Project Components

The Project will demonstrate three classes of technologies to help integrate 18,000 MW wind generation…

1. Synchrophasor Technology
2. Smart Meter Texas Portal
3. Smart Grid Community of the Future

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Synchrophasor Overview

Although we already know the many benefits of wind power, it is critical that we manage its effect on reliability of the grid before wind can become a viable energy source in the Texas electricity market.

Our first task in this demonstration will be to monitor the ERCOT grid and its large-scale wind resources with **Synchrophasor** technology to detect and identify undesirable conditions on the grid, thereby enabling ERCOT operators to make adjustments to maintain grid reliability, and to expand the level of wind generation from available wind capacity.

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Demonstration Goals

- Enhance transmission operations management practices:
  - Provide a method for establishing and maintaining a reliable synchrophasor network
  - Provide real time dynamic information on wind resources and their impact on the transmission grid
  - Provide best practices and guidelines for PMU siting
- Improve grid reliability
  - Identify precursor conditions to undesirable grid performance and behavior, or to grid interruptions
  - Analyze, investigate, and suggest changes to operating procedures
- Provide lessons learned to other parts of the U.S.

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Approach

- Add 13 PMUs
  - 6 – AEP
  - 4 – Oncor
  - 3 – Sharyland/Hunt
- Install a phasor data concentrator (PDC) at each participating utility and a central PDC at ERCOT
- Integrate and enhance the phasor data concentrators (PDCs) and the Real-Time Dynamic Monitoring System (RTDMS)
- Perform interoperability and cyber security testing
- Collect and analyze synchrophasor data
- Evaluate current transmission engineering models
- Suggest operational and model changes
- Optimize PMU positioning
- Determine future PMU needs and locations

