



Sandia National Laboratories



U.S. DEPARTMENT OF
ENERGY

Project Accomplishment Summary

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



PROJECT ACCOMPLISHMENTS SUMMARY

Cooperative Research and Development Agreement (#SC16/01876.01.00)
between Sandia National Laboratories and SunSpec Alliance

Note: This Project Accomplishments Summary will serve to meet the requirements for a final abstract and final report as specified in Article X of the CRADA.

Title: Creation of System Validation Platform

Final Abstract:

The objective of this CRADA between Sandia National Laboratories (SNL) and SunSpec Alliance (SunSpec) was to create a software test platform called the System Validation Platform (SVP) that performs end-to-end certification testing of photovoltaic (PV) inverters, energy storage systems, and other distributed energy resources (DERs). The SVP automates interactions of test equipment (PV and grid simulators), data acquisition systems, and interoperable DERs to certify the devices for advanced grid-support functions and interoperability. To assist electricity grid, operators maintain voltage and frequency, new interconnection requirements in the U.S. and Europe require DERs to have grid-support functions with adjustable settings.

Automating the certification process for DER devices impacts the bottom line of NRTLs because they do not need to rely on test engineers running days (or weeks) of experiments to validate the performance of the equipment. These savings can then be passed down to the DER vendors so the certification process becomes less expensive and lowers the barrier to market for PV inverters, charge controllers, and other grid-interconnected equipment. This technology can also be used as a research platform for SNL, other national labs, and universities that would like to run hardware tests with power electronics equipment.

Background:

To assist electricity grid, operators maintain voltage and frequency, new interconnection requirements in the U.S. and Europe require DERs to have grid-support functions with adjustable settings. To certify these devices, Nationally Recognized Test Laboratories (NRTLs) must run hundreds of experiments which take significant time, engineering effort, and money. This tool reduces the NRTL test time by ~10x, removes the chance of human mistakes, and decreases certification costs for DER vendors. There are currently no alternatives to the System Validation Platform on the market. The only alternative is to perform the experiments by hand.

Description:

The orchestration of the test environment in a scriptable environment provides test engineers with the ability to execute grid-support and interoperability function test sequences with a single mouse click. Arguably, without this technology, the PV inverter certification process could backlog in the next year because of the extensive testing requirements in the certification test sequence defined in Underwriters Laboratories 1741 Supplement A. At this point, a first draft of the test scripts for many of the advanced grid-support functions have been created, including volt-var, fixed power factor, and frequency-watt with equipment drives to multiple grid simulators, PV simulators, data acquisition systems, and DER devices.

Benefits to the Department of Energy:

This technology can be used by all the National Laboratories to perform R&D for solar and energy storage integration. The code is released publicly at: https://github.com/sunspec/svp_directories

Economic Impact:

This is a first-of-its-kind solution to an emerging problem in the renewable energy sector. This technology is paving the way to wide-spread adoption of new renewable energy generation and storage devices in the U.S. and world. The results will be valued by testing labs around the world to accelerate renewable energy adoption. More details are at <http://sunspec.org/sunspec-svp/>

Project Status:

This project has been completed.

ADDITIONAL INFORMATION

Laboratory/Department of Energy Facility Point of Contact for Information on Project

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Company Size and Points of Contact

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CRADA Intellectual Property

N/A

Technology Commercialization

The SunSpec System Validation Platform (SVP) is currently commercialized and being sold to laboratories.

Project Examples

N/A

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This summary has been approved for public release by Sandia and SunSpec Alliance.

Sandia National Laboratories

By

Jay Johnson

Principal Investigator

Date

12/5/2017

Sandia National Laboratories

By

Manager

WFO/CRADA Agreements

Date

11/14/17