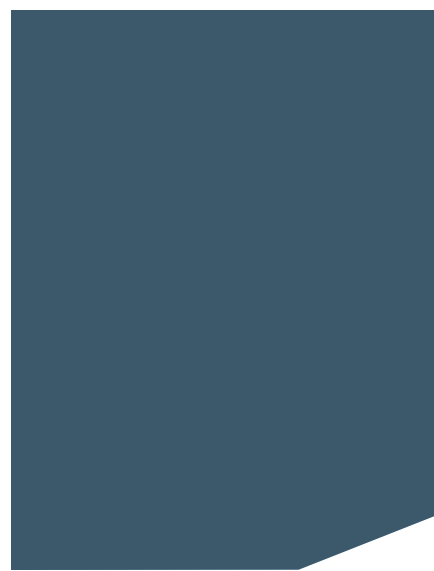
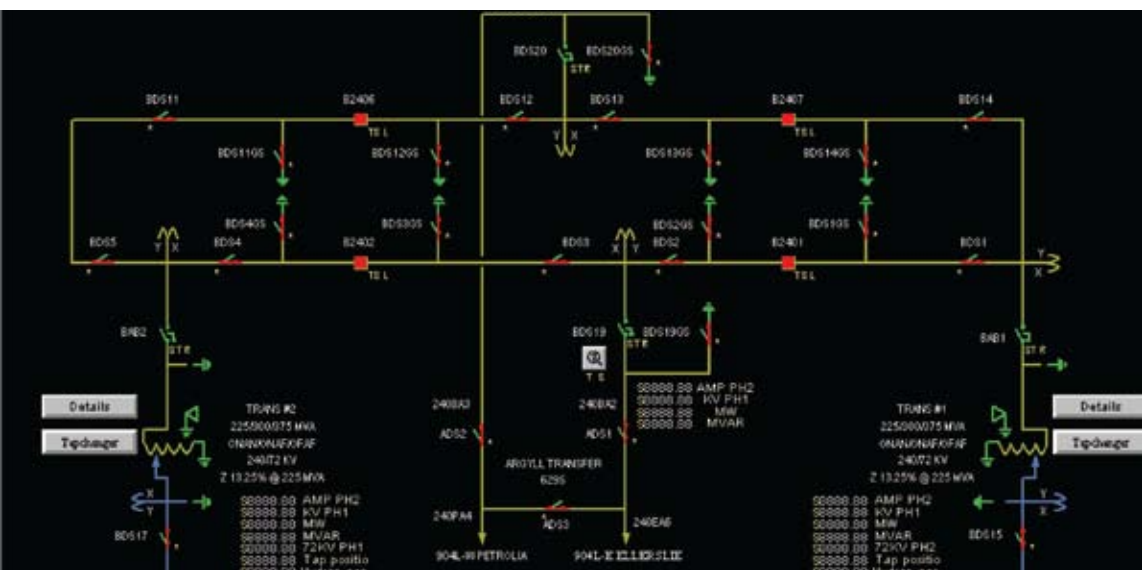




# Visual Asset Monitoring Solution

**COOPER** Power Systems



# Visual Asset Monitoring Solution

## Industry-Leading Asset Monitoring Solution

Visual Asset Monitoring is an application of Visual Transmission and Distribution (Visual T&D). It is a solution that:

- Helps utilities implement their Smart Grid initiative with real-time asset monitoring
- Monitors how fast device conditions are changing, thereby limiting emergency maintenance deployment resulting from generic trouble alarms
- Helps utilities save money by shifting from time-based maintenance to condition-based maintenance

A solution that lowers the risk of component failure—while it increases system reliability, equipment availability and prolongs the life of high-value assets.

### Cooper Power Systems Visual Asset Monitoring Solution

Substation maintenance managers are concerned about identifying conditions leading to catastrophic failures in high-value assets. The Visual Asset Monitoring solution by Cooper Power Systems provides real-time, remote monitoring that can help identify abnormal operating conditions or early failure indications. The result is a timely, appropriate response before a situation becomes critical.

