

DisTT was inaugurated June 2016

Mission Statement

The mission of the Distribution Task Team (DisTT) 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 and their applications.

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

Topics of ongoing work for this group include:

- Present practices, research, state of the art and challenges with distribution PMUs
- Distribution PMU applications and use cases
- Theoretical aspects of PMU measurements
- Technical requirements and specifications for distribution PMUs

Report Out: Distribution Task Team Session

Wednesday, October 18, 2016

Presentation Synopses

(please see slide decks online)

Harold Kirkham (PNNL)

Phasor Measurement: A Short History of the Technology and the Standards

Pause to think before you try to write standards; learn from PMU history. Devices compliant with standard can produce very different results.

Sean Murphy & Jerry Schuman (PingThings)

Using micro-PMU data for a data-driven solution to geomagnetic disturbances

We can find cool correlations in huge datasets quickly and easily;
Moore's Law still applies in data science.

Tariq Rahman (SDG&E) & Kamal Garg (SEL)

SDG&E Experience with Distribution Synchrophasors and Catching Falling Conductors

We can get actionable operational intelligence; have identified 60 use cases for distribution PMUs.

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Field Experience with Distribution PMUs

Distribution synchrophasor research projects and use cases explored to date: a preliminary inventory

Many distribution use cases have been identified and are in different stages of development

DisTT will compile ongoing projects and references so that we can learn from each other

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Discussion: Technical Specs for Distribution PMUs

- We must consider what we want distribution PMUs (incl. attendant communication and data systems) to actually do, in the context of different applications, well before anyone writes standards.
- We already see very different needs (e.g. latency, data continuity, precision and accuracy, streaming rate) for distribution PMU data in different situations.
- M-class vs. P-class illustrates a tradeoff between latency and data quality, imposed by filtering. Applications dictate the need for filtering.
- Filtering data onboard PMU device or at application level is an important decision
- Perhaps frequency should be computed on the PMU device itself?
- Should particular devices pertain to certain applications or will it be a one size fits all approach?

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Discussion: Technical Specs for Distribution PMUs, cont'd

- Noise and residuals are an important part of understanding performance; DisTT will try to ask the right questions of experts.
- May need both phasor and waveform analysis.
- Sources of error: PTs and CTs, temperature drift... how can we calibrate?

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White Paper

DisTT is collaborating on a ~~white paper~~ set of white papers about

- Distribution PMU experience, challenges and lessons learned to date
- What's different in distribution vs. transmission
- Technical requirements associated with different applications
- Data quality assessment
- Making the business case for distribution PMUs
- Research road map and problem statements

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Reference Dataset

LBLN is making a 3-month reference dataset from three micro-PMUs on a 12-kV system available for researchers

see powerdata.lbl.gov

The screenshot shows a web browser window with the URL powerdata.lbl.gov. The page features a dark blue header with the Berkeley Lab logo and the text "Power Data Portal". Below the header are three main navigation buttons: "Visualize" (with a bar chart icon), "Explore" (with a magnifying glass icon), and "Download" (with a download icon). Each button has a brief description and a status label: "Visualize" is "Now Available", "Explore" is "Coming Soon", and "Download" is "Now Available".

Visualize
Visualize the data via BTrDB and ElasticSearch. **Now Available**

Explore
Explore and download the raw data via Cassandra. **Coming Soon**

Download
Download the gzipped raw data files over HTTP. **Now Available**

About

Can synchronized distribution level phasor measurements enhance planning for power flow and system control, security and resiliency in the modernized grid?

By installing a number of μ PMUs in various locations in the electric distribution system and evaluating the data from them, the project aims to determine whether refined measurement of voltage phase angles can enable advanced diagnostic, monitoring and control methodologies in distribution systems, and to begin developing algorithms for diagnostic applications based on μ PMU data.

Applications being studied include:

- State estimation and enhanced visibility for distribution system operators
- Characterization of loads and distributed generation
- Diagnosis of potentially problematic conditions such as oscillations or FIDVR
- Microgrid synchronization

Available datasets

A limited LBNL μ PMU dataset is available for research collaborators to visualize and download.

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DisTT Logistics

Sascha von Meier (UC Berkeley) and Emma Stewart (LBNL), Co-Leads

You are welcome to join:

please email teresa.carlon@pnnl.gov to be added to list

Conference calls generally 1st Thursday each month, 10am Pacific/1pm Eastern

Next conference call Thursday, Nov 10, 10am Pacific/1pm Eastern