IEEE STANDARDS ASSOCIATION

IEEE

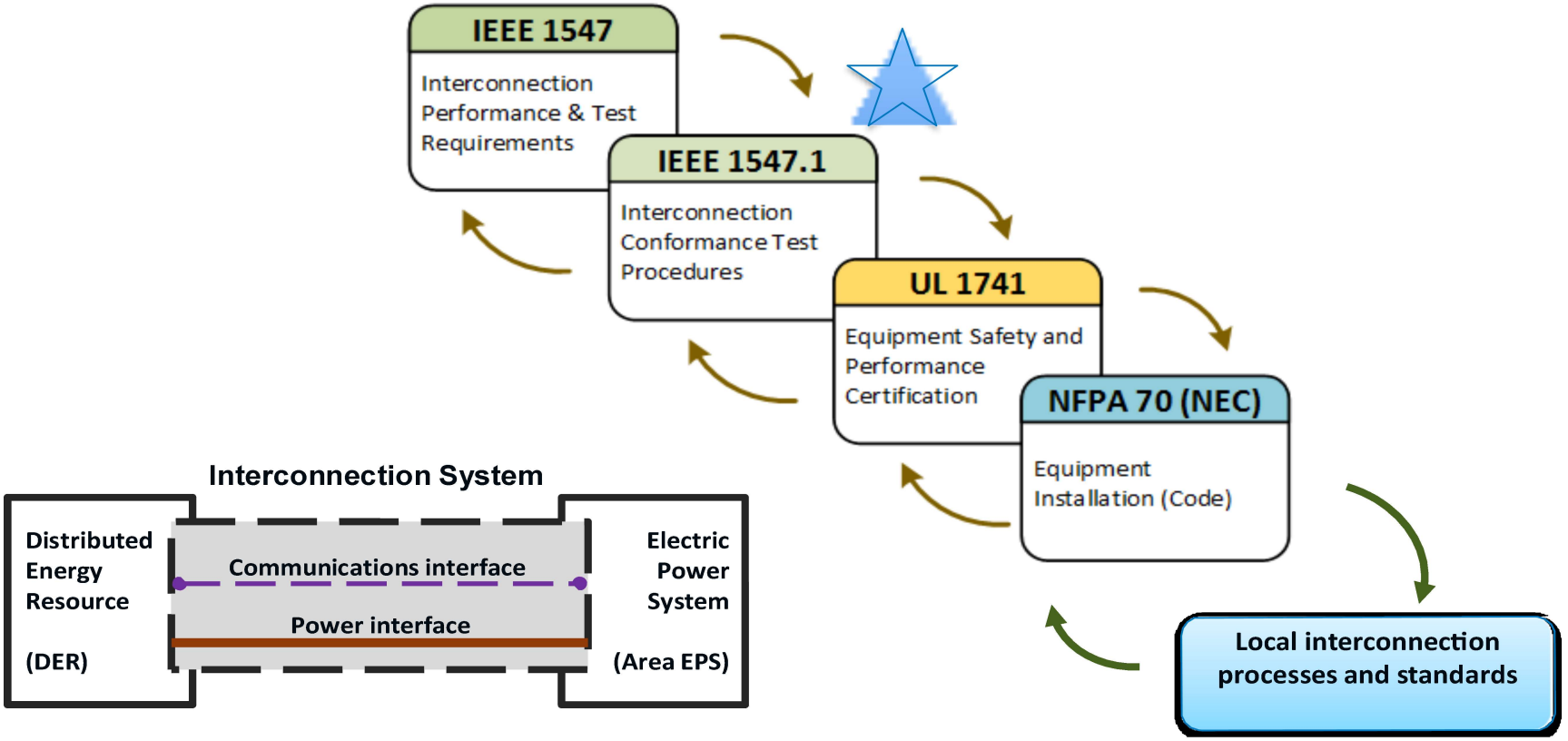
IEEE Conformity Assessment Program (ICAP)

2019

ICAP Completes the IEEE-SA Business/Standards Lifecycle

ICAP is a Program of IEEE-SA

Intent and Use of 1547.1 and Related Standards



Compliments of Andy Hoke, NREL

Energy Policy Act

- 109-58-Aug 8, 2005 – Sec 1254

SEC. 1254. INTERCONNECTION.

