NASPI Control Room Solutions Task Team
Monthly Meeting

June 23, 2020

CRSTT Agenda

- Introductions
- Revisit meeting minutes from May 26, 2020 conference call
- Review CRSTT Mission, Goals and Objectives
- Discuss status of CRSTT work products
  - Focus Area Docs
  - Video Event Files
  - Ops Use Case Docs
- Brainstorm initial set of enhanced operational use cases
- Adjourn

Meetings Minutes – May 26, 2020

- Reviewed CRSTT Mission, Goals, and Objectives, which are posted on the **CRSTT Page** of the NASPI webpage.
- Reviewed CRSTT work products which include focus area docs, video event files and ops use cases.
  - NDR working w/ participants to update the Phase Angle Monitoring paper, limited responses received so far.
  - Requested volunteers to assist w/ Reactive Power Balancing paper, which may transition to ops use case(s).
- Reviewed status of Time-Synched Measures Training developed by TRS and PNNL and proposed strategy and approach to engaging industry to develop ops use cases.
- Conducted brainstorming session to discuss preparations to address generation profile changes.

CRSTT Mission, Goals, and Objectives

- CRSTT's mission, goals, and objectives can be found on the NASPI CRSTT webpage: https://www.naspi.org/crstt

- Other items on the CRSTT web page:
  - CRSTT Work Plan
  - Use case document, mis-operations with PMU Data Summary Table
  - PMU versus SCADA video events summary video

Focus Area Documents

1. **System Islanding Detection and Blackstart Restoration – Posted June 2015.**
   - (Kleitsch – ATC, Cassiadoro – TRS)
2. **Using Synchrophasor Data for Voltage Stability Assessment – Posted Nov. 2015.**
   - **(**Farantatos – EPRI, Vaiman – V&R Energy)
3. **Using Synchrophasor Data for Phase Angle Monitoring – Posted May 2016.**

   (Cassiadoro – TRS, Nuthalapati – LCRA)
   - **Response received from very few (3)**
   - **NDR will follow-up again. Please provide responses so we can update the document.**
4. **Enhanced State Estimation Survey –Preliminary responses received; more analysis needed.**

   (Vaiman – V&R Energy, Kleitsch – ATC)

Focus Area Documents (cont'd)

5. **Using Synchrophasor Data for Oscillation Detection – Posted Feb. 2018.**

   (Nuthalapati –LCRA, Dyer –EPG, Blevins and Rjagopalan –ERCOT, Patel -EPRI)

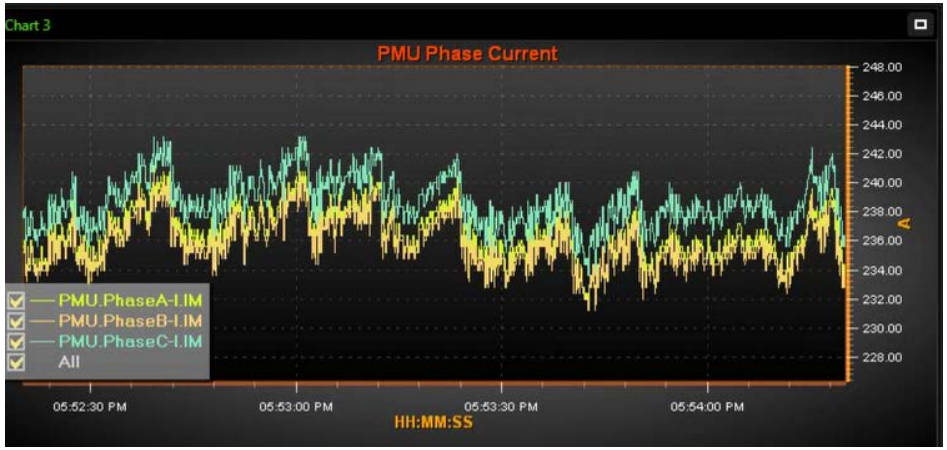
6. **Using Synchrophasor Data to Determine Disturbance Location – Posted Feb. 2019.**

   (Nuthalapati – LCRA, Zweigle –SEL Inc., Cassiadoro –TRS)

NOTE: CRSTT may update existing docs from time to time but does not expect to develop new focus area docs in this format.

Video Event Files

Objective – Continue building library of events to demonstrate value PMU data provides when analyzing abnormal events and disturbances.



Video
PMU versus SCADA Video Events Summary. Please refer to EPG's template and the Synchrophasor Data File Format .CSV when creating a video event.
Video 1 - Current and voltage oscillations observed on the 138 kV system during testing of new generator controls (65 MW gas turbine). RTDMS PMU vs. SCADA Video 1
Video 2 - Voltage oscillations observed on the 230 kV system when a water pump was taken offline. RTDMS PMU vs. SCADA Video 2
Video 3 - Voltage oscillations observed following the loss of a 345 kV line during a period of high wind generation. RTDMS PMU vs. SCADA Video 3
Video 4 - Real and Reactive Power oscillations observed on the 69 kV system during a period of high wind generation with the plant radially connected (i.e. one of two normal source lines out of service). RTDMS PMU vs. SCADA Video 4
Video 5 - Real and Reactive Power oscillations observed during a period of high wind generation. RTDMS PMU vs. SCADA Video 5
Video 6 - Real Power and voltage oscillations observed following the loss of a large generator. RTDMS PMU vs. SCADA Video 6
Video 7 - Wind farm Oscillation Detection and Mitigation using Synchrophasor Technology Wind Farm Oscillation Detection and Mitigation
Video 8 - A 230kV fault followed by a loss of a large generation plant caused system frequency to drop approximately 72mHz momentarily, while having an impact on nearby system voltages and online generators (Clip 1, Clip 2 , Clip 3)
Video 9 - Please be patient with the download, the video is very large. This video captures the actual synchronization of a large generator to the electric grid. The windows in the visualization tool capture frequency, output power, voltage angle, and voltage magnitude of the generator and at a reference point on the electric grid.

