Synchrowave® Monitoring

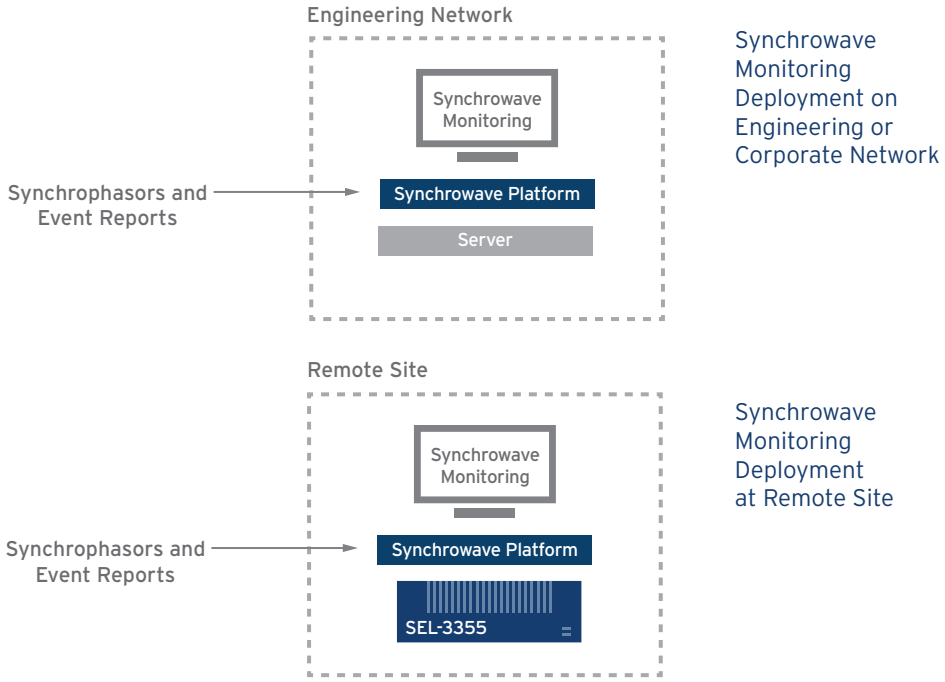
Power System Operations and Analytics Software

Improve disturbance analysis with real-time and historic trending and archiving

- Analyze synchrophasor and relay event reports together for complete disturbance monitoring.
- Easily export system disturbance data to meet NERC PRC-002-2.
- Gain power system insight that SCADA can't provide, with high-resolution time-series data.
- Detect transients induced by renewable generation to help maintain power system stability.

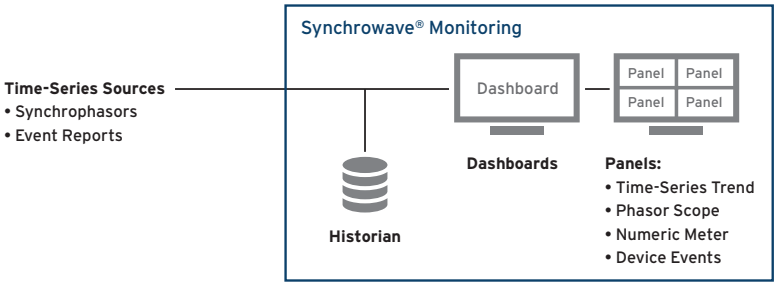
Synchrowave for Monitoring and Archiving

Improve understanding of system events, and expedite root cause analysis with high-resolution time-series data. Synchrowave Monitoring brings synchrophasor data and relay event reports together into one place so engineers can analyze both the high-level system impact of an event and the detailed oscillography data.



Synchrowave Monitoring Functional Overview

Time-series sources stream data to a historian and dashboards. Engineers view the data on dashboards composed of various data visualization and analysis panels.



Key Benefits

Disturbance Archiving and NERC PRC-002 Compliance

Analyze archived synchrophasor data and relay event reports together in one display for a complete disturbance monitoring solution. Easily find system disturbances, and export data to CSV and COMTRADE data formats for NERC PRC-002-2 compliance.

See the Real-Time System State

Improve system visibility by viewing live, subsecond, and time-aligned information from across the entire power system. Gain additional insight into the dynamic behavior of the power system through waveform signatures to aid in analysis during abnormal conditions.

Reliably Integrate Renewable Generation

High-resolution time-series data enable engineers to monitor and track the impact of renewables. Integrating renewable energy into the power system can result in reduced system stability and new oscillatory modes. System dynamics from these generation sources change quickly—too fast to see at traditional SCADA rates.

