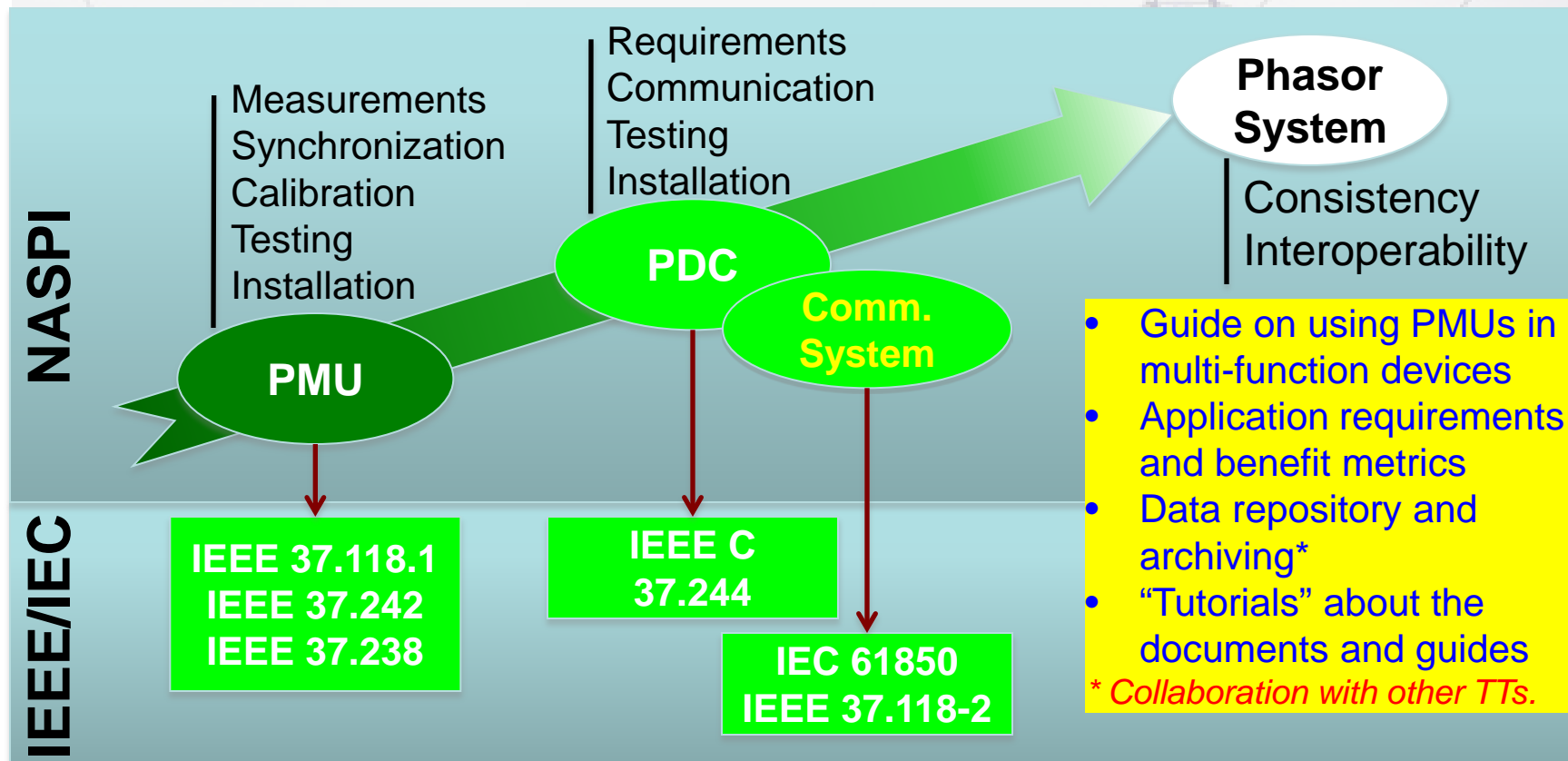# Performance and Standards Task Team

- **Task Team Leader:** Vahid Madani/PG&E

- **Task Team Co-Leader:** Damir Novosel/QT

- **Task Team Technical Support:** Henry Huang/PNNL

- **Task Team Administrative Support**: Teresa Carlon/PNNL

- This task team comprises ~ 200 members (>70 Active)

Synchrophasor System Standards/Guides

Phasor System
- Consistency
- Interoperability

NASPI

Measurements
Synchronization
Calibration
Testing
Installation

Requirements
Communication
Testing
Installation

PDC

Comm. System

PMU

IEEE/IEC

IEEE 37.118.1
IEEE 37.242
IEEE 37.238

IEEE C 37.244

IEC 61850
IEEE 37.118-2

- Guide on using PMUs in multi-function devices
- Application requirements and benefit metrics
- Data repository and archiving*
- "Tutorials" about the documents and guides

Collaboration with other TTs.

