

Standards Associated with Synchrophasors

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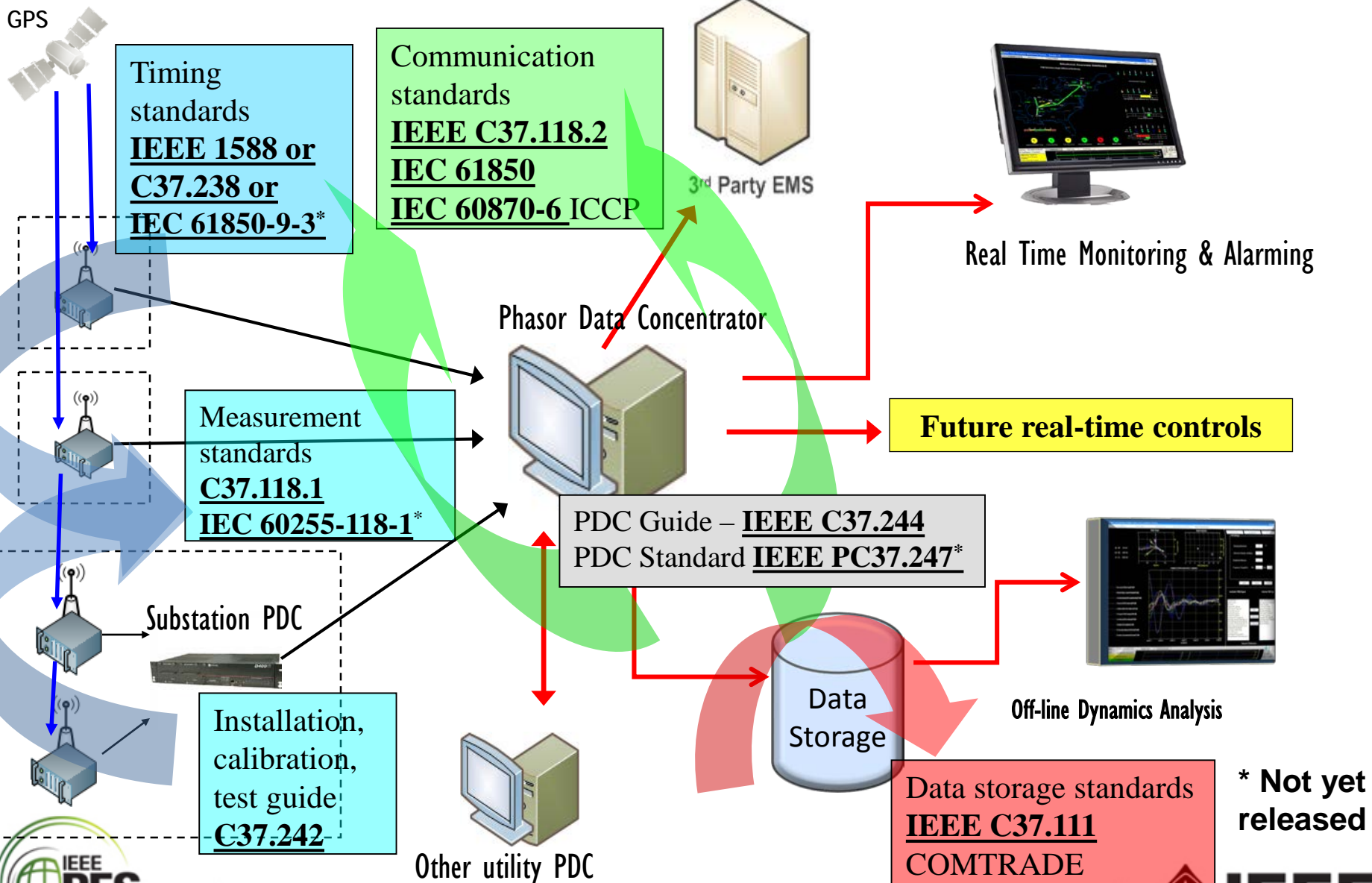
Coordination of Synchrophasor Related
Activities

Acknowledgements

I want to thank the many participants in both NASPI and IEEE. They are the ultimate source of this information. I am just but their voice.

Many of these documents originated in the NASPI organization.

