

Performance and Standards Task Team

- **Task Team Leader:** Vahid Madani/PG&E
- **Task Team Co-Leader:** Damir Novosel/Quanta Technology
- **Task Team Technical Support:** Henry Huang/PNNL
- **Task Team Administrative Support:** Teresa Carlon/PNNL
- This task team comprises ~ 200 members (>70 Active)

Summary of PSTT Activities

PMU/PDC Hardware



- PMU Testing And Calibration
- Phasor Accuracy
- Define PMU
- Commissioning & Maintenance
- PDC Functions**
- PDC Testing**
- Multi-function PMUs**
- IEC 61850 for PMU
- C37.118 for "Dynamic" Phasor

Phasor Network

- Synchronization Techniques
- PMU Installation
- PDC Communication**
- HW & SW Upgrade
- Network Connection
- Network Configuration
- *Network Testing
- *Naming Convention
- *Cyber Security Std for Phasor

Phasor Data

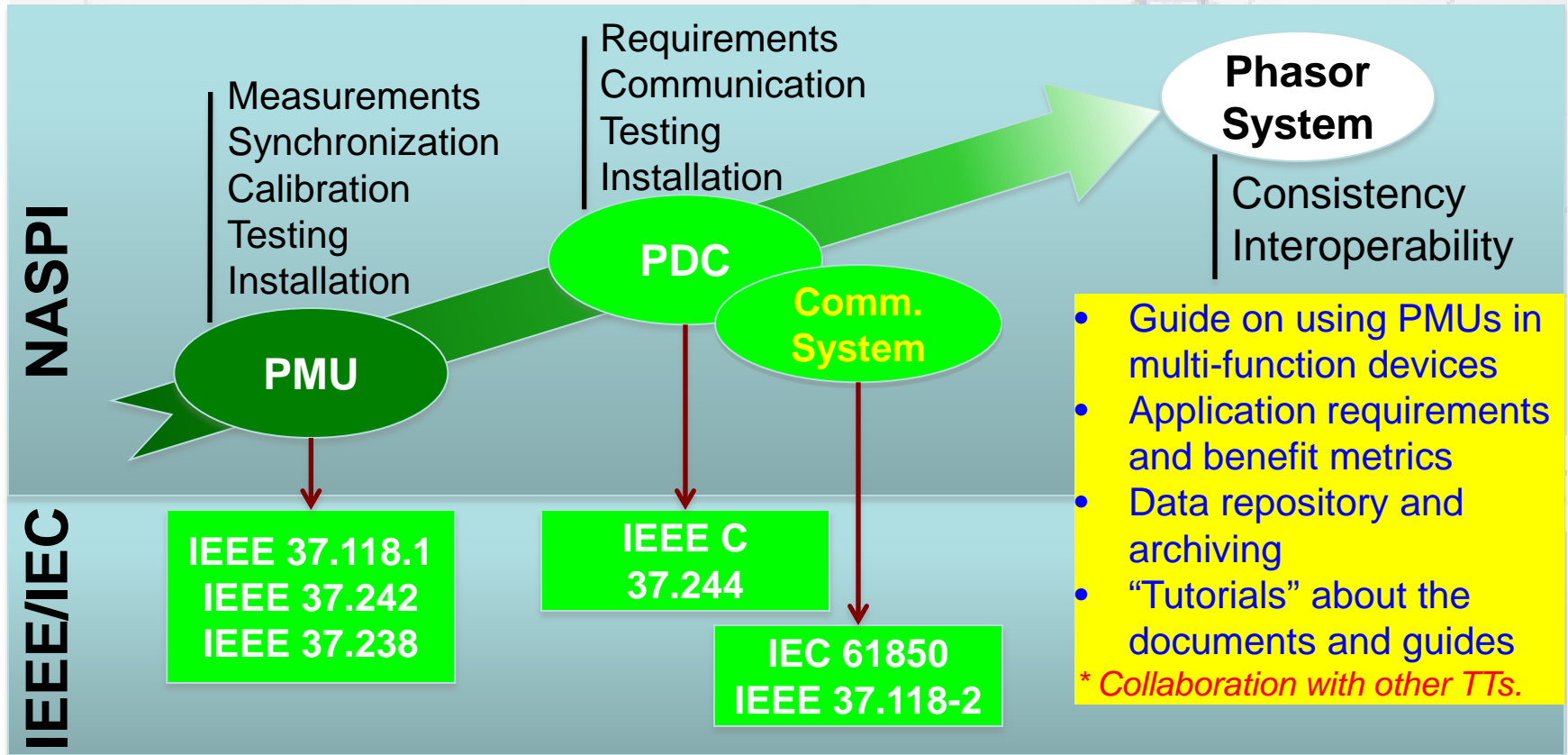
- *Format & compression std
- Phase Angle Reference
- Phasing Survey
- Phase Mapping
- Archival System**

