

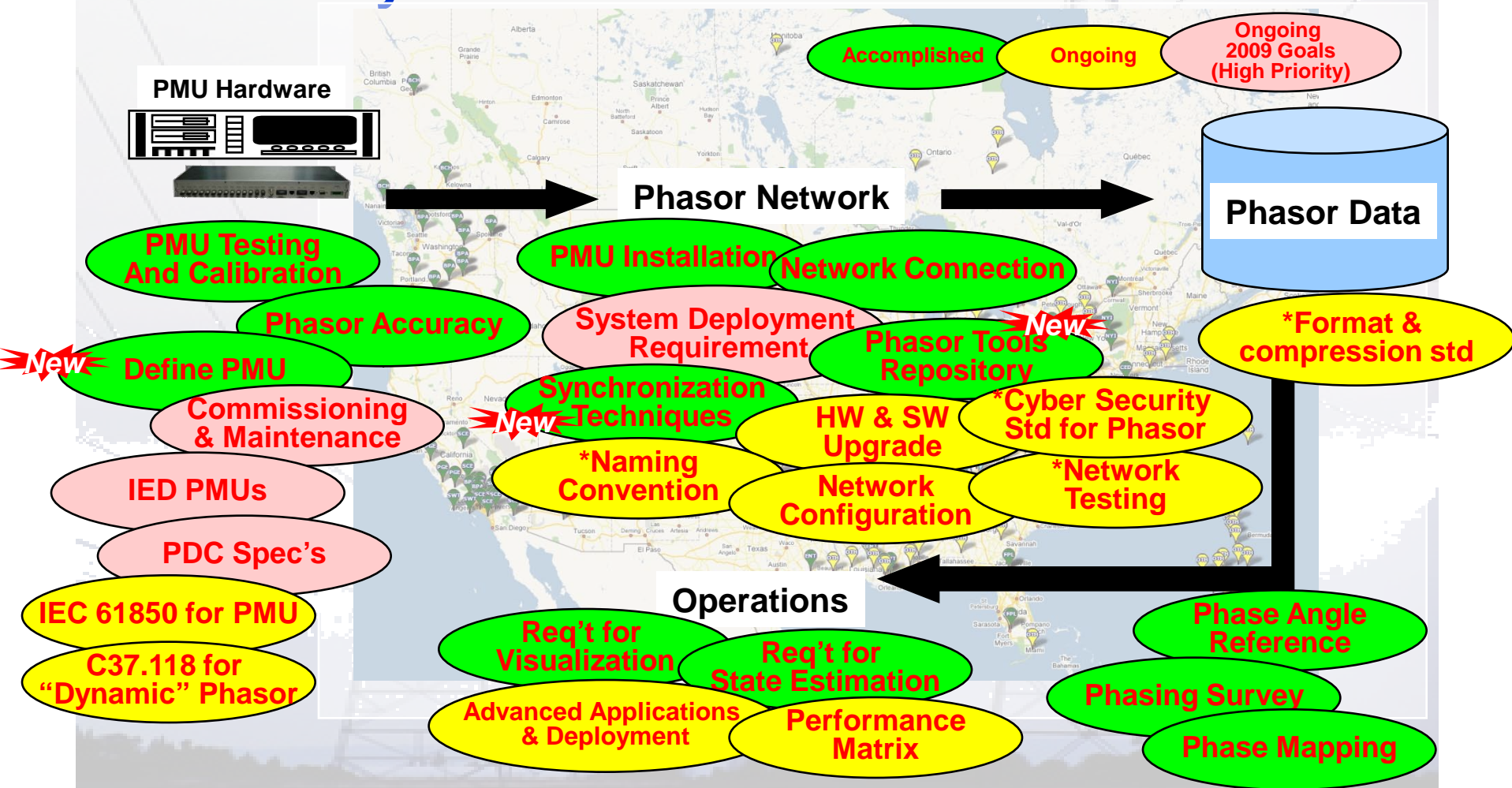
Performance and Standards Task Team

- **Task Team Leader:** Vahid Madani/PG&E
- **Task Team Co-Leader:** Damir Novosel/Quanta Technology
- **Task Team Support:** Henry Huang/PNNL
- This task team comprises more than 100 members

Highlights

- The scope of the Performance and Standards Task Team includes coordinating and acting as liaison to standards efforts and determining consistent and satisfactory performance of synchronized measurement devices and systems by creating guidelines and reports in accordance with best practices.
- PSTT has been active in developing guidelines and requirements documents to serve NASPI needs. The scope of the documents covers a wide spectrum from PMU testing to phasor network deployment to phasor applications.

