

NASPI/IEEE Synchro-Waveform State-of-Practice Task Force

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Task Force: Introduction

- Joint task force between IEEE and NASPI
- Mission:
 - Document the current state-of-practice in deployment of synchro-waveform technology
 - Assess industry readiness to integrate synchro-waveforms into operations
- Task Force Team
 - Kaustav Chatterjee, Pacific Northwest National Laboratory
 - Hamed Mohsenian-Rad, University of California, Riverside
 - Jhi-Young Joo, Pacific Gas & Electric
 - Sungyun Choi, Korea University
 - Hassan Ghoudjehbaklou, SDG&E

Synchro-Waveform Measurements

- High-resolution, time-synchronized point-on-wave measurements offering visibility into fast-acting grid dynamics
- Different sensors with different capabilities and applications*

Available Technologies

- Power Quality Meters
- Digital Fault Recorders
- PMUs with waveform recording
- New sensor technologies

Metering and Data Recording

- Event-triggered disturbance recording
- Continuous gapless recording
- Periodic intermittent recording

Data Management and Storage

- Local storage vs cloud-based services
- Lossless vs. lossy compression

End-Use Applications

- Disturbance recording
- Event analysis
- Sub-synchronous oscillation monitoring
- Power quality monitoring

Communication and Streaming

- Local storage and analysis without streaming to central location
- Continuous streaming to central location
- Hybrid – local analysis and selective streaming of results to central location

Scope of Work

- Conduct industry survey of utilities and vendors to gather information on the state of synchro-waveform technology
 - Survey utilities for
 - Current state-of-deployment
 - Use of synchro-waveform measurements in applications
 - Organizational readiness, barriers to adoption
 - Survey vendors for
 - Available commercial technologies and their capabilities
 - Including solutions for sensor technologies, analysis, storage, streaming and communication
 - Existing partnerships with utilities
- Analyze responses and prepare a comprehensive summary report

Timeline

Task	Milestone/Deliverable	Timeline	Status
Task 1: Questionnaire	Questionnaire for the survey finalized	Sept 2025 – Dec 2025	Completed
Task 2: Industry Engagement	Participants identified and emailed survey questions	Jan 2025 – May 2026	On-going
	Survey response collected from participants	Feb 2026 – Jun 2026	On-going
Task 3: Reporting	Survey response complied into a summary report	May 2026 – Sept 2026	Not Started

Survey Questions

- Easy to answer multiple choice questions and form fills
- Separate questionnaires for
 - utilities
 - vendors
 - ✓ sensor and meter manufacturers
 - ✓ application/software/platform developers
 - ✓ communication and storage service providers

What is the mechanism for waveform capture?

Which applications of yours uses waveform measurements?

Is your waveform data time-synchronized?

What is your maximum data resolution (in samples/cycle) ?

What communication protocol do you use for data collection?

Do you store data locally or stream elsewhere ?

What file-format do you use for waveform records?



Survey Participation

- We invite you to participate in the survey
- Survey is available through
 - QR code
 - Online link
 - Email

You may email naspi@pnnl.gov or task force members for the survey

Contact: Kaustav.Chatterjee@pnnl.gov

QR Code for the Survey



Thank you