(a) ADOPTION OF STANDARDS.—Section 111(d) of the Public Utility Regulatory Policies Act of 1978 (16 U.S.C. 2621(d)) is amended by adding at the end the following:

"(15) INTERCONNECTION.—Each electric utility shall make available, upon request, interconnection service to any electric consumer that the electric utility serves. For purposes of this paragraph, the term 'interconnection service' means service to an electric consumer under which an on-site generating facility on the consumer's premises shall be connected to the local distribution facilities. Interconnection services shall be offered based upon the standards developed by the Institute of Electrical and Electronics Engineers: IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems, as they may be amended from time to time. In addition, agreements and procedures shall be established whereby the services are offered shall promote current best practices of interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by

Understanding Conformity Assessment

- What is Conformity Assessment?
  - Conformity Assessment is the process or processes that are used to demonstrate that a product or service meets specified requirements (set forth in Standards, Test Plans, etc.)
- Conformity Assessment Benefits
  - Provides manufacturers a proven method of demonstrating compliance to the requirements
  - Empowers the end-user to make better purchasing decisions
  - Benefits the supplier as products can quickly gain market acceptance
  - Increases the likelihood of a stable technology in the market with robust products
- Conformity Assessment Activities Include:
  - Conformance, Commissioning, Interoperability, Inspection, Accreditation
  - Test Suite Specification development
  - "Catch-all" term to address range of test-related activities

Why Certification is important?

- Testing and Certification helps differentiate between compliant and non-compliant Products
- Through ARRA US$357 million was invested to deploy synchrophasor technology
- NIST.IR.8106 indicated 8 out of 10 PMUs tested were not compliant to IEEE Synchrophasor Measurement TSS (based on IEEE C37.118).
  - Test Program allowed for vendors to improve products and resubmit for testing – results are reflective of improvements
- ICAP uses a steering committee format to holistically develop conformity assessment programs around specific standards
- ***TRUST BUT VERIFY***