Summary of PSTT Activities and 2009 Goals



* Coordination with DNMTT

Coordination with IEEE, IEC, and NIST on standard PMU developments

Further formalize the process by expanding existing PSTT documents to become IEEE standards:

- PMU System Testing and Calibration Guide
- Guidelines for synchronization techniques - Accuracy and Availability
- PMU Installation/Commissioning/Maintenance Guide
- SynchroPhasor Accuracy Characterization
- Standard PMU Definition / Basic Specification

Requirements Not Recognized in C37.118

- **Configurability**
 - Selection of inputs, calculations and applications . . .
- **Overall performance parameters**
 - Filters, latency, application priorities . . .
- **Data handling**
 - Handling of data with different attributes, time delays . . .
 - Access to and management of locally stored data
- **Interoperability for Smart Grid infrastructure**
 - PMU integration in a networked environment
 - Use of synchrophasors in substation applications

Interoperability and Application Performance

- How one can verify that using PMUs from different vendors or mixing PMUs and PMU-enabled IEDs produces consistent accuracy in a system solution
- How one can verify that various PMUs and PMU-enabled IEDs can work consistently with different Phasor Data Concentrators (PDCs) and related visualization tools
- How one can verify that selected PMUs and/or PMU-enabled IEDs will work with various time synchronization options (GPS or IEEE 1588) and substation integration solutions (IEC 61850)

Sharing Performance Specification

<u>Element</u>	<u>Required</u>	<u>Preferred</u>
Basic		
A/D Sampling Resolution	16 bit	
UTC Synchronization	100E-6 sec	
Sampling Rate	60 Hz	
Nyquist Frequency = ½ of Sampling Rate	30 Hz	
Total Vector Error	+/- 1° at +/-5Hz	
Filtering		
Frequency Response to -0.5 dB (94.5%)	5 Hz	
Frequency Response to -3.0 dB (70.7%)	10 Hz	
Gain at Nyquist Frequency	-40dB (1%)	-60dB (0.1%)
Max. Gain above Nyquist Frequency	-40dB (0.1%)	-60dB (0.1%)
Max. Gain at harmonics of n(60 +/-1)Hz	-60dB (0.1%)	
Max. Phase delay at 0.25 Hz	3°	
Max. Phase delay at 2.0 Hz	15°	

Element	Required	Preferred
Step Response		
Response time from 0 to 95% not to exceed	50 ms	
Response time from 10 to 90% not to exceed	32 ms	
Response overshoot not to exceed	7.5%	5%
Input Capabilities		
3-phase AC voltages (115Volt)	2	
3-phase AC currents (5 Amp)	6	
+/- 20 Volt floating DC voltage		4
4-20mA DC control current		4
Digital status	8	8
Output Capabilities		
Fiber-Optic	X	
Interoperability		
C37.118 standard support	X	
IEC 61850	X	

Continuous Priorities

- IEC 61850 and IEEE C 37.118 Coordination and Harmonization
- Phasor Data Concentrator Requirements.
- Requirements for Combined Applications using Synchronized Measurement Data.
- Coordination with DMTT on NASPInet interface (API) between Data Bus and Phasor Gateways, and between Phasor Gateways and PMUs/PDCs/applications

Summary Plans

- Clarify role of PSTT in relationship to focused NIST activities on interoperability standards.
- Further formalize the process by expanding existing PSTT documents to become IEEE standards
- PSTT would prepare white papers to:
 - Identify critical issues and gaps
 - Define “certification of PMU”
- Sharing Specification and Functional Requirements
- Coordinate with Industry and if needed, work on a guide on use PMU as part of the multi-function devices.

Questions?

