NASPI Distribution Task Team

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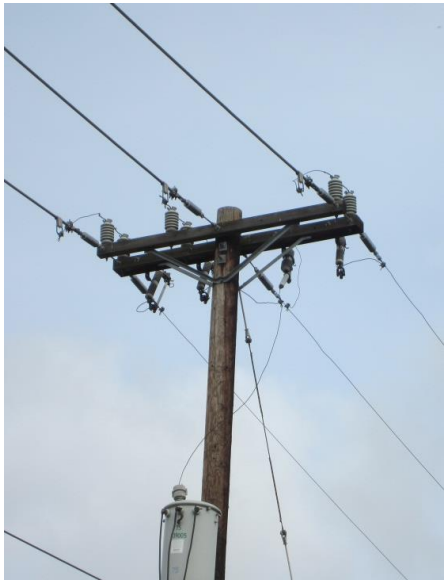
Background

Synchronized measurements are much less common in distribution systems than in transmission, for several reasons:

- Historically, with radial design, strictly one-way power flow and unquesitoned stability, there was no need to monitor distribution systems.
- Less load and less money is at stake, so the business case for instrumenting distribution circuits is harder to make.
- To provide meaningful information about distribution-level power flows, voltage phasor measurements must be more precise and accurate than typical transmission-level PMUs.



Background

But the landscape is changing:

- Solar PV generation at high penetration levels, along with distributed energy storage and electric vehicle charging, introduce new variability and control challenges.
- Wildfire hazards, exposure to sudden loss of generation, and emphasis on resilience introduce a new level of scrutiny for distribution operations.
- Technology has evolved considerably, supporting ultra-high-precision phasor measurements, continuous point-on-wave measurements, and easy cloud hosting for large data streams and analytics.

Mission Statement

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

This group shares information in support of effective research, development and deployment of distribution PMUs and related measurement devices.

We aim to cultivate a community to solve technical and other challenges specific to synchronized measurement technology and its applications in distribution system operation, planning and analysis.

NASPI North American SynchroPhasor Initiative

Some Applications and Use Cases

Event detection and analysis
High-impedance fault detection, fault location, asset health monitoring

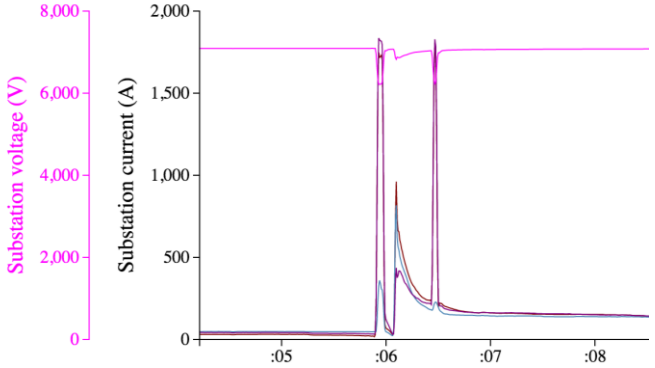
see also SGSMA Panel 2

Distribution state estimation
Voltage and power flow, topology identification; system restoration

Monitoring distributed energy resources
PV-load disaggregation; control or curtailment of PV generation

Model validation
Distribution circuit models, inverter models;
steady-state, transient and oscillation behaviors

Smart protection
Fallen conductor recognition



What I do in my day job

Teaching: Intro to Electric Power Systems
(Energy engineering majors, undergrad + grad)

Selected past and ongoing research projects:

- Micro-synchrophasors for Distribution Systems *(ARPA-E)*
- Phasor-Based Control for Scalable Solar PV *(DOE/SETO)*
- National Infrastructure for Artificial Intelligence on the Grid *(ARPA-E)*
- GridSweep: Measuring the frequency response of low-inertia grids *(DOE/GMLC)*
- Oakland EcoBlock: Multi-customer retrofit block-scale microgrid *(California Energy Commission)*

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Questions?

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