

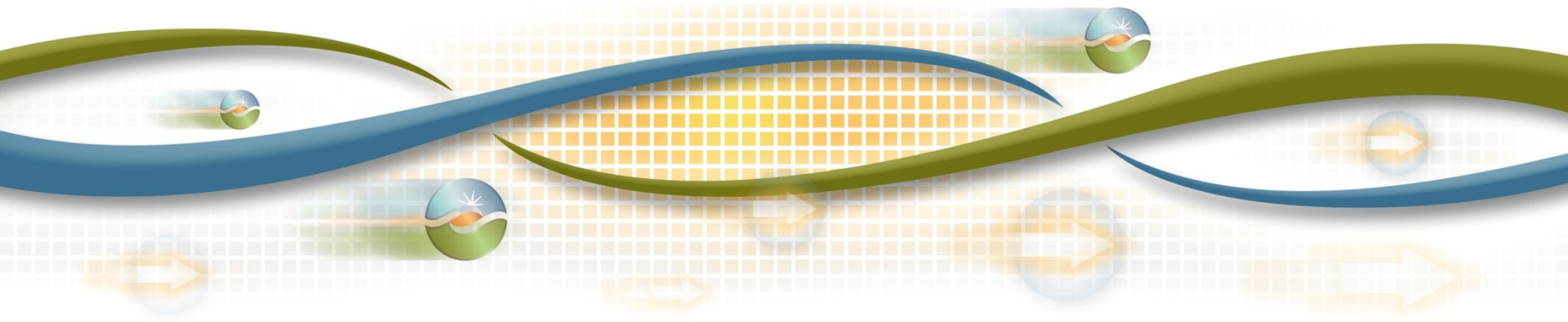


NASPI Work Group Meeting

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Hyatt Regency Denver Tech Center



Synchrophasors –Operationalizing the Tools

- Synchrophasors give Control Center Operators the ability to monitor real time Grid conditions and receive automated alerts which is essential for maintaining Grid reliability. Also they will improve market models to increase their accuracy.
- Synchrophasors are the most significant improvement in Control Center data within the span of my 40+ year career- most of that time in Operations
- DOE, NERC & NASPI have worked hard to bring this technology to its present state-they are to be congratulated for their insight and dedication to bringing PMU data into the control centers

Synchrophasors-Operationalizing the Tools

- Those of us in the room need to continue our efforts in application development and situational awareness visualization so operators can gain the immediate benefit of this technology
- Improving network and market models with PMU data will have significant impact in operational costs and improve Grid reliability
- As identified in various forensic analysis reports, improving adjacent Balancing Authority visualization plays a key role in improving Grid reliability

Synchrophasors - Operationalizing the Tool

- For the vendors and the operations folks in attendance getting the applications working in the Control Centers and giving the System Operators a chance to gain confidence by their utilization is critical to their acceptance
- The CAISO has been an R & D site since 2003 with the EPG-RTDMS platform. We have installed RTDMS 2012 Beta Version on our test systems and will be installing the Production Version in September. The Operators have already done training on earlier versions and are anxious for this application to be in their tool set.

New Control Center Features

- Small Signal Analysis
- Dynamic model validation
- Voltage Sensitivity Analysis
- Phase Angle difference dynamic limits
- Sudden change voltage and frequency event playback
- Automatic event analyzer
- State Estimator validation
- Nomogram validation
- Improved visualization and situational awareness improving renewable resource integration

Synchrophasors – Operationalizing the Tool

- Even in the R & D state, as you will see here later in the program, there is tremendous value in visual PMU data vs. SCADA data driving screens for the Operators
- Oscillation detection and phase angle alarming are key new tools that will help improve Grid reliability by early detection, giving the Operators an opportunity to make good operating decisions and take actions that will help avoid cascading events in the future
- As my good friend Bob Cummings will tell you, time stamped PMU data turns forensic analysis time lines from years to weeks, if all the data is available via PMUs it really can be in days. And Bob like me, is getting old; so he really appreciates our current efforts

OK- I'm Winding Down

- As you may or may not know, this will be my last NASPI meeting with my CAISO hat on. This group has had a formidable role in the present evolution of PMUs. I would like to formally thank Phil Overholt, DOE, Mark Lauby, NERC, Alison Silverstein, NASPI Project Manager, and Jeff Dagle, PNNL for their leadership in keeping NASPI moving forward and in an effective manner.
- In the West, I would also like to thank Dmitry Kosterev and Dan Trudnowski for their efforts in helping me operate the COI throughout my career at the CAISO

Help from CEC and PIER

- The CAISO would also like to thank the California Energy Commission (CEC) and the Public Interest Energy Research (PIER) Group for sponsoring Synchrophaser research in California and the West over the last 12 Years. Research in Synchrophasor technology has progressed greatly because of the funding made available by the CEC and PIER. Utilities around the US and Canada have benefited directly because they recognized the importance of advanced Synchrophasor technology for real time Grid conditions and Renewables visualization.
- In addition, DOE should be recognized for their insight in funding this new technology. It will be a key component in all control centers.

Closing Remarks

- I will truly miss my interaction with this group.
- Those in the audience that have had a chance to dine with me know that I always toast to “60hz or something close”.
- I’ll need to work on a new toast!

Questions?