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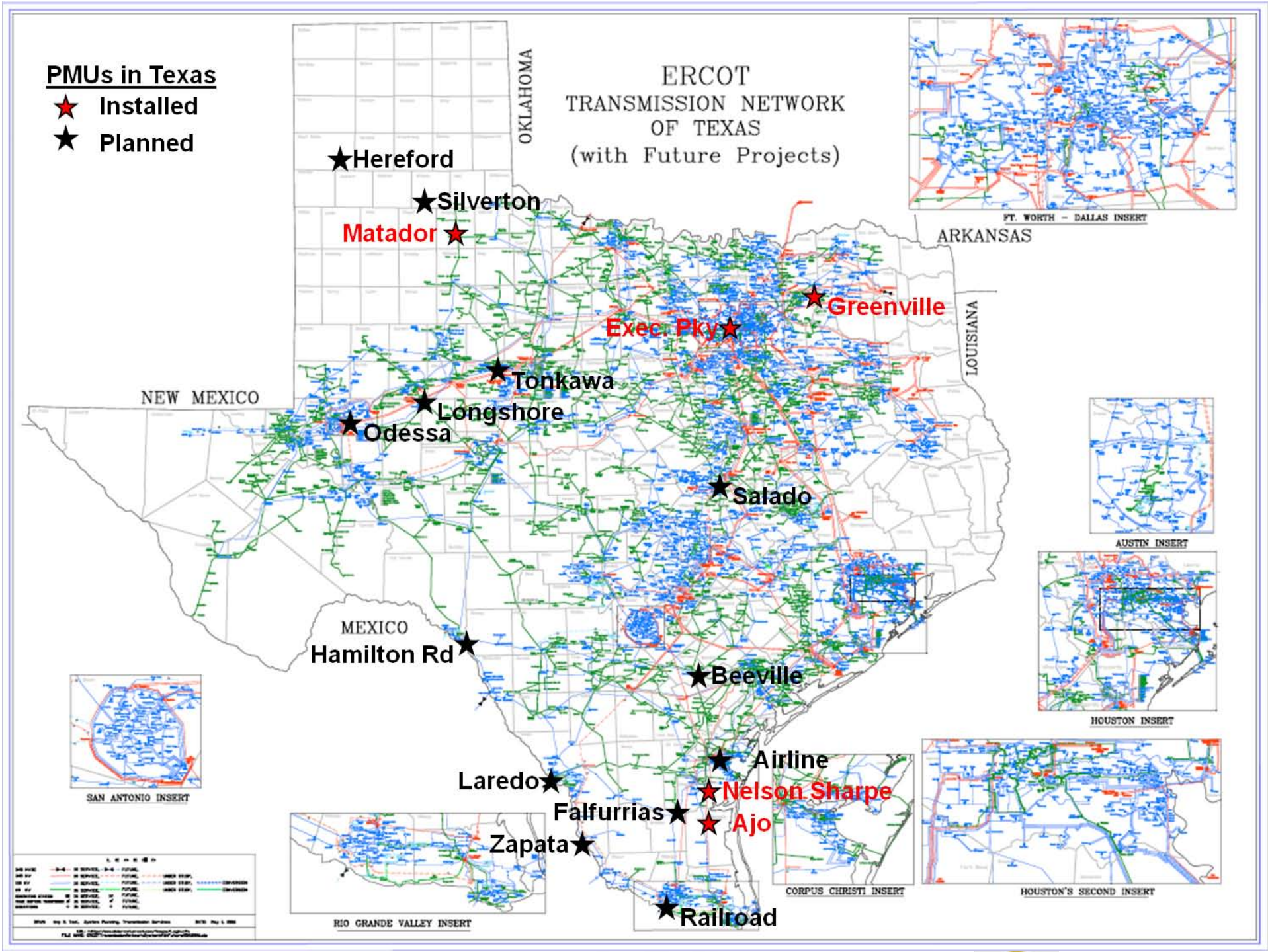
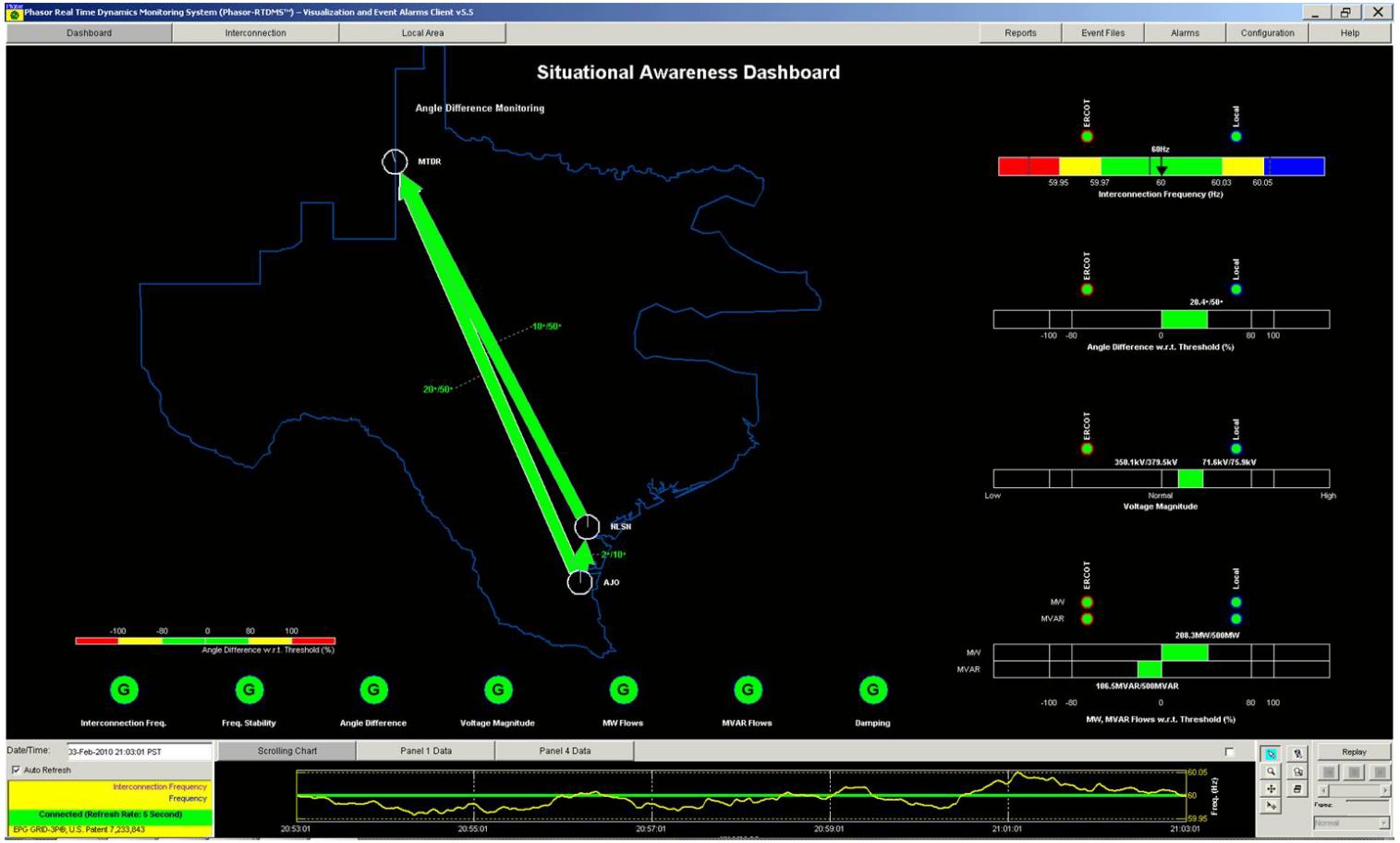

PMUs in Texas
Installed
Planned
ERCOT
TRANSMISSION NETWORK
OF TEXAS
(with Future Projects)
OKLAHOMA
ARKANSAS
LOUISIANA
NEW MEXICO
MEXICO
Hereford
Silverton
Matador
Greenville
Exec. Pky
Tonkawa
Longshore
Odessa
Salado
Hamilton Rd
Beeville
Airline
Laredo
Nelson Sharpe
Falfurrias
Ajo
Zapata
Railroad
FT. WORTH - DALLAS INSERT
AUSTIN INSERT
HOUSTON INSERT
SAN ANTONIO INSERT
CORPUS CHRISTI INSERT
HOUSTON'S SECOND INSERT
RIO GRANDE VALLEY INSERT

RTDMS

Synchrophasor technology measures variations across a transmission grid in absolute real-time. The measurement includes a time stamp that provides an easy method of correlating values from different locations that take different amounts of time to arrive at a common collection point. This gives us a tool to view the power system as a whole or to compare different points in real time.



