Smart Grid International Research Facility Network

ISGAN – Annex 5

> **ISGAN (International Smart Grid Action Network) is an initiative of the Clean Energy Ministerial and is an IEA Technology Collaboration Program.**
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> **The vision of ISGAN is to accelerate progress on key aspects of smart grid policy, technology, and related standards through voluntary participation by governments.**

SIRFN Description

The Smart Grids International Research Facility Network (SIRFN) is a network of smart grid testing facilities in countries participating in the ISGAN.

SIRFN coordinates joint testing-related activities relevant to "smart" electricity grids. SIRFN's collaborative testing and evaluation capabilities are meant to be leveraged by the international community to enable improved design, implementation, and testing of smart grids and their functionality, including the reliable integration of clean energy technologies.

SIRFN's Focus Areas bring together technical experts to consider the current state, identify issues for test facilities to collaborate on resolving, identify potential SIRFN users, and recommend and implement SIRFN activities to overcome obstacles.

SIRFN – Technical Task 2:
Development of Interoperable DER Certification Protocols

The rapid increase of decentralized, renewable energy (RE) sources in the electric power grid is offsetting the traditional, centralized electricity generation. These distributed energy resources (DERs) are mostly inverter-based and they impact power system operations and dynamics. Grid codes or interconnection standards around the world are being updated to include grid-support functions and interoperability requirements for DER devices. However, DER vendors, grid operators, certification laboratories, and academic smart grid test laboratories need the ability to verify these new functionalities to ensure effective communication and power characteristics. Validating device behaviors for a range of conditions and corner cases, accelerates the deployment of these novel RE technologies.

This SIRFN task continuously assesses the versatility and effectiveness of upcoming international grid codes and associated test procedures and provide feedback to the standards for corrections and enhancements of the test procedures. This group collaborates in the development of a versatile, open-source DER certification platform and associated test scripts for multiple certification standards. This allows DER vendors, universities, research institutions, certification laboratories and standards organizations to apply the same codified testing methods at each stage of development.

Activities of the "Development of Interoperable DER Certification Protocols" Task

- Development of open-source certification test scripts for different test protocols and standards (e.g. UL 1741 SA, IEEE 1547.1, AS/NZS 4777.2, etc.)

- Establishment of automated testing procedures using the open-source testing platform software, called the Sunspec System Validation Platform (SVP)

- Automated certification testing of DER devices at different SIRFN laboratories.

- Sharing, comparing and analyzing the test results of multiple labs with the different setups for verifying common test protocol.

- Recommendations for procedures and parameters in the certification test protocols that will be implemented in National Grid codes or international standards.

Current Work Program

- Development of test scripts for IEEE std. 1547.1 fast (response) functions with a Power Hardware-In-the-Loop system for waveform acquisition and analysis (e.g. Voltage Ride-Through, Frequency Ride-Through, etc.).

- Creation of additional test scripts for automated testing following other international standards (i.e., AS/NZS 4777.2).

- Enhancement of the SVP automated test platform, i.e., development of a real-time plotting feature, incorporation of simulation mode for playback or result analysis, etc.

- Evaluation of DER test protocols at more than six international laboratories and technical feedback to standard review committees.
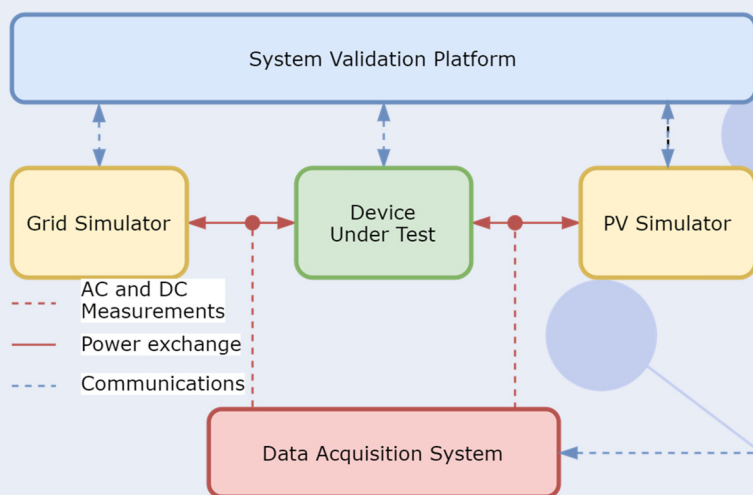
Automated testbed with open source system validation platform software (Sunspec SVP)

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