

The Valley Group, Inc.

CAT-1™ Transmission Line Monitoring Systems

IntelliCAT™ for Windows® Real Time Rating Software

IntelliCAT for Windows (ICW) Real Time Rating software enables customers to rapidly deploy an operational thermal rating system for multiple transmission lines, including complex tap and conductor configurations, with minimal demand on EMS/SCADA programming resources.

ICW works in conjunction with the EMS/SCADA system by exchanging data via an ICCP network integration. From the EMS/SCADA database, ICW receives raw data from the remote CAT-1 units (sent in from CATMaster™ Base Stations), along with line load information from existing telemetry sources. ICW then calculates real time line capacity, temperature, sag, and alarm indications, and transfers them back to the EMS/SCADA database, where they appear as any other system analog or status value (such as Amps, KV, or system alarms) for access and display on existing operator consoles.

Optional Transient Analysis

ICW can be equipped with additional modules to calculate real-time short-term emergency (STE) ratings (i.e. what load level can be safely supported for a given time period, typically 15 to 30 minutes), and real-time post-contingency time limits (i.e. how long can a post-contingency load be safely supported). Both calculations are based on actual initial conditions (conductor temperature, load, and effective wind speed). The STE is updated every CAT-1 sample interval (5 or 10 minutes depending on conductor time constant) and the post-contingency time limit is updated every two minutes to provide operators with accurate, reliable, and timely information they need to maximize both system reliability and transmission asset utilization. Both functions provide a user-input function to support real-time “what if” calculations for STE and time limits; operators can enter a time limit to see how much load can be supported, or a load value to see how long it can be safely maintained.

A Dynamic Alarm function provides operators with advance warning if the real-time line capacity and line load (or security analysis load) are trending toward convergence within the next 30 minutes.

Functional Description

ICW is a software application program designed to run under Windows 2000 or later. ICW is run on a PC that has access to the EMS/SCADA system database. This permits ICW to collect data from the EMS/SCADA database, and deliver results data to the database for operator display and historical logging. ICW is fully user-configurable via a set of initialization, calibration, and configuration text files which can be modified using any text editor.

ICW is equipped with a licensed copy of an OPC server with an ICCP protocol interface (currently either Sisco or Matrikon software). Security is protected since ICW can only access data points that have been mapped to DNP, or into the ICCP bilateral table on the EMS. These are limited to the data points received from the CATMaster, plus the load data for the line or lines being monitored.

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Calibration and Configuration

During the course of system installation, data collected by the CAT-1 remote units is used to perform an initial system calibration. Real-time rating values will be immediately available for operational use.

Component List:

Customer-supplied PC running Windows 2000 or later; Pentium III or better, minimum 128 MB RAM, minimum 5 MB available disk storage

ICCP requires 15 MB available disk storage, parallel printer port for hardware lock, CDROM drive

DNP RS232 serial or ICCP network interface to EMS/SCADA system

ICW software installation disk

Specifications:

Capacity Up to 16 transmission lines of any configuration
Up to six (6) CAT-1 remote units per line

Communication Options DNP 3.0 RS232 serial
ICCP network interface

Diagnostics Process log file
Error log file
On-screen status display
CAT-1 battery monitoring
System communications reliability monitoring
Sensor data quality and validity monitoring

Output:

Analog Data Points

Ampacity (or MVA) Rating
Conductor Temperature
STE Rating (w/T.A. option)
Post-Contingency Rating (w/T.A. option)
Time to Max Sag (w/T.A. option)
User STE Rating (w/T.A. option)
User Time to Max Sag (w/T.A. option)
(repeat for each monitored line)

Cell Ampacity (or MVA) Rating
Cell Conductor Temperature
Cell Sag
Cell Ice Thickness
Cell Ice Weight
Cell STE Rating (w/T.A. option)
Cell Time to Max Sag (w/T.A. option)
Cell Post-Contingency Rating (w/T.A. opt)
(repeat for each line section)

Status Data Points

NRS-based Rating Used
Minimum Rating Used
Default Rating Used
Maximum Rating Used
Data Quality Warning/Error
Line Load Quality Warning/Error
Dynamic Alarm Warning
(repeat for each monitored line)

CAT Comm Alarm
CAT Comm Warning
CAT Battery Warning
CAT PAC Battery Warning
CAT Temp 1-3 Validity Error
CAT Ambient Temp Validity Error
(repeat for each CAT-1)
Cell Clearance Alarm
Cell Ice Present
Cell Internal Error
Cell Validity Error
(repeat for each line section)