



Key Success Factors to Benefit from Synchronized Measurements

Damir Novosel and Alison Silverstein

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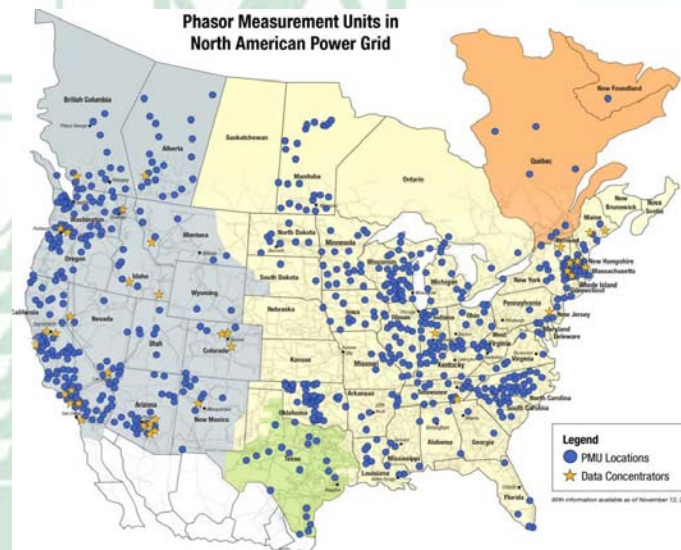
Industry Status Today

THIS IS REAL PRODUCTION-GRADE TECHNOLOGY TODAY

- Many full synchrophasor systems deployed across North America
- Many high-quality applications in use and more under development
- New sources of value being identified
- Technical standards in place

WHAT'S NEXT

- Better business processes to support ongoing deployment and use
- Helping non-users see reasons to adopt synchrophasor systems and making new deployments easier



Benefits of using the same infrastructure for variety of applications



Key Deployment Success Factors

- Present synchrophasor deployment is only “tip of the iceberg” for on-going reliability improvements and benefit realization
 - More high-value uses and benefits are being developed
- Assure Life-cycle Quality of Measurements – Requires TOs to take Ownership and Realize own Benefits
- Baseline to Provide Norms: Historical Data/Simulations
- Updates of Application and Design Roadmaps
 - System expandability as measurements & applications grow
 - System integration with other enterprise systems
- Engineering and Operator Guidelines and Training
- Data and Information Exchange Across Interconnections: Requirements, Standards, Costs, and Risks

Synchronized Measurement Progression

Before

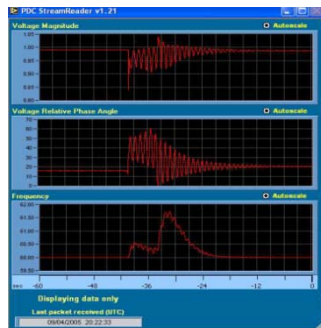


First PMU



Analog Displays

Products Now



2014

**Standard feature
(relays, DFR,
controllers, monitors)**

**On major
interconnections and
generators**

**Standard SW tools
included in
EMS/SCADA**

**Primary use for
monitoring, event
analysis**

**Interoperability
standards deployed**

Some distribution PMUs

**Improvements in
communication
infrastructure**

2018

**Thousands of
synchronized
measurements
world-wide**

**Integrated in standard
business and
operational
practices**

**Fully integrated with
EMS/SCADA or
Independent system**

Higher data rates

Fully in Distribution

**Distributed comm.
and processing
architecture**

**Fast Control and
Adaptive Protection**