Phasor Measurement Systems



Standards and Guides – Released

- IEC 61850-90-5
 - Addresses new communication requirements to take advantage of IEC 61850 environment (includes cyber security features)
 - Joint efforts by IEC, IEEE, DOE, NIST, NASPI PSTT, users and vendors
 - Incorporated into IEC 61850 Standard
- IEEE C37.118.1-2011* (from IEEE C37.118)
 - Measurement of and requirements for synchrophasors, frequency, & rate of change of frequency (ROCOF)
 - C37.118.1a-2014 includes changes to ROCOF requirements
 - Certification possible via ICAP
 - <http://standards.ieee.org/findstds/standard/C37.118.1-2011.html>
 - <http://standards.ieee.org/findstds/standard/C37.118.1a-2014.html>
- IEEE C37.118.2-2011* (from IEEE C37.118)
 - Communication of phasor measurements, message format
 - <http://standards.ieee.org/findstds/standard/C37.118.2-2011.html>

* Indicates an approved document that is under revision

Standards and Guides – Released

- IEEE C37.238-2011*
 - The standard profile for use of Precision Time Protocol (IEEE 1588 Ver. 2) for transferring precise time over Ethernet for power system applications
 - <http://standards.ieee.org/findstds/standard/C37.238-2011.html>
- IEEE C37.111-2013 COMTRADE (IEC 60255-24, Edition 2)
 - <http://standards.ieee.org/findstds/standard/C37.111-2013.html>
- IEEE C37.242* Guide for Synchronization, Testing, Calibration and Installation of PMUs:
 - Combination of three NASPI PSTT Guides
 - Testing and calibration at the NIST Laboratory
 - <http://standards.ieee.org/findstds/standard/C37.242-2013.html>

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Standards and Guides – Released

- IEEE C37.244 Guide for PDC Requirements:
 - PDC functional requirements
 - Communication Needs & Requirements
 - Test techniques to verify core Functional Requirements
 - Supports both IEEE C37.118.2 and IEC 61850-90-5
 - <http://standards.ieee.org/findstds/standard/C37.244-2013.html>

Standards and Guides in Process

- IEEE PSRC Work Group H11 with IEC - IEC 60255-118-1 under TC 95: IEC synchrophasor measurement standard
 - Based on IEEE C37.118.1
 - Includes use of data from digital instrument transformers (merging units)
 - Joint IEC (TC 95) / IEEE (PES-PSRC) effort
- IEEE PSRC Work Group H24 - Revisions to IEEE C37.238-2011
 - The standard profile for use of Precision Time Protocol (IEEE 1588 Ver. 2) for transferring precise time over Ethernet for power system applications

Standards and Guides in Process - Continued

- IEEE PSRC Work Group H21, “Mapping between IEEE C37.118.2 and IEC 61850 synchrophasor systems” – on going
 - Will describe use cases, conceptual architecture, and the general mapping considerations
 - Will define the standard mapping of individual data objects, related configurations and naming conventions, and data and message conversion methods
- IEEE PSRC Work Group C19 - PC 37.247, “Standard for phasor data concentrators for power systems”
 - Started in 2013
 - Refining C37.244 (PDC Guide) to develop a PDC standard
- IEEE PSRC Work Group C28 - Revision to IEEE Std. C37.242
 - A PSRC Task Force approved to create a WG to revise C37.242 (Guide for testing and installation of PMUs)

Standards and Guides in Process - Continued

- Substation Work Group C20 Use of Databases in Substation Automation Systems - Home of Synchrophasor historian work.
- IEC 61869 Series of standards includes stand alone Merging Unit and Electronic Transformers which may provide Sampled Value input to PMU algorithm

Other Relevant Standards / Guides

Approved

- IEEE C37.232-2011, IEEE Standard for Common Format for Naming Time Sequence Data File (COMNAME)
 - <http://standards.ieee.org/findstds/standard/C37.232-2011.html>
- IEEE C37.239-2010, IEEE Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems
 - <http://standards.ieee.org/findstds/standard/C37.239-2010.html>
- IEEE C37.240-2014, Standard for Cyber Security Requirements for Substation Automation, Protection and Control Systems
 - <http://standards.ieee.org/findstds/standard/C37.240-2014.html>
- NERC CIP 2-11, Version #5

Other Standards

- IEEE C37.118-2005 IEEE Standard for Synchrophasors for Power Systems
 - Superseded by IEEE C37.118.1, IEEE C37.118.1a
 - Superseded by C37.118.2
 - <http://standards.ieee.org/findstds/standard/C37.118-2005.html>
 - Recommendation is to not use. Still available to provide reference.