

NASPI Control Room Solutions Task Team Monthly Meeting

**Presenters: Mike Cassiadoro & Jim Kleitsch
September 19, 2018**



Agenda

- I. Introductions
- II. Review action items from July 2018 call
- III. Provide update on Disturbance Location document
- IV. Discuss Fall 2018 NASPI Work Group Meeting
- V. Address recurring request for:
 - Focus Area Documents
 - Video Event Data
 - Use Case Document Ideas
- VI. Discuss Use of Time-Synchronized Measurements in Real-time Ops Horizon training course.
- VII. Adjourn

CRSTT June 2018 Meeting Minutes

Action Items

- **NDR and Mike** will take another look at updating the Phase Angle Monitoring spreadsheet and possibly update the paper in an effort to keep the CRSTT documents current. ([Download](#) the paper).
- **NDR** to check with Peak on sharing an event video – in progress. NDR will let us know when Peak is ready.
- **Tom** will reach out to Allen Goldstein (NIST) for possible coordination between the CRSTT and other organizations such as IEEE and IEC activities. Mike asked back in May 2018 how should CRSTT coordinate or work with other industry bodies (e.g. IEEE, etc.)? The reason is so that CRSTT would have a presence at those types of meetings and conferences. Tom suggested to Mike that we connect with Allen to tie into IEEE and IEC activities.
- **Mahendra** will reach out to the PRSVTT on task team collaboration during the October 2018 meeting
- **All:** Mike is looking for people willing to serve on a panel at the Oct. 2018 NASPI WG mtg. in Philly to discuss specific uses of synchrophasor technology in the control room (e.g., enhanced state estimation, oscillation detection, etc.). If you are interested, please let Mike know.

Additional Item: Mike to contact SCE, SDG&E and others to determine interest in developing operational use case addressing the use of synchrophasor data to monitor synchronous devices.

Fall 2018 NASPI WG Mtg. Discussion

- ❑ NASPI Work Group Meeting will occur October 23-24, 2018 in Philadelphia, PA.
- ❑ NECR SMS Meeting will occur October 25, 2018 at PJM's facility in Audubon, PA.
- ❑ CRSTT will participate in joint panel session with DisTT and DNMTT on the *Use of Synchrophasor Technology to Determine Disturbance Location* (Main Session).
- ❑ CRSTT and PRSVTT to participate in joint panel session on the *Use of Synchrophasor Technology for Enhanced State Estimation* (Breakout Session).

Fall 2018 NASPI WG Mtg. Discussion (Cont.)

2:35 - 5:30 PM	Task Team Breakouts
	Control Room Solutions Task Team <ul style="list-style-type: none">• CRSTT business
	Data & Network Management Task Team <ul style="list-style-type: none">• DNMTT business
	Distribution Task Team <ul style="list-style-type: none">• DisTT business
	Engineering Analysis Task Team <ul style="list-style-type: none">• EATT business
	Performance, Requirements, Standards & Verification Task Team <ul style="list-style-type: none">• PRSVTT business

Team Discussion: We will have two hours left to discuss team business after the CRSTT & PRSVTT joint panel session. Are there specific topics that the team wishes to cover during that time?

Focus Area Documents

Determining Disturbance Locations (Nuthalapati –Peak Reliability)

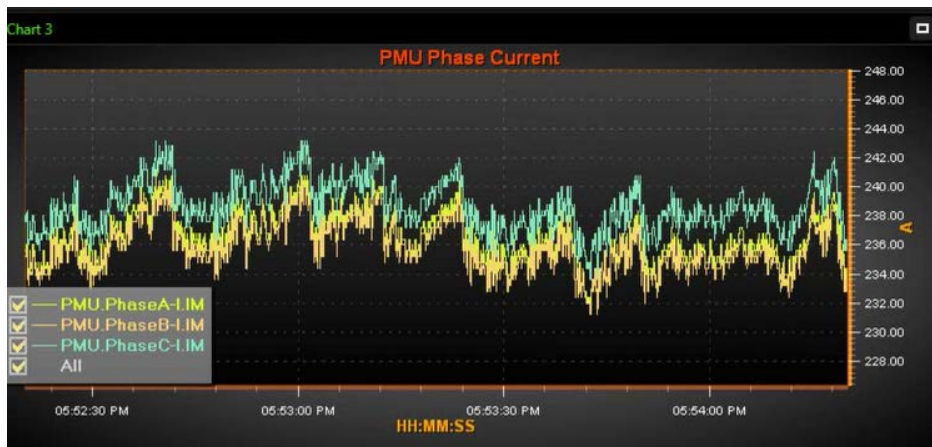
- Survey distributed to industry by NDR.
- Received responses and working on initial draft.
- Present initial draft at Fall 2018 Work Group meeting?

Using Synchrophasor Data to Monitor Reactive Power Balancing

- (Cassiadoro -TRS, Peak RC –Zhang, Vaiman –V&R Energy)
- No significant progress to date

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.

Synchrophasor Training Course

TRS and PNNL are collaborating to develop a *Use of Time-Synchronized Measurements in the Real-time Ops Horizon* training course. The base materials will be made available to the public upon completion.

Course Length: 8 Hours (8 CEH)

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

Training Goals:

1. 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.
2. Provide train-the-trainer workshops to help electric industry trainers meet the underlying knowledge requirements before delivering company-specific training on the topic.

Synchrophasor Training Course (Cont.)

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. Those that do will be invited to attend a “train-the-trainer” session at PNNL free of charge (entities responsible for travel costs only).

Who has agreed to participate so far?

ERCOT, ISO-NE, SCE and WAPA have tentatively agreed to support this work effort. Invites are outstanding to BPA, CAISO, Peak Reliability, PJM and SDG&E.

What’s the timeline for course development?

PNNL & TRS expect to finalize the training outline in Oct.2018, complete the course materials in Jan. 2019, and hold the “train-the-trainer” class in Feb. 2019.

Please contact Mike Cassiadoro (mcassiadoro@totalreliabilitysolutions.com) or Eric Andersen (Eric.Andersen@pnnl.gov) if you’re interested in participating!

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Next NASPI WG Meeting: October 23-24, 2018 in Philadelphia
Next NASPI CRSTT Conference Call: November 21, 2018