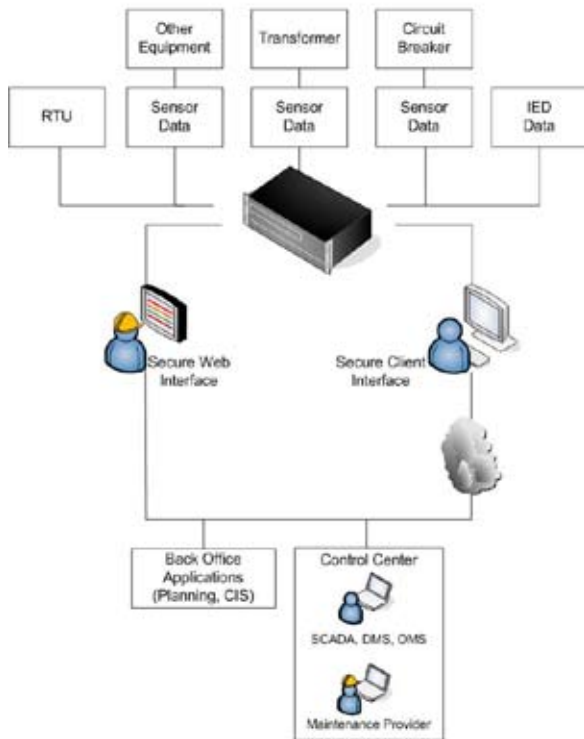
Unlike periodic manual testing, real-time asset monitoring provides timely notification with trended contextual data instead of a generic trouble alarm. It allows appropriate event response while lowering the risk of component failure. This increases system reliability and equipment availability and prolongs the life of high-value assets.

The system sends pager, e-mail, or text message alerts with links to trend information directly to the primary maintenance provider—usually before generic trouble alarms arrive at a 24x7 operations center. Detailed information is securely accessible from any location.

#### How Visual Asset Monitoring helps utilities:

- Increases system reliability, availability and utilization
- Provides timely, effective alarms and notifications
- Provides timely and historical information for condition-based maintenance program planning
  - Reduces operating costs
  - Reduces expensive failures
  - Reduces inspections
  - Reduces emergency crew deployments

## Asset Monitoring Solution Information Architecture



System Architecture

A comprehensive communications/information architecture—ensures the right information is available to the right person at the right time.

### Visual Asset Monitoring Architecture

The Cooper Power Systems Visual Asset Monitoring solution consists of three main components:

- **Sensors and Gateways**—Sensors designed for the severe environments of substations and gateways that bridge sensor data to the substation communications system
- **Communications**—A variety of communications options for data retrieval that include fiber optics, copper, and wireless media
- **Software**—The Yukon platform is an enterprise class suite of advanced energy management software that addresses all of the complex operations of a multi-faceted utility

The Cooper Power Systems asset monitoring package is a cost-effective solution for monitoring real-time the health of transformers and circuit breakers and collecting a long-term, detailed operating history of the system. Monitoring packages support multiple sensor configurations, communication protocols, and communication mediums. The system can also monitor other equipment, including third-party devices, such as DGA and bushing monitors.

Real-time circuit breaker or transformer monitoring provides an instantaneous check of the device’s health including the condition of the mechanical system, insulation system, and other parameters important to proper operation. Moreover, the system records the data from every circuit breaker or transformer and stores it in a data historian that provides trended data and operational history. By reviewing this information, utilities can develop a maintenance schedule based on the condition of the equipment. It also provides input for developing capital expenditure plans.

# Visual Asset Monitoring Solution

## Asset Monitoring Solution Offers Real-Time Benefits

A comprehensive communications/information architecture—ensures real-time information for real-time decisions.



AC Current Sensor



DC Current Sensor



TSS/TSA Temperature Sensor



PS1 Pressure Sensor



TSP Temperature Oil Probe



Oil Temperature Indicator

## Sensors and Gateways

Cooper Power Systems provides inexpensive, hardened sensors appropriate for original equipment or substation retrofit. These sensors can be used with any SCADA RTU and are available individually.

**AC Current Sensor**—Use the AC Current Status Sensor to monitor the presence of AC current in a conductor. Example applications include monitoring of transformer fan motors, oil pump motors, circuit breaker air compressor motors, spring charging motors, LTC mechanisms, and SF6 tank heaters.

**DC Current Sensor**—Use the DC Current Initiate Sensor to monitor and indicate the initial rising edge of DC current in a conductor. Example applications include Sequence of Events (SOE) logging and timer applications for trip/close currents, relay operations, and breaker operations.

**TSS/TSA Temperature Sensors**—Use model TSS Temperature Sensors to measure a device's surface temperature. Typical applications include transformer LTC tanks and transformer main tanks.

Use model TSA Temperature Sensors to measure ambient air temperatures.