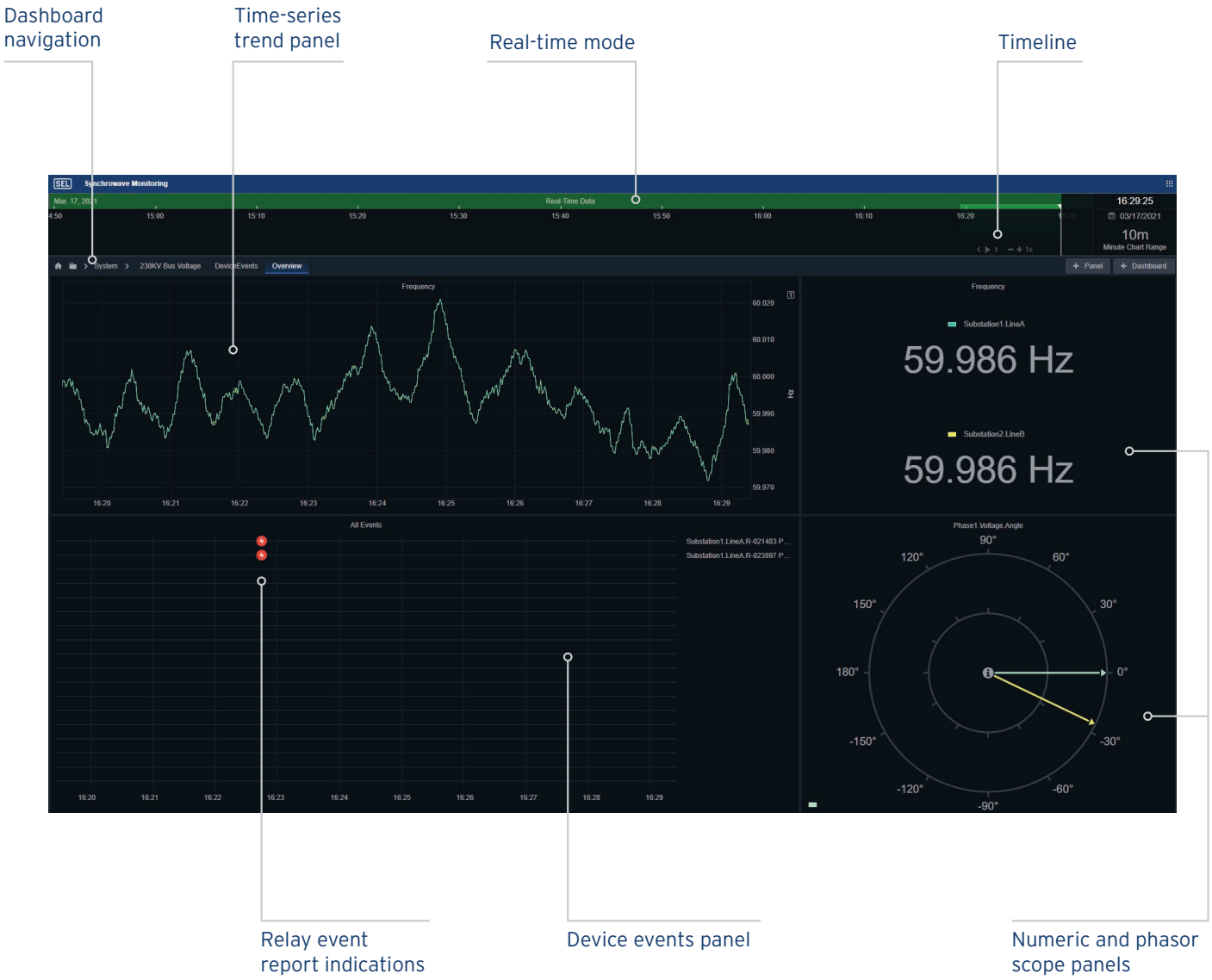
Validate and Improve Power System Models

To accurately replicate events, power system studies rely on accurate system models. Synchrowave Monitoring will record the system response to system events, such as capacitor switching, generator trips, load shedding, or other events. Comparing the recording to system models enables engineers to plan a safer and more reliable system.

Overview

User Interface

Synchrowave Monitoring uses a modern, intuitive design. Dashboards are customized with Trend, Phasor Scope, Numeric, and Device Events panels to ensure engineers can always have access to the data they need displayed.



