

Real-World Synchrophasor Solutions

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Abstract

Synchrophasors are an economical, innovative, and practical means to improving power system operations. Synchrophasor solutions are capable of solving real-world problems that before were unsolvable by any other means or with solutions that are cost prohibitive.

This paper examines how synchrophasors have been applied to perform power system monitoring, visualization, and control. Specifically, this paper discusses the following topics:

- Monitoring angles between transmission system and critical distribution buses
- State measurement
- Near bus voltage estimation
- Substation wiring connection verification
- Communication channel analysis
- Wide-area system disturbance monitoring
- Power system model verification
- Florida blackout analysis
- Wide-area power system angle limit verification before allowing circuit breaker closing
- Improved static var compensation
- Remote synchronism check
- Improved state estimation

Each application includes a treatment of how synchrophasors provided a unique solution and benefit. Also included is a discussion of the infrastructure required for each solution, e.g., phasor measurement units, phasor data concentrators, synchrophasor vector processors, communications channel, data rates, computational processing, and storage requirements.

Discussion Point

This paper describes real-world synchrophasor solutions. After reading this paper, the reader will have a guide/tutorial of how to apply proven, practical synchrophasor solutions.