

Distribution Time-Synchronized Measurements: Sensors and Applications

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The 2nd IEEE International Conference on Smart Grid Synchronized Measurements and Analytics (SGSMA) *Virtual Event* | May 24-27, 2021

Many Devices at the Distribution Level

Stand-alone PMU and/or integration with multiple functions?

Voltage regulators

Meters

Capacitor bank controller

Reclosers

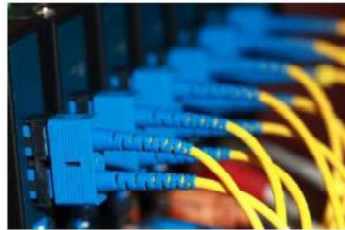
Protective relays

DER controllers



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Communicating the data



- Powerline Carrier
- Fiber Optics
- Radio
- Cellular
- Ethernet
- Satellite



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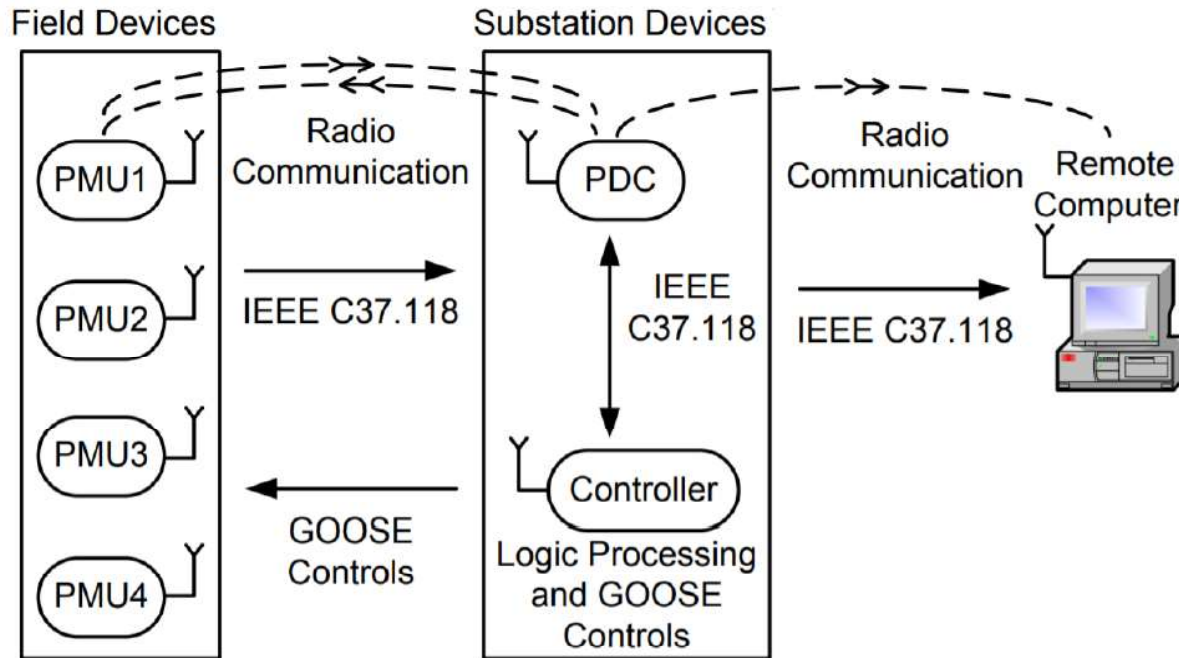
The Physical PMU Device

- Utility grade robustness designed for outdoor high-energy
 - Physical standards
 - Terminal spacings
 - Temperature: -40°C to $+85^{\circ}\text{C}$
- Measuring beyond PMU: time-synchronized point-on-wave
- Combination of features
 - Control
 - Monitoring
 - Logic
- Warranty, service, utility confidence