Use Case Documents

Objective – Develop docs that demonstrate ways that grid operators and electric utilities are using synchrophasor data to provide operational value.

Event ID	Event	Event Category	Entities Involved	Event Description	Extended Description in Related NASPI Technical Paper	Safety Impact	Reliability Impact	Budgetary Impact
TE02	Failing potential transformer	Transmission Equipment	ATC	Abnormal voltage signature found while reviewing PMU data led to discovery of a failing potential transformer which was subsequently isolated and replaced.	p.38	The utility avoided safety risk to personnel that might have been in close proximity to the PT during its failure.		Utility avoided costs associated with customer minutes of interruption that would have resulted from the potential transformer's failure had the condition not been identified and a mobile transformer placed in service to facilitate the outages necessary for its replacement.
TE03	Loose connections in potential circuits	Transmission Equipment	OG&E	Fluctuations observed in positive sequence voltage data collected from PMUs led to discovery of a loose fuse connection in a CCVT safety switch. PMU data has been used in a similar fashion to reveal faulty terminations, animal-damaged conductor and contact corrosion.	p.40			Utility avoided costs associated with equipment damage and customer minutes of interruption that might have resulted had the issues not been addressed.

Reference: [Using Synchrophasor Data to Diagnose Equipment Health and Misoperations Event Summary Table]

Time-Synched Measures Training Update

2019: TRS and PNNL collaborated to develop a *Use of Time-Synchronized Measurements in the Real-time Ops Horizon* training course (8 CEH).

2020: TRS and PNNL to build on existing training by developing a *Time-Synchronized Measurements Simulation Training* course (8 CEH).

Related Objective: Work with industry to develop improved operational use cases that clearly demonstrate how synchrophasor technology can be used to perform reliability-related tasks.

Enhancing Ops Use Cases: Strategy & Approach

- Engage Industry – Collaborate with grid operators and electric utilities, vendors and others to develop cases.
- Focus on Reliability-Related Tasks – Build cases that highlight use of synchrophasor technology to perform reliability-related tasks.
- Apply Consistent Structure – Create a common framework for presenting cases.
- Present All Pertinent Info – Expand beyond sub-set of PMU data trends presented in most current cases.
- Introduce Enhanced Visualizations – Make it easier access info and understand how it can be used to inform operational decisions.

Brainstorming Session

Open discussion about the initial set of operational use cases that we should focus on developing.

1. ….
2. ….
3. ….
4. ….
5. ….

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THE NORTH AMERICAN SYNCHROPHASOR INITIATIVE

WEBINAR SERIES

Jim Follum, Ph.D.

Pacific Northwest National Laboratory (PNNL)

Real-Time Oscillation Analysis: Technology Readiness, and a Vision for Future Needs and Applications

Power system operators have made significant progress detecting and mitigating oscillations using synchrophasor measurements. Commercial and custom-made software is used to monitor stability margins, detect sustained oscillations, and identify underlying problems. Despite the progress, recent wide-area oscillation events have highlighted the need for improved coordination among grid operators and wider use of oscillation detection and source localization tools. Grid operators have also identified the need to better understand changes in system dynamics related to the rapidly changing generation mix. During this webinar, panelists will first present success stories from oscillation analysis technology deployments and provide an overview of efforts to address current and emerging challenges. These will focus on activities among the WECC Oscillation Analysis Working Group (OAWG), NERC Synchronized Measurement Subcommittee (SMS), and DOE-funded research teams.

Jim Follum received the B.S. and Ph.D. degrees in electrical engineering from the University of Wyoming in 2011 and 2014, respectively. He joined the Department of Energy's Pacific Northwest National Laboratory (PNNL) in 2014 as a Power System Research Engineer. His research focuses on the application of signal processing techniques to problems of power system dynamics. He is the co-chair of the Oscillation Analysis Working Group (OAWG) under WECC's Joint Synchronized Information Subcommittee (JSIS) and a member of the IEEE Oscillation Source Localization Task Force.

Register:
www.naspi.org/node/831

Wednesday, June 24, 2020
10:00am Pacific / 1:00pm Eastern (1 hr.)
Please share with colleagues

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If you want to be added to the CRSTT or DisTT email list or have questions about the NASPI website please contact teresa.carlon@pnnl.gov

NASPI Distribution Task Team
Monthly Meeting

June 23, 2020

DisTT Agenda

Introductions – anyone new?

Mission Statement

DisTT Report progress update

Wildfire Mitigation discussion update

Round Table

NASPI

Mission Statement

The mission of the NASPI Distribution Task Team is to foster the use and capabilities of networked PMUs at the medium-voltage distribution level, beyond the substation.

This group will share information in support of effective research, development and deployment of distribution PMUs.

We aim to create a community to solve technical and other challenges specific to distribution PMU technology and applications.

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DisTT Report progress update

Final Proofreading and Review

NASPI

Wildfire Mitigation update

Still working on scheduling discussion call and webinar

Round Table

DisTT Contacts

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