**PS1 Pressure Sensor**—The model PS1 Pressure Sensor is used to measure the pressure of enclosed gas systems.

With fittings engineered for specific equipment, it can be used to measure the pressure of a transformer tank, SF6 insulating gas, or a pneumatic circuit breaker air tank.

**TSP Temperature Oil Probe**—The model TSP Temperature Probe replaces a transformer's existing top oil temperature indicator probe and provides a means to measure the discrete top oil temperature. The TSP can be connected to a Cooper Power Systems Oil temperature indicator (OTI), which replaces a traditional oil temperature indicator. Alternatively, the TSP can be connected to a standard whetted analog input to feed traditional SCADA.

**Oil Temperature Indicator (OTI)**—Use in conjunction with the TSP to provide a local digital display of the oil temperature. OTI also contains programmable alarm contacts to be used for alarming or fans, and provides an analog output for use with SCADA or Visual Asset Monitoring.

## Asset Monitoring Solution Offers A Real-Time Pulse

A comprehensive communications/information architecture—ensures a real-time pulse is maintained on all substation equipment.

### Gateway features include:

- Hardened design for use in substation environments
- Ability to connect to Master Station Gateway, RTU, or IED
- Three DNP 3.0 Protocol Port Interfaces
  - One SelectComm port (serial, Ethernet)
  - Two fixed RS-232/485 serial ports
- Flexible Power Supply Input (100-130 VAC or 90-130 VDC)
- Flexible Local I/O
  - 12 status inputs (wetted or dry)
  - 4 bi-polar DC Analog inputs ( $\pm 5$  VDC,  $\pm 1$  mA, 4-20 mA)
  - 2 control outputs
  - Removable terminal blocks for wiring ease
- One USB maintenance port and one RS-232 DB-9 maintenance port
- On-board standard applications including breaker timing and compressor run time



SubGate Gateway with Radio

### Gateways

Cooper's sensor gateway is designed for wireless, wired (RS-232/485, LAN), or fiber optic connection of substation monitoring sensors to remote RTUs and data gateways.

The gateway is designed to connect equipment-mounted sensors to a data gateway or RTU using wireless technology. It greatly simplifies installation of a substation Visual Asset Monitoring system, and is designed to operate with Cooper's Visual Asset Monitoring products, as well as third party RTUs.

### Visual Asset Monitoring Server

The Yukon platform is an enterprise class suite of energy management software that addresses all of the complex operations of a multi-faceted utility. Yukon is the foundation supporting Cooper Power Systems Energy Automation Solutions vision to implement any Smart Grid initiative. The software is an innovative, flexible, and intelligent platform that is scalable for all types of deployments and supported by a full-time team of dedicated personnel.

### Visual Asset Monitoring Software

Visual Asset Monitoring software communicates with new and existing substation equipment. One-line diagrams are used as the general interface for substation monitoring and may be as simple or complex as necessary to accurately depict the monitored system. Data collected by the server may be analyzed locally or automatically routed to another system (e.g., SCADA, OMS, and DMS). This data can be evaluated to reduce the risk of device failure by monitoring and alarming on conditions detrimental to the longevity of the specific device.

The Visual Asset Monitoring software provides utilities with a constant watch on the pulse of all substation equipment to ensure devices are working properly and the necessary maintenance can be provided in a timely and cost-effective manner.

# Visual Asset Monitoring Solution

## Asset Monitoring Solution Offers A Real-Time View

The Asset Monitoring Solution offers real-time views—system views that give utility personnel the information they need to identify, analyze, and resolve potential failure conditions.

Visual Asset Monitoring software provides the following:

- Graphical and tabular real-time and historical trending displays
- Intelligent notification of component events and alarms via pager, e-mail or text message with user-configurable event set-points
- System overviews and trended historical data
- Data historian
- Optional browser-based remote access from any location via secure interface

### Cooper's Turn-Key Solution Operational From Day One

For utilities that wish to free themselves from installing a new system, Cooper Power Systems offers a turn-key solution that will provide the latest Asset Monitoring capabilities and a Visual Transmission and Distribution (Visual T&D) system.

### Complete System Design

Cooper engineers and designers will work with a utility's engineers and operations personnel to develop a system design that includes equipment configuration, software, database and display development, installation supervision, and support.

### All Necessary Hardware Provided

Cooper's turn-key solution includes all required hardware, both in the office and in the field. This often includes any applicable upgrades for existing Cooper Power Systems equipment, field sensors, communications infrastructure, RTUs, servers, and more.