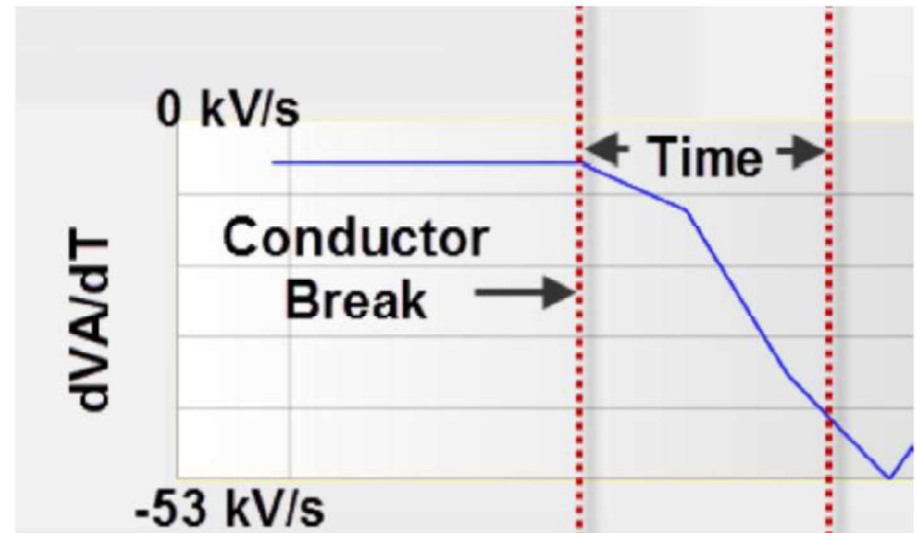
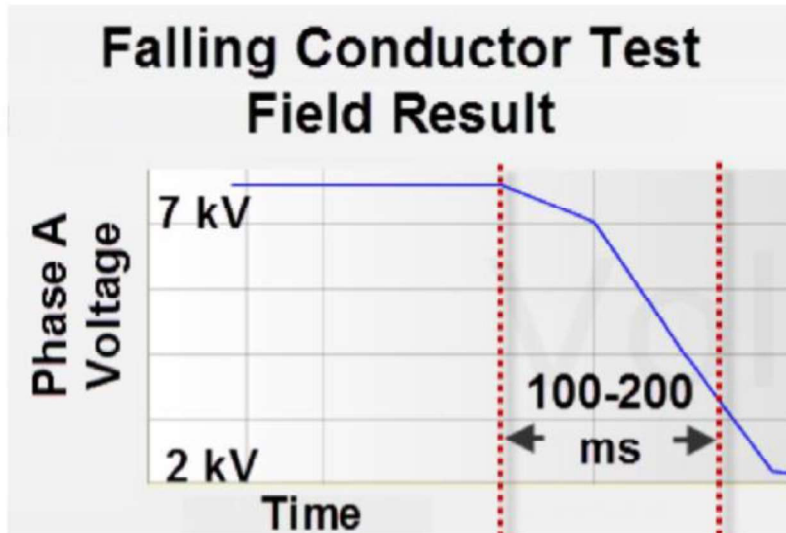
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Distribution PMU Application – Fire Mitigation



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PMU Test Results



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Other Distribution PMU Applications

- Situational awareness and monitoring
- Wide-area DER control
- Microgrid control
- Predictive failure analytics
- Power quality
- Fault detection and locating

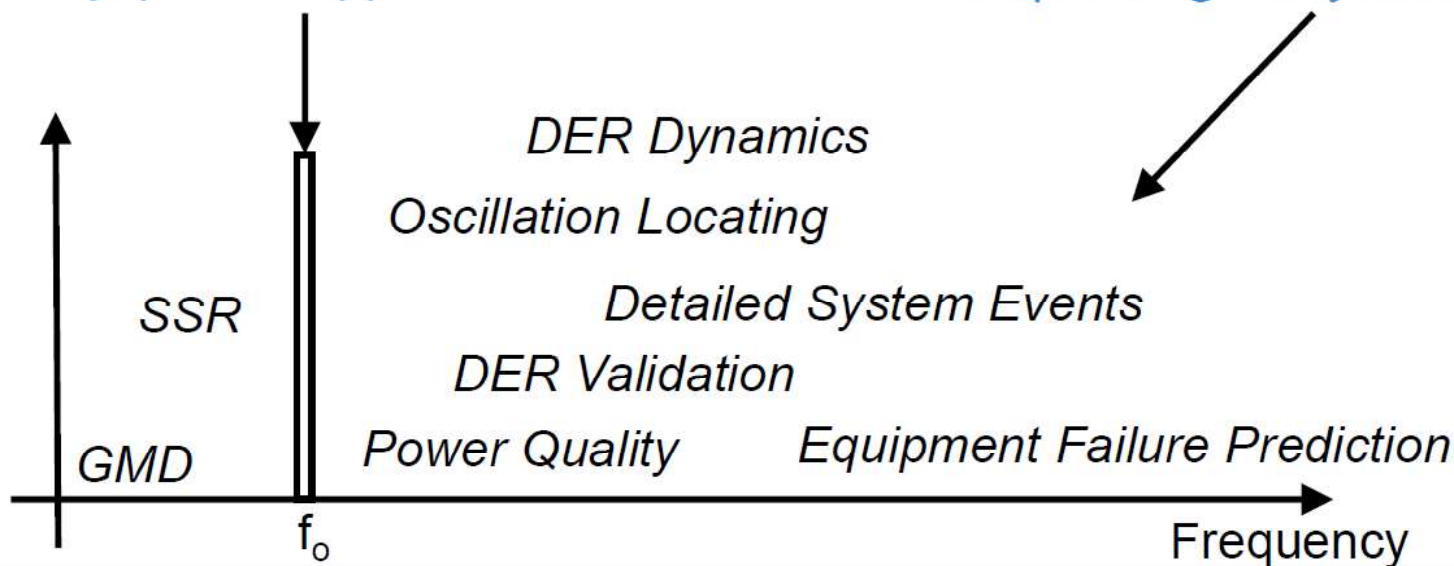


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Moving Beyond Phasors – DER Driven

SCADA and synchrophasors rely on the same quasi-steady-state, lossy, phasor approximation

Wide-bandwidth, time-domain technology brings new information to the operating/analysis environment



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Q&A – Lightning Round!

- What is the one current open subject or application you care most about?
- What is the one aspiration that you would like to lead or actively join?
- What is the one major value proposition to drive the field forward?
- Large amounts of synchronized measurement data. Compressed or not? Distributed or Central Repositories? Lifetime?
- Does cyber-physical security need to have a tailored part for this field?



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Open Discussion & Audience Questions



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