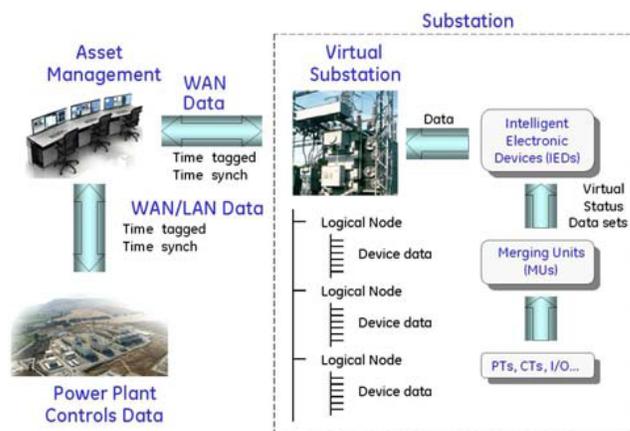# Power Management Systems

IEC 61850 Communications

fact sheet
GEA-S1264A

Substation and Power Plant Data Integration

Mark* VIe controls offer IEC 61850 protocol for enhanced communications with electrical substation automation systems. Since its inception in 2002, IEC 61850 has quickly become the protocol of choice for hundreds of large and small substations displacing traditional Remote Terminal Unit (RTU) protocols with bandwidth-limited serial links.

The IEC 61850 protocol uses networks to reduce overall lifecycle costs, including installation, configuration, and ongoing maintenance. Additionally, a common virtual network sets the stage for life-cycle network migration, application migration, and enhanced system capabilities. Interface with remote control centers has substantially improved by replacing legacy RTU-modern-telephone communications with router firewall and wide area network (WAN) communications.

IEC 61850 Standard

The standard uses fast, modern networking technology, such as TCP/IP networks and/or substation local area networks (LAN) with high-speed Ethernet for the fast response needed to monitor protective relays.

This facilitates redundancy options and time synchronization for system-wide timecoherent data. IEC 61850 is much more than just a protocol standard. It uses object-oriented device models for interoperability between devices and user-friendly names in a standard power system context.

Mark VIe Control Integration

Mark VIe plant control systems have an advanced ControlST* software suite with a WorkstationST* application for Humanmachine Interfaces (HMI) and Historians, a ToolboxST* application for diagnostics and trending, and a wide range of third-party software packages. IEC 61850 enables substation data to be integrated with power plant data in a common database, displayed with similar graphics screens, monitored with the same alarm management system, and analyzed with the same trending tools to simplify operation and reduce life-cycle cost.

To evaluate substation events, Mark VIe controls have inherent 1 ms resolution for sequence-of-events and plantwide time synchronization, which can be extended to data received from substations. The control room console displays the alarms and events with local time tags as they occur in the substation Intelligent Electronic Devices (IEDs). This includes RTUs, protection relays, meters, and load tap changers, and they are displayed in the same manner as the local time tags in the power plant controls.

Alarms and events for the substation can be combined or separated from power plant data, prioritized, filtered, and sorted with a variety of tools, such as Pareto charts. For reliability, redundant workstations can be provided, and data can be archived in the plant historian or exported to an Enterprise Asset Management System.

GE recently installed Mark VIe controls at a gas-fired power plant with six (6) 9FA gas turbines and three (3) steam turbines configured for combined cycle operation. This 200 MW plant uses IEC 61850 communications to 800+ IEDs and 15+ signals/IED to simplify plant configuration and maintenance.