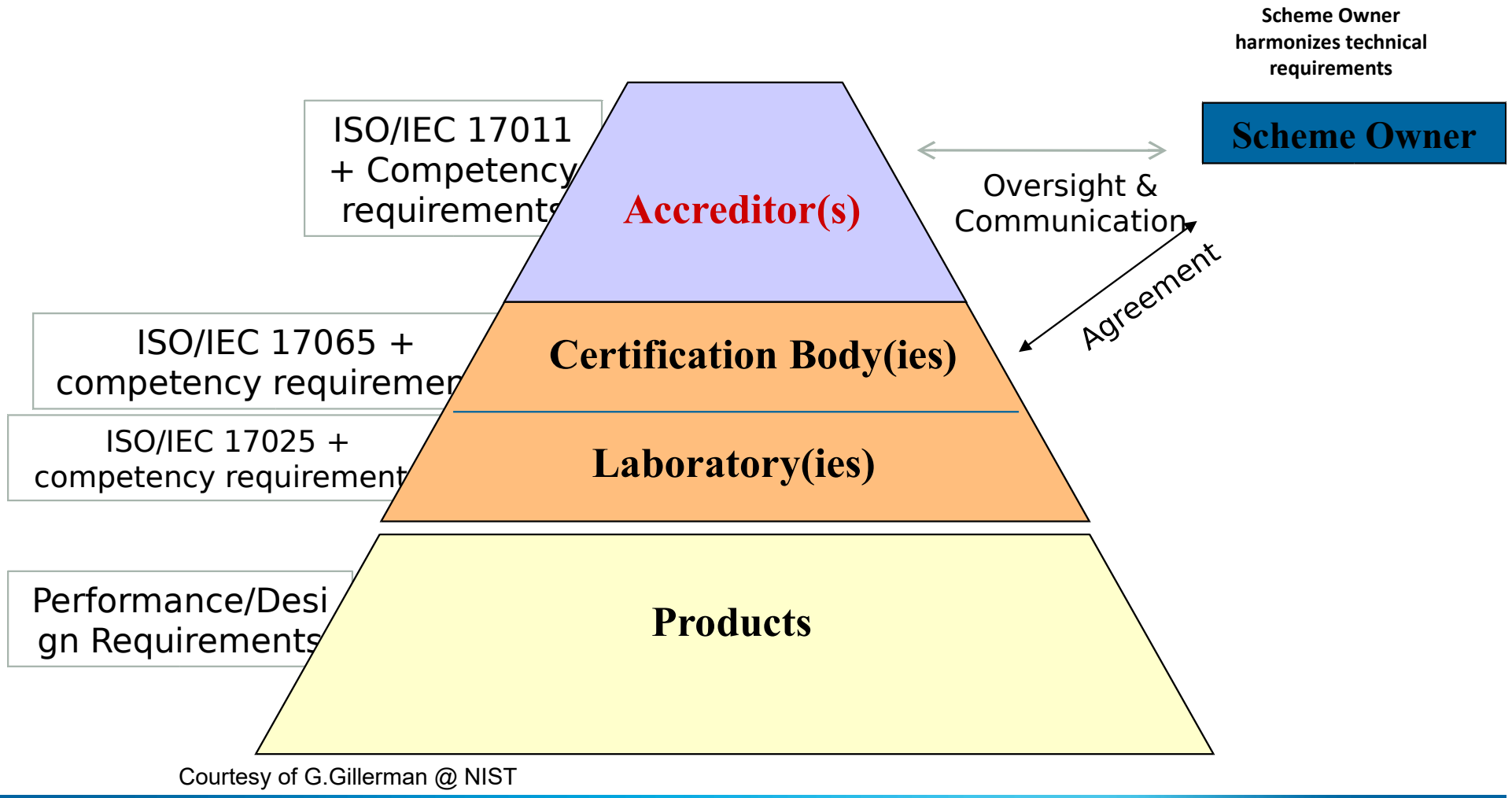
Types of Conformity Assessment

- 1st Party / Suppliers Declaration of Conformity (SDOC)
  - Self Declaration ; Companies conduct their own testing
- 2nd Party Conformity Assessment
  - Conformity assessment conducted by the end purchaser of products (e.g., Service Providers) to ensure purchased products are deemed compliant or interoperable
- 3rd Party Conformity Assessment
  - Conformity assessment being determined by an independent body.

Related International Standards

- Accreditation Bodies – ISO/IEC 17011
- Certification Bodies - ISO/IEC 17065
- Test Labs – ISO/IEC 17025

Conformity Assessment Certification Scheme – Single Scheme



Courtesy of G.Gillerman @ NIST

Values of ICAP Certification

Convenience

- Intrinsic connection with IEEE-SA working groups and supporting staff
- Enable certification programs based on converging technologies that covers multiple technologies IEEE-SA works on

Credibility

- Only ICAP certifications come with the IEEE Certification mark
- IEEE maintained Certified Product Registry
- IEEE maintained Authorized Laboratories Registry

Full-Spectrum Service

- Turnkey Certification Management program, including Conformance, Interoperability, Inspection, Accreditation
- ICAP strategically aligns with global expert test labs to provide the best level of testing and field evaluation support
- Legal and operational umbrella for testing & conformity assessment programs
- Test Suite & Specification Development
- Self-Validation Suite Development
- Inspection and Verification
- Management of expert committees

