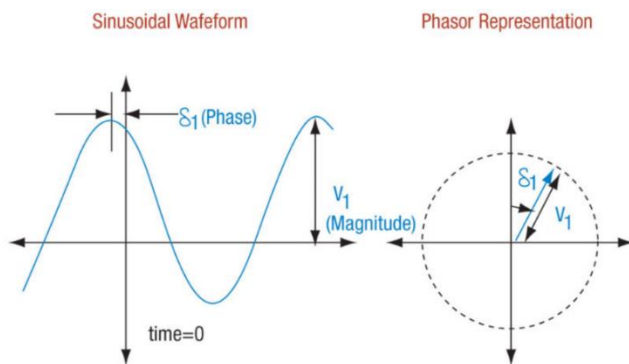


## What are synchrophasors?

Synchrophasor use has been increasing since 2004 when the U.S.-Canada blackout investigation report recognized that many of North America's major blackouts have been caused by inadequate situational awareness for grid operators, and recommended the use of synchrophasor technologies to provide a real-time wide-area grid visibility.

Synchrophasors are precise time-synchronized measurements of certain parameters on the electricity grid. A phasor is a complex number that represents both the magnitude and phase angle of voltage and current sinusoidal waveforms (60 Hz) at a specific point in time as shown below.



The DDA2000™ measures the instantaneous voltage, current, and frequency at each installed location throughout the grid. These parameters represent the “heart-beat” and health of the power system. Voltage and current are parameters characterizing the delivery of electric power from generation plants to end-user loads, while frequency is the key indicator of the balance between electric load and generation. Thus frequency that doesn't deviate very much from 60Hz is key to ensuring the proper operation of the power system and its reliability.

Synchrophasor data streams are sent from the DDA2000™ to the DSU2000™ and then on to Phasor Data Concentrators (PDCs), which collect, time-align, and quality-check the synchrophasors before sending them on for use in advanced applications software.

### Benefits

On-line Benefits of Synchrophasors:

- Wide Area Monitoring and Visualization (WAMV)
- Oscillation Detection
- Frequency Stability Monitoring
- Disturbance Detection and Alarming Studies
- Resource Integration
- State Estimation
- Transmission Pathway and Congestion Management
- Islanding identification
- Quicker Restorations