Powerful and Intuitive Dashboards

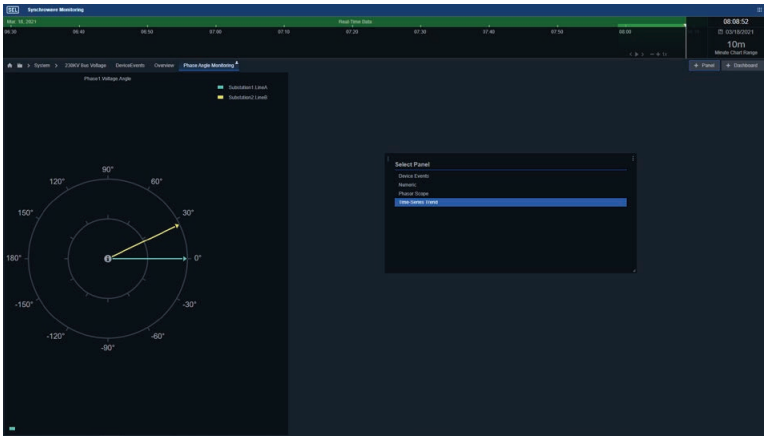
Dashboards provide real-time and historic visualization of power system data and information through a collection of panels. Dashboards are customizable and provide engineers the insight they need to efficiently analyze the power system.

Dashboard Visualization

Improve system understanding by using dashboards to monitor system frequency, bus voltage, phase angle stress, power flow, and much more.

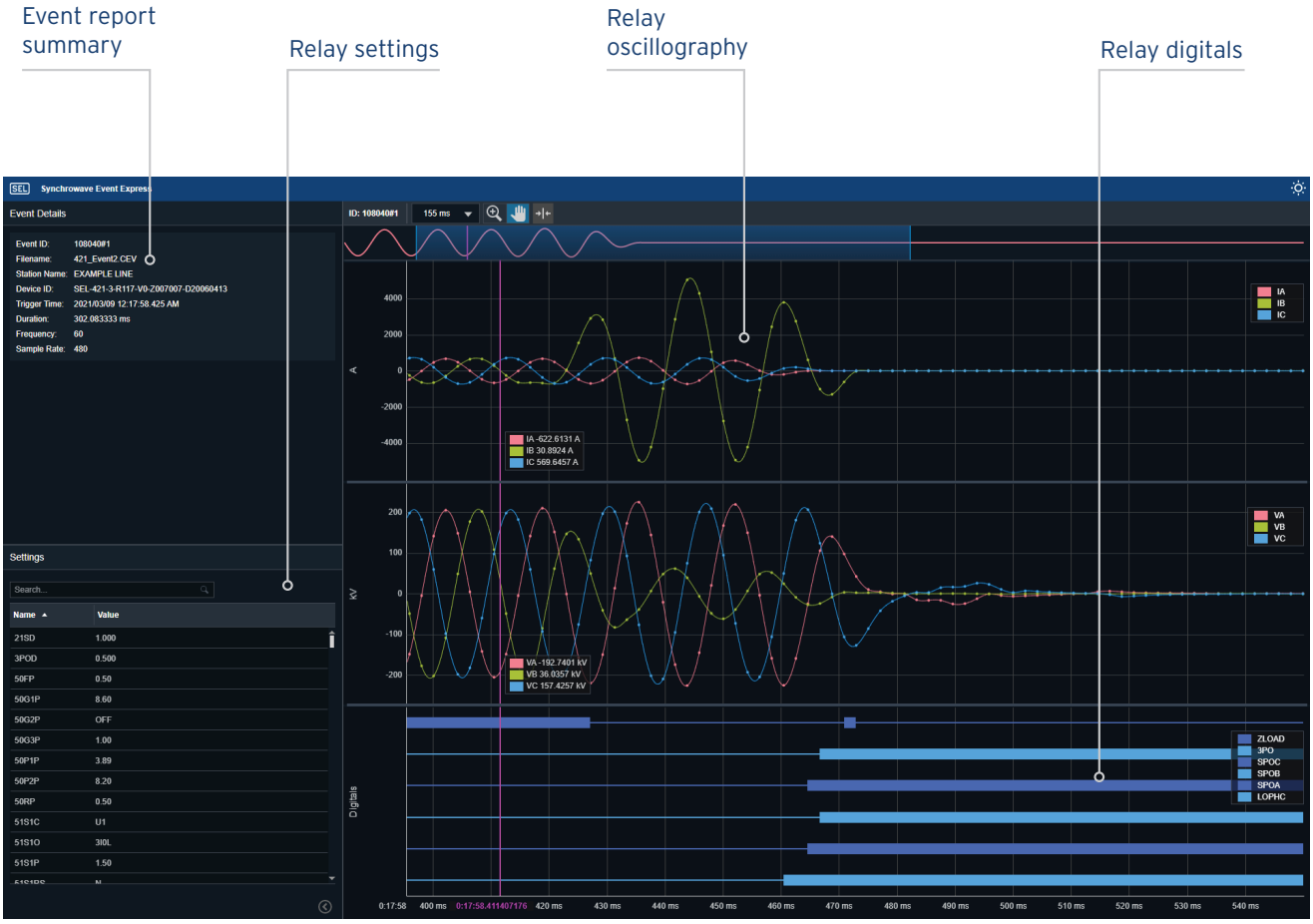
Creating a Dashboard

Engineers can create dashboards by adding panels. Panels can be arranged via drag-and-drop functionality and resized to meet specific monitoring needs. Each panel allows for individual configuration so engineers can choose the type and location of data for monitoring. Engineers can share insights and analyses across the organization by publishing the dashboards they have created.



