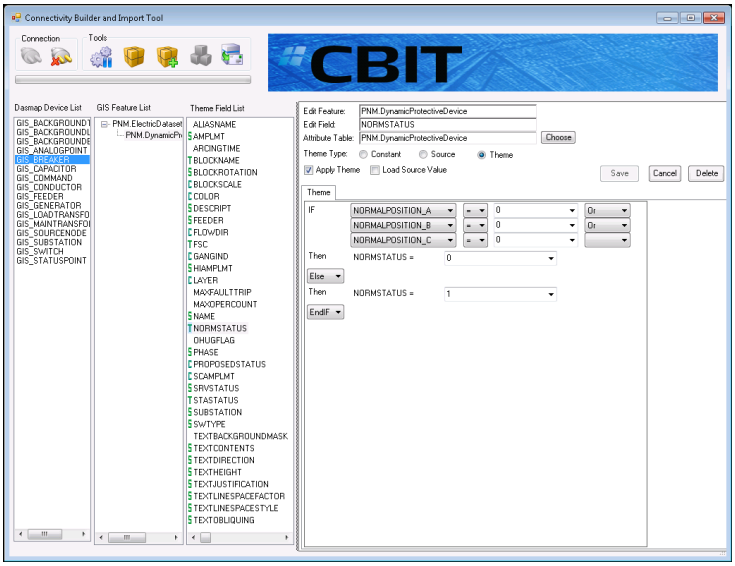
It is a 3-step process:

1. DASmap editor creates the display and network model simultaneously.
2. The display and database are converted for use as a SCADA real-time display. As part of the conversion, new entries are automatically placed in the real-time database; automatic linkages are assigned between the display and the database; and the DAS network model is created in Oracle from DASmap to drive the operational applications (e.g., topology processing). For example, the network electrical connectivity attributes, database, network model and displays are extracted from the GIS-based DASmap. For future application additions, the network model will drive the restoration applications/load flow.
3. Once tested, the changes are committed to the online system.

An optional Power System Simulator or Dispatcher Training Simulator can simulate database and display operation before committing them to real time.



Insert substations into map view



Mapping devices in connectivity builder import tool

Topology Processor

The Topology Processor identifies a network configuration based on the network connectivity model and dynamic switch status. Graphically, the function produces the visual indications of the energized and de-energized areas of the distribution system for display. In addition, it provides visual tools to distinguish devices that are supplied by different feeders and to visually trace the network in color. Programmatically TP generates the network topology for modeled and analysis purposes. Many applications rely on the network topology and network tracing capability to produce their required results. Programs such as Load Flows, Trouble Call Analysis as well as indices calculations, such as SAIDI, CAIDI, MAIFI all require knowledge of the network state.

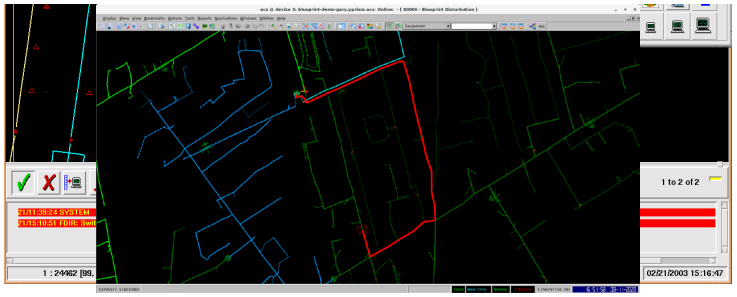
Topology tracing generally starts from a given node and a branch. The tracing then continues by taking the next node of the branch as the new node and one of the branches connected to the new node (except the current branch) as the new branch. This process is performed recursively until it either reaches an open switch (a break point) or all devices have been reached.

The topology processor function assumes that all devices are properly connected through branches and nodes such that all devices can be reached from any given point in the distribution network. To satisfy this requirement, a network connectivity check is performed before running the topology processor. The connectivity check will report any unreachable devices and produce related messages. If no errors are found during this process, a network trace will be initiated to set topology flags based on actual device service status and switch open/close status.

Flags generated from topology trace include:

- Device energized flags
- Branch device color code
- Loop flags
- Actual phase code on each node

These topology flags are output to the Real-time DB and Oracle® and are available to be displayed on Minsait ACS PRISM OI displays colored to represent various conditions.



Feeder trace mode

Feeder map - outage mode

Network Colorization

In order to view the dynamic status of the power system, colorization is user-driven from a network topology. This is accomplished by using the topology model and running Topology Processor to automatically color the network based on dispatcher-selected conditions. The Load Flow operates against the same network connectivity data.

Network colorization on the runtime feeder display is based on dispatcher-selected conditions as shown in the following figure. The Topology Tracing also uses colorization to trace upstream or downstream from a device or to show all connected equipment. The system supports colorizing the display based on various conditions.

The available modes are:

- Normal
- Loop Condition
- Feeder Trace
- Voltage Violations
- Load Violations
- Voltage Unbalance
- Load Unbalance

DASmap Model Builder

Loop Detection

Loop Detection uses the results from Topology Processor and is performed continuously in real-time. The loop conditions/ configurations that the Loop Detection function detects are:

- Loop within the same feeder
- Loop between feeders in the same substation
- Loop between substations
- Loop within the same substation

The dispatcher can switch the Dynamic Overview Display into a "Loop" display mode, which re-colors the display showing any loop conditions. Each condition is displayed on the dynamic overview display in a user-defined color.

Colorized Trace Upstream, Downstream

Topology Processor provides new trace capability with upstream, downstream and all-connected-points trace options. The display network will be colorized to trace from any selected location back to the source or away from the source. This is especially useful on complex geographic displays.

Network Digitization

A node-arc-node distribution network model is required. The model includes the connectivity information consisting of the device blocks linkages that represent the physical connections between pieces of equipment.

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