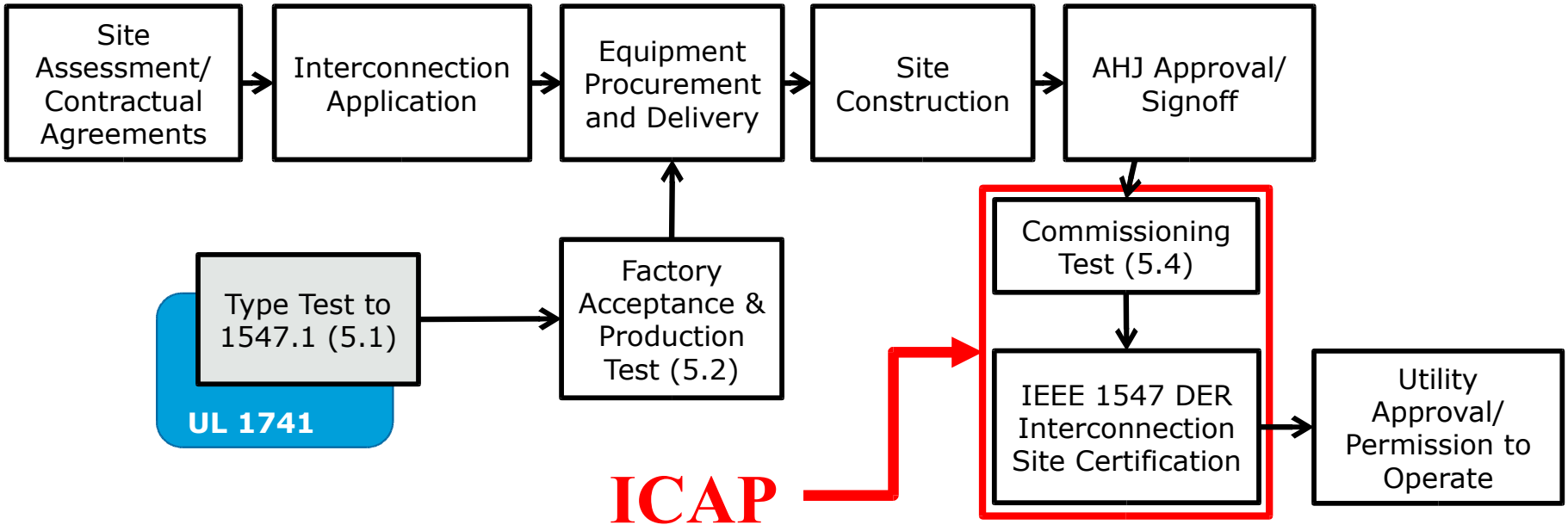
What is IEEE 1547/1547.1 CA Program all about?

PROGRAM OBJECTIVE: Develop a Site Certification [process] with respect to DER Interconnection that Emphasizes All Essential Aspects of IEEE 1547/1547.1 over the life of the Interconnection.

- Area Electric Power System (EPS) Requirements
- Operational Modes
- Interoperability
- Verifications/Inspections
- Unintentional Islands
- Cease-to-energize
- Initial Readings/Settings/Documentation
- Commissioning Report

IEEE 1547 Compliance Roadmap

Typical DER Project Progression



IEEE 1547 Commissioning Pilot Demonstrations

IEEE 1547 Commissioning Pilot Demonstrations aim to assess the effectives and identify gaps of the IEEE 1547 Commissioning Conformity Assessment Program's process and approved templates while providing participants the opportunity to showcase their organizations efforts in the DER market as well as the specific sites conformance to the standard and their local interconnection agreement.

NC State FREEDM Center

Duke Energy eGrid

Completed Pilot Demonstrations

- ICAP has completed two IEEE 1547 Commissioning Pilots that showcase the CA program's Commissioning Template and Checklist's in-depth review of the DER Interconnection's ability to meet the requirements of IEEE 1547.
- A diverse group of industry stakeholders have participated in the Pilot Demonstrations.
- Pilots included the creation of site-specific test plans developed from the IEEE Commissioning Template and Final Reports detailing the results and observations of the DER Interconnection.
- Pilot events and collaborators have been highlighted in ICAP publications and outreach efforts to DER Community and state and federal regulating bodies.
- Additional Pilot demonstrations are being discussed with utilities and DER developers globally.
  - **To perform an IEEE pilot commissioning in your jurisdiction, email: icap-team@ieee.org**

IEEE – Conformity Assessment Program (ICAP)

Program Portfolio:

- Phasor Measurement Unit (PMU) – IEC/IEEE 60255-118-1
- PTP Power Profile – IEEE 1588 & C37.238
- COMTRADE - IEEE C37.111/ IEC 60255-24 Ed 2.0
- Distributed Energy Interconnects – IEEE 1547/1547.1
- IEEE Nuclear Equipment Standards – IEC/IEEE 60780 – 323
- EV Charging – IEEE 2030.1.1
- Smart Energy Profile – IEEE 2030.5
- Sensors & IoT – IEEE P2510
- Blockchain – IEEE P2418
- Camera Phone Image Quality – IEEE 1858