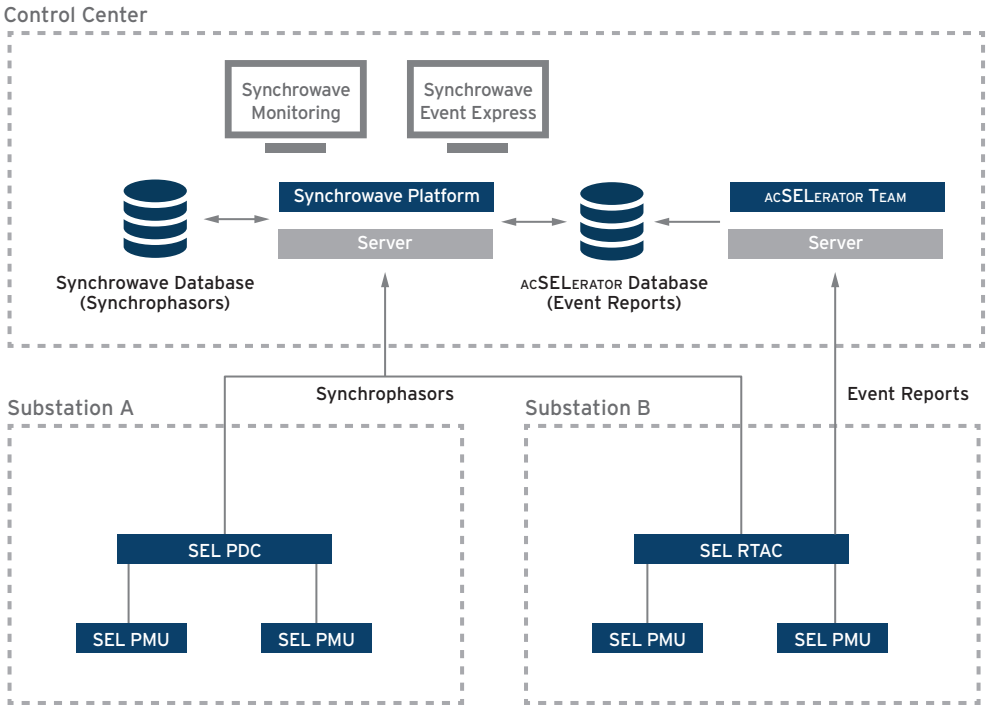
Synchrowave Event Express

Synchrowave Event Express is web client-based relay event report analysis software that is included with the purchase of Synchrowave Monitoring. Synchrowave Event Express can open event reports displayed in the Device Events panel within Synchrowave Monitoring. The Device Events panel requires event reports to be stored in the ACSELERATOR® Database. ACSELERATOR TEAM® SEL-5045 Software can automate the collection and storage of events in the ACSELERATOR Database.



System Architecture Example

Synchrowave Monitoring connects to IEEE C37.118-compliant phasor measurement units (PMUs) and phasor data concentrators (PDCs) for archiving and visualizing synchrophasor data. It also supports display and analysis of relay event reports stored in the ACSELERATOR Database.



Specifications

General	
Data Rates	1—1,000 samples per second
Data Formats	Synchrophasors, relay event reports
Database	Time series—contact SEL for hard drive sizing requirements.

Minimum System Requirements	
File System	Local drive or external network file system
Supported Web Browsers	Google Chrome Version 73 or newer Microsoft Edge
Server	2.1 GHz processor with 16+ cores, 16 GB RAM, 10 Gb network card (2x) See the instruction manual for minimum and high-performance recommendations
Operating Systems	Microsoft Windows 10 Enterprise, Windows Server 2016, Windows Server 2019
Network	1 Gbps network (recommended), 100 Mbps network (minimum)

Configuration Requirements:

Synchrowave Monitoring requires one or more IEEE C37.118-compliant synchrophasor sources. Source data can stream directly from the PMU(s) or be concentrated via the PDC(s). Synchrowave Monitoring requires ACSELERATOR Database for event report archiving and visualization.

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