

# Use of Time-Synchronized Measurements in the Operations Horizon

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# Recognizing the Training Needs



## Current State of Synchrophasor-Based Applications:

- Widely deployed for use in the Operations Planning and Operations Assessment Horizons.
- Limited integration into the control room environment for use in the Same-day and Real-time Operations Horizon.

**Solution:** Develop training for System Operators and Operations Support staff to demonstrate how synchrophasor measurements can be used to support the performance of reliability-related tasks.

# Training Course Description



Proudly Operated by **Battelle** Since 1965

TRS and PNNL are collaborating to develop a *Use of Time-Synchronized Measurements in the Real-time Ops Horizon* training course (8 CEH).

**Course Summary:** Provide an introduction to synchrophasor technology, describe the value it can provide in the Real-time Ops Horizon, and demonstrate how synchrophasor-based apps can be used by grid operators and electric utilities to improve wide-area situational awareness and grid reliability.

**Intended Audience:** RC, BA and TOP System Operators and Operations Support staff tasked with monitoring and controlling the Bulk Electric System.

# Training Course Description (Cont.)



Proudly Operated by **Battelle** Since 1965

**Training Location:** Train-the-Trainer sessions and operator training classes to be held at PNNL and select offsite locations in Spring/Summer 2019.

**Training Cost:** No registration fee (entities responsible for travel costs only).



# Overreaching Training Goals

- Increase knowledge and advance use of synchrophasor technology by creating training materials that grid operators and electric utilities can integrate into their respective training programs.
- Provide train-the-trainer workshops to help electric industry trainers meet the underlying knowledge requirements before delivering company-specific training on the topic.



# Training Course Outline



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- Lesson 1: Intro to Synchrophasor Technology
- Lesson 2: NERC Functional Roles & Responsibilities
- Lesson 3: Recognizing Power System Oscillations
- Lesson 4: Monitoring Frequency, Voltage & Real/Reactive Power
- Lesson 5: Monitoring Phase Angle Deltas

# Design & Development – Lessons Learned



- **Demonstrating Value in the Control Room** – Developing content that will help entities build business cases.
- **Strong Operational Use Cases** – Defining specific uses of time-synched measurements to perform operational tasks.
- **Flexible Assessment Methods** – Designing a training course that allows for different assessment methods.
- **Advanced Training Options** – Considering additional training classes to address more advanced uses of the technology (enhanced state estimation, system islanding and blackstart restoration, etc.)

## ***Are PNNL and TRS in search of industry partners to assist with the design and development of training materials?***

Yes, all grid operators and electric utilities that wish to participate in the design and development of course materials are invited to do so. A generic version of the training materials will be made available to industry upon completion of the project.

## ***Who has agreed to participate so far?***

ATC, ERCOT, ISO-NE, LCRA, Peak Reliability, SCE, Southern Company and WAPA have agreed to support this effort so far.



# Contact Information



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