Applications

- Req't for Visualization
- Req't for State Estimation
- Advanced Applications & Deployment
- Performance Matrix
- Phasor "ROI"**
- Phasor Tools Repository**
- PSTT-IEEE Standard Development
- Phasor Tutorials**

* Coordination with DNMTT

Synchrophasor System Standards/Guides



Current PSTT Goals and Metrics

Goal	Goal	Metric	Deliverable	Priority	Lead
1	Oversee the process of moving PSTT documents to IEEE/IEC and to expedite the process.	- IEEE 37.118.1 & .2 - IEEE C37.242 - IEEE C37.244 - IEEE C37.238 - IEC 61850	Various due date for each standard	High	Group effort: Vahid Madani, Damir Novosel, Paul Myrda, Ken Martin, Mladen Kezunovic, Galina Antonova, Farnoosh Rahmatian
2	Phasor Requirements and Benefit Metrics for Tools and Applications	Develop a draft guide	December '12	High	Dave Bertagnolli & Tony Weekes
3	Guide for Phasor Data Repository and Archiving	Develop a draft guide for review at PSTT	February '13	High	Vahid Madani & Henry Huang
4	Guide on Using PMU in Multi-Function Devices	Develop a draft guide	December '12	High	Yi Hu
5	Tutorials on Phasor Technology and Applications	Develop a draft tutorial	December '12	High	Harold Kirkham
6	Sharing Specification and Functional Requirements	Review and Approve documents submitted by NASPI members	on-going	Medium	Vahid Madani
7	Support SGIP/NIST/DOE activities on interoperability standards: Ex: Time synchronization issues	Participation at NIST/Enernex review meetings	on-going	Medium	Ron Farquharson
8	Support other TTs as needed	Joint meetings	on-going	Medium	Vahid Madani, Damir Novosel

- IEEE C37.242 Guide for Synchronization, Testing, Calibration and Installation of PMUs:
Balloted in March 2012 – **Started 5/2010**
 - Combination of 3 PSTT Guides; Testing and calibration at NIST lab
 - **Completed IEEE balloting.**
 - **Now addressing comments. Anticipate publication in Jan 2013**
- IEEE C37.244 Guide for PDC Requirements:
Balloting Initiated 4/12 – **Started 5/2011**
 - PDC functional requirements, communication, and testing
 - Supports both IEEE C37.118.2 and IEC 61850-90-5
 - **Completed IEEE balloting.**
 - **Now addressing 201 comments. Anticipate new version for circulation in November 2012**

More PSTT Standardization Efforts

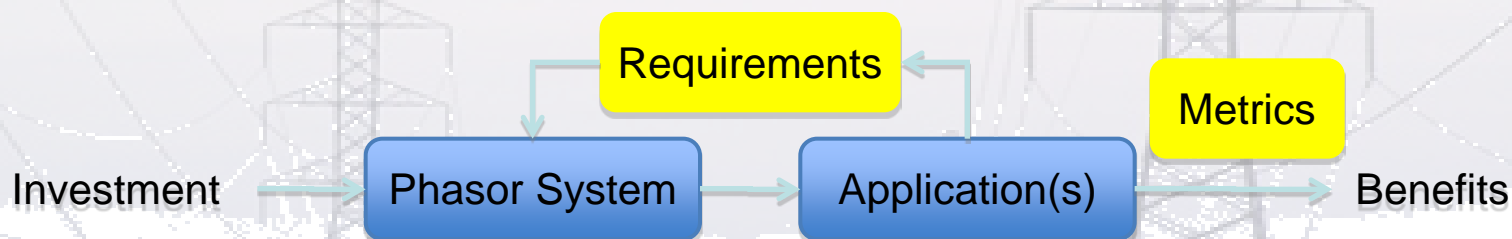
- PAP13 – closed
 - Published IEC 61850-90-5, phasor communication
 - Published IEEE C37.238, precision time protocol
- Continuing tasks:
 - IEEE WG H21 on IEC 61850 and IEEE C37.118 mapping
 - Cyber deficiency in IEEE C37.238.
- Developed and presented an IEC 61850 tutorial on October 16.
- Participate in ICAP* Synchrophasor Conformity Steering Committee for PMU certification.
- Formed a task force on PMU certification process.