### Browser Hosted System

For utilities without information technology departments or who prefer not to install Visual T&D on local servers, Cooper offers a Visual T&D Browser system. The hosted system collects substation data and stores it on commercial secure servers. Utilities have secure access to all of their data online via the Internet from any location. The only requirement is a Web browser. Cooper's flexible roll out program permits bringing additional substations online as budget or operating conditions allow.

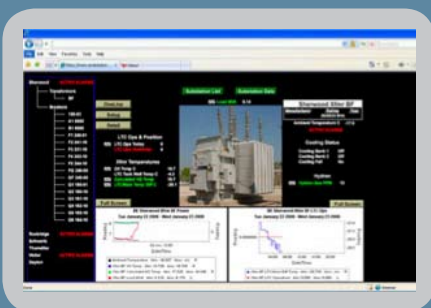
### Yukon Visual Asset Displays



Substation Overview



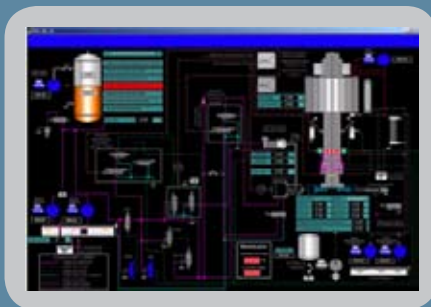
Substation Overview



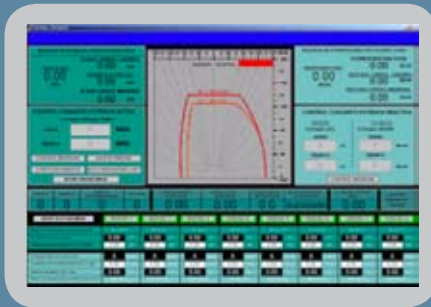
Equipment Detail

## Asset Monitoring Solution Offers Tools for Tomorrow – Today

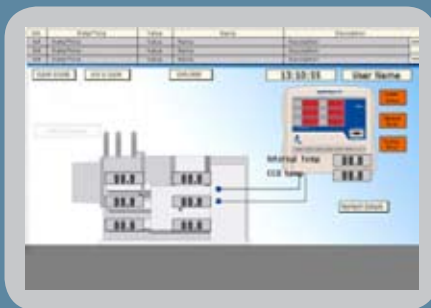
### Yukon Visual Asset Displays



Generation Monitoring



Process Detail



Alarm Display

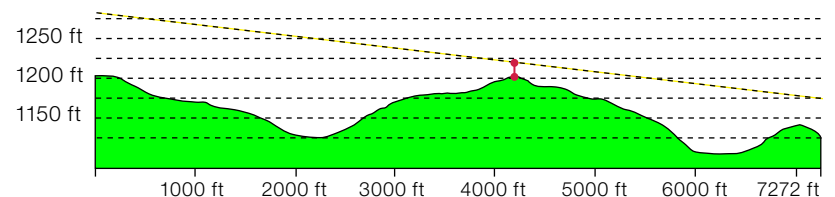
The Asset Monitoring Solution maximizes the return on investment at an enterprise level by offering utilities the tools for tomorrow – today.

### Communication Path Studies

Cooper Power Systems recognizes reliable communication links as absolutely essential to every successful radio telemetry system installation. Each radio path of every Cooper radio telemetry system is evaluated by one of our communication specialists. Cooper provides thorough communication path analyses based on the following procedures:

- **Path Profiles**

Path profiles are two-dimensional plots showing the location of the Central Master Station locations, the substations, and the terrain between them. The results will show if a clear “line of sight” exists between two locations. Path profiles are an essential part of every Cooper radio path study.



- **Topographic Maps**

Topographic maps display site-specific terrain data in labeled and shaded-relief forms. Each site is pinpointed and labeled on the map based on the field data provided. This map provides an accurate layout and overall view of the telemetry system. A topographic map is provided as part of every Cooper radio path study.

### Bottom Line

The Visual Asset Monitoring solution from Cooper Power Systems gives utility personnel the information they need to quickly identify and analyze potential failure conditions, improve system reliability, increase equipment availability, lower the risk of expensive failures and reduce costs.

Cooper Power Systems provides utilities the Tools for Tomorrow – Today. To learn more about how Cooper Power Systems emerging technologies like Visual Asset Monitoring can empower you, visit [www.cooperpowereas.com](http://www.cooperpowereas.com) or [www.cooperpower.com](http://www.cooperpower.com) or call our toll free number 1.800.827.7966.

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