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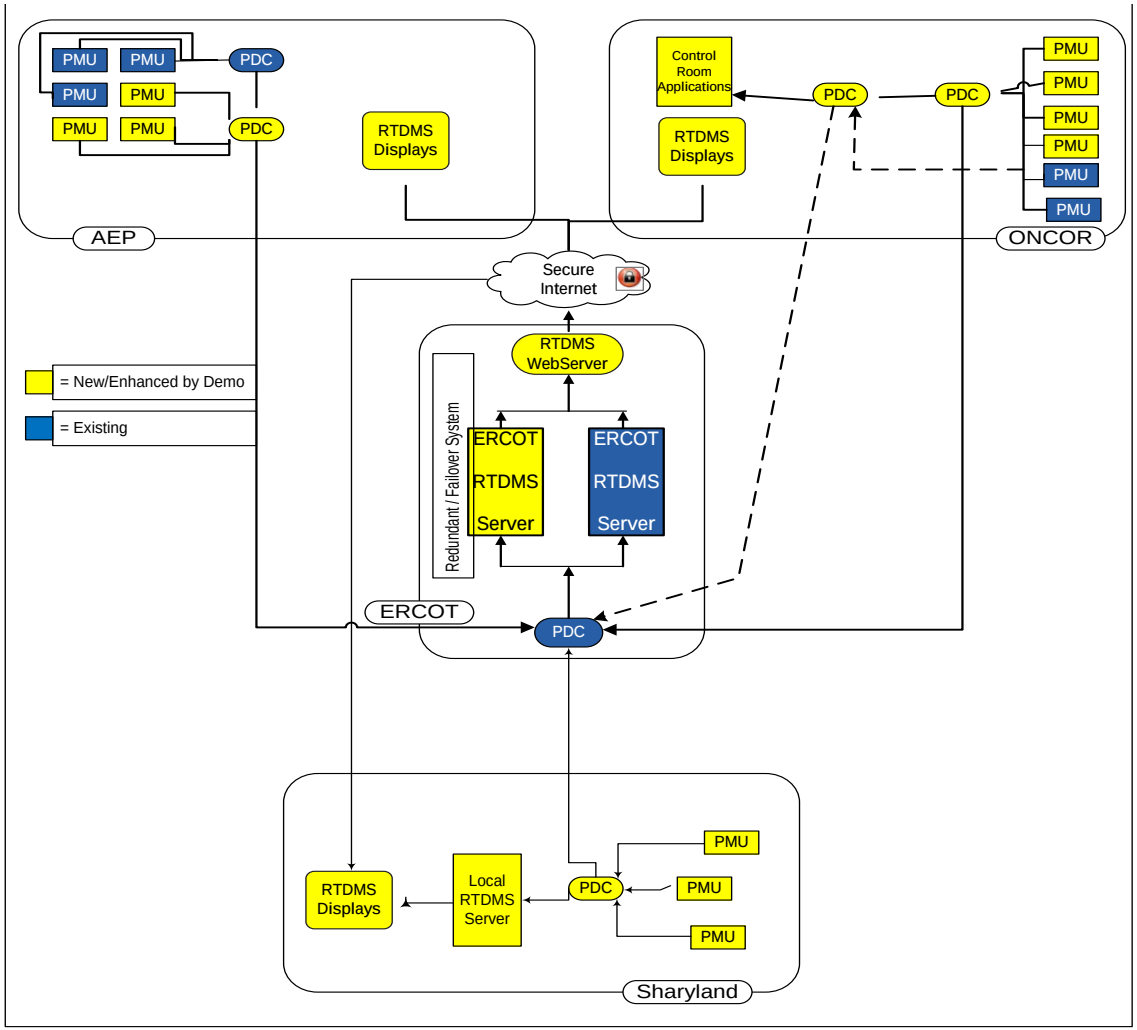
PMU -> PDC -> RTDMS Architecture



High-Level General Use Case

Short Description: PMUs at substations collect information and stream data to PDCs at control centers for the utilities. Substation PDCs may be used to aggregate PMU data before streaming the data to the utility PDC. A Central PDC at ERCOT aggregates the data from all of the PDCs. Data is then distributed to the RTDMS and data historians. Individual use cases will be developed for each aspect of the phasor system.

Standards Used: IEEE C37.118, possible future use of IEC 61850

Interfaces: PMUs, PDCs for TDSPs and ERCOT, Substation PDCs, RTDMS, data historian

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