PSTT Four New Initiatives

- Guides on:
 - Application requirements and benefit metrics (Phasor “ROI”)
 - Data archival systems
 - Using PMUs in multi-function devices
- Synhrophasor System Tutorials

Guide on phasor application requirements and benefit metrics (*Phasor “ROI”*)

- **Scope:** Develop a guide for developing phasor system specifications and evaluating benefits of intended phasor applications. (Defining phasor “ROI”)



- **Background:** Post-SGIG needs investment from utility companies to sustain phasor development. This guide will help them to determine their phasor “ROI” in decision making.
- **Status:** Defined requirements and metrics. In the process of writing the guide.
- **Goal:** Preliminary draft ready for review **December 2012**.

Guide on phasor data archival systems

- **Scope:** Develop a guide that addresses the following topics:
 - Archiving system hardware requirements
 - Data types and categorization
 - Data Management and Administration
 - Data query and reconstruction
 - Data compression
 - Testing, training, and information dissemination
 - Cost vs. performance
- **Background:** Multiple formats for phasor data archiving exist, limiting data sharing, storage capabilities, portability, and interoperability.
- **Status:** Outline developed. In the process of writing the guide.
- **Goal:** Draft guide ready for review **February 2013**.

Guide on using PMUs in multi-function devices

- **Scope:** Develop a guide on the use of phasor functions in multi-function devices.
- **Background:** More and more multi-function devices (relays, DFRs, ...) provide phasor functions. Concerns exist about availability, interference, resource competition, and cyber security.
- **Status:** Outline developed and discussed. In the process of writing the guide.
- **Goal:** Draft guide ready for review **December 2012.**

Phasor “Tutorials”

- **Scope:** Develop a series of tutorials based on PSTT-developed documents and IEEE/IEC standards as well as today’s practices.
- **Background:** Documents and standards exist on individual topics. Users want a systematic view of phasor technology.
- **Status:** Tutorial outline developed and reviewed. Contributors and speakers identified. In the process of developing the tutorial.
- **Goal:** Tutorial ready for dissemination **June 2013**. Consider venues such as NASPI meeting, IEEE conferences, webcast, Youtube, etc.



Proof of Concept (POC) Facilities

- Risk management: Identifies and remedies product and system integration issues
- A conduit to the industry standards
- Tests have resulted in:
 - Identification of gaps and solutions related to standards
 - Remedied product and system integration issues with potential for serious delays during field installation and commissioning
- Fine tuning applications for functionality and performance
- Transition from development to operation for training future users



POC along with other established test facilities have provided the platform for gathering the knowledge to provide the industry with direction and a fast track process for maturing the standards such as the IEEE C37.118.2, C37.238, C37.242, C37.244, and IEC-61850-90-5

- IEC 61850-90-5
 - Addresses new communication requirements to take advantage of IEC 61850 environment
 - Joint efforts by IEC, IEEE, DOE, NIST, NASPI PSTT, users & vendors
 - Interoperability tests at proof-of-concept facilities have been essential
- IEEE C37.118.1 (from IEEE C37.118)
 - Measurement of and requirements for synchrophasors, frequency, & rate of change of frequency
 - IEC 60255-118-1 under TC 95: IEC synchrophasor measurement standard based on IEEE C37.118.1
- IEEE C37.118.2 (from IEEE C37.118)
 - Communication of phasor measurements, not defining an actual protocol
- IEEE C37.238
 - The standard profile for use of Precision Time Protocol (IEEE 1588 Ver. 2) for transferring precise time over Ethernet for applications

IEEE P1815.1 Standard to be released in 2012

- Mapping Between IEEE 1815 and IEC 61850
 - DNP3 standard developed and maintained by DNP industry forum
 - IEC 61850 standards are development and maintained by IEC TC57 WG 10
 - SGIP PAP12 coordinated initial efforts : Developed use cases and an outline of the standardized mapping
 - NIST direct support resulted in an initial full draft produced within 4 months
 - It enabled IEEE to setup a new working group in substation committee to fast track finalizing it – Started 1/2011