- ## 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 C37.242 Guide for Synchronization, Testing, Calibration and Installation of PMUs:
  Balloted in March 2012 – *Started 5/2010*
  - Combination of three NASPI Performance and Standards Task Team Guides
  - Testing and calibration at the NIST Laboratory
  - Anticipate publication in July 2012

- IEEE C37.244 Guide for PDC Requirements:
  Balloting Initiated 4/12 – *Started 5/2011*
  - PDC functional requirements
  - Communication Needs & Requirements
  - Test techniques to verify core Functional Requirements
  - Supports both IEEE C37.118.2 and IEC 61850-90-5
  - Anticipate publication in September 2012

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

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

Unicast and Multicast between PMUs and Test PC

IEC 61850-90-5 Destination Data Set To Port 102

5PMU1 – transmits using C37.118 through a substation PDC to a SuperPDC

5PMU6 – transmits using 61850-90-5 directly to the SPDC
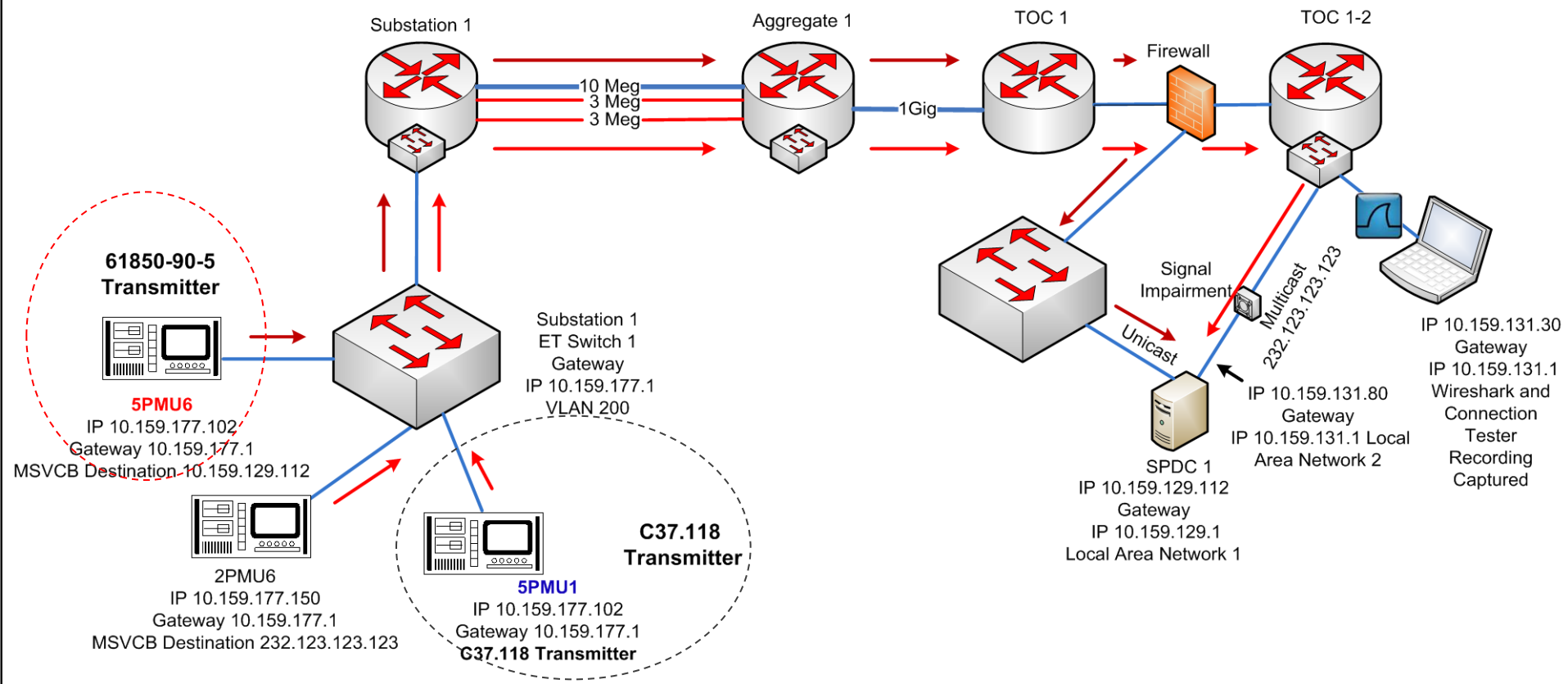
Guide on phasor application requirements and benefit metrics

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

Investment → Phasor System → Application(s) → Benefits

Requirements

Metrics
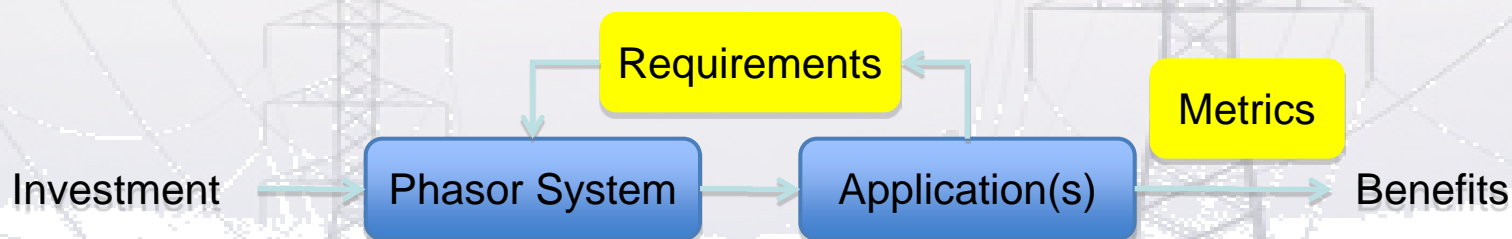
- **Background**: Post-SGIG needs investment from utility companies to sustain phasor development. This guide will help them to determine their phasor "ROI" in decision making.
- **Goal**: Preliminary draft ready for review December 2012.
- **Status**: Review phasor applications categories and requirements. In the process of defining phasor benefits.

Guide on phasor data repository and archiving

- **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.
- **Goal**: Draft guide ready for review December 2012.
- **Status**: Identified phasor archiving topics. In the process of developing an outline.

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.

- **Goal**: Draft guide ready for review December 2012.

- **Status**: An outline has been developed and discussed.

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.

- **Goal**: 1-2 tutorials ready for dissemination December 2012.

- **Status**: An tutorial outline has been developed and discussed. Solicit contributors and speakers.