Synchrophasor Certification Program: An Example

ICAP Phasor Measurement Unit (PMU) Conformity Assessment Program

- Purpose of the program is to enable PMU Manufacturers to demonstrate conformance to IEEE C37.118.1a – 2014
- The Steering Committee (SC), which consists of volunteer Subject Matter Experts in the power and energy field, has worked since 2012 to develop and approve the main requirements of the program.
- In addition to the program details the SC has also created the *IEEE Synchrophasor Measurement Test Suite Specification* (TSS) available for purchase through IEEE
- Consumers Energy (Jackson, MI) was the first ICAP Accredited Lab and offers complete testing capabilities to the TSS
  - First certified PMU in early 2016
  - More Info on Consumers Energy at www.laboratoryservices.com

IEEE Phasor Measurement Unit (PMU) Certification Program

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0 Purchase TSS

PMU Manufacturer

5 Market your IEEE Certified PMU

IEEE Certified C37.118.1a-2014 Synchrophasors

1 Initiate a quote

*Testing typically takes between 2 and 3 weeks

Accredited Lab

3 Completed Lab Report is sent to IEEE for Technical Review

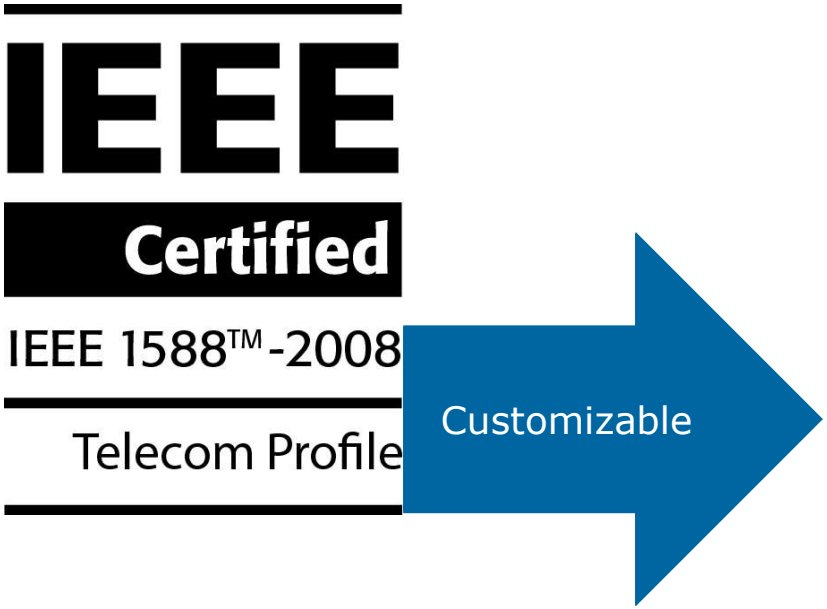
IEEE

2 Fill out Participant Agreement

4 Receive Certificate and product listing on IEEE Registry

Certification Mark Defined

- A certification mark is any **word, phrase, symbol or design**, or a combination thereof owned by one party who **certifies the goods and services of others when they meet certain standards.** The **owner of the mark exercises control** over the use of the mark; however, because the sole purpose of a certification mark is to indicate that certain standards have been met, **use of the mark is by others.**



Thank you

IEEE Conformity Assessment Program

http://standards.ieee.org/icap

Ravi Subramaniam
r.subramaniam@ieee.org

What does IEEE PMU Certification provide?

- Provides assurance to end-users that certified PMU's conform to the requirements of IEEE C37.118.1a – 2014.
- Helps differentiate between compliant and non-compliant PMUs.
- Addition to the IEEE Registry for certified products, allowing purchasers an easy and quick resource to find compliant devices.
- Insight to improvements to C37.118 standard in the future with real-world test results to confirm.
- Ability to operate applications that utilize PMU data as inputs more confidently.