The **Object Pane** displays a tree view of remote nodes (servers) and all of the IEC 61850 object definitions are retrieved directly from the device. No local configuration of remote objects is necessary.
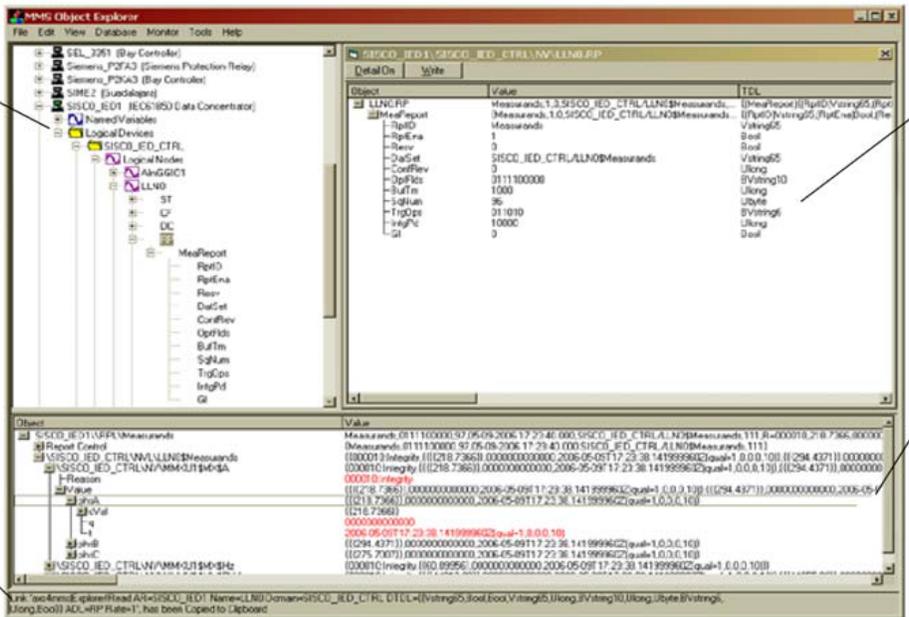
The **Detail Pane** displays and allows you to change the value of a selected IEC 61850 object. Select an item in the Object Pane to display IEC 61850 details and edit the values.

Monitor the values of specific objects, including IEC 61850 reports, by using the drag-and-drop feature to move it from the **Monitor Pane** to the Object Pane.

The **Status Line** displays current activity.
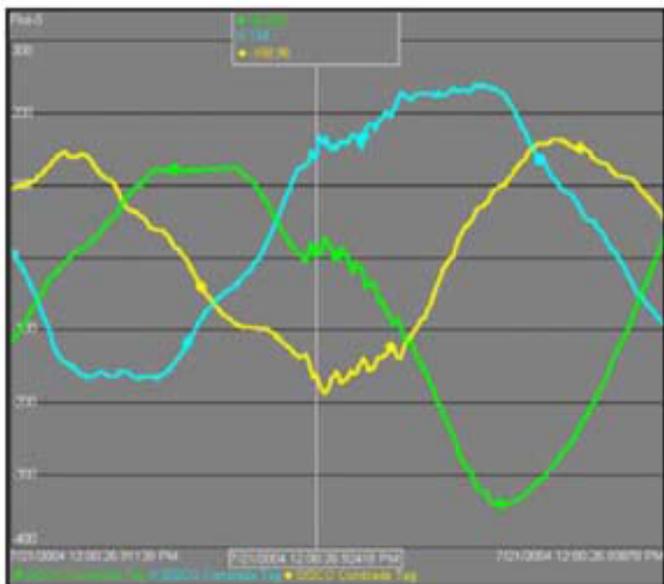
Software Interface

The application provides real-time access to Ethernet-based devices supporting IEC 61850 protocols for any object linking and embedding (OLE) for Process Control (OPC®) or Dynamic Data Exchange (DDE)-enabled client application. It runs over standard Ethernet adapters supporting TCP/IP transport protocols for IEC 61850 parts 6-1, 7-2, 7-3, 7-4, and 8-1 including Abstract Communication Service Interface (ACSI), Generic Object Oriented Substation Event (GOOSE), and Generic Substation Status Event (GSSE).

~ 27 msec

High-speed COMTRADE Data Capture

OSIsoft® PI Interface

An optional utility is available for PI-based historians to provide historical analysis and display tools for processing device disturbance files in IEEE Common Format for Transient Data Exchange (COMTRADE). The utility enables users to create their own COMTRADE applications with standard PI System™ tools and is compatible with PI ProcessBook™ and PI Advanced Calculation Engine™ (ACE).

Benefits

- Provides long-term storage and retrieval of power system event data
- Simplifies user configuration with all data stored in standard PI Server format
- Enhances the analysis and reporting of power system events with the OSIsoft toolset
- Provides a detailed audit trail to assist in regulatory compliance including time stamps for data generation, archival and retrieval

For further assistance or technical information, contact the nearest GE Sales or Service Office, or an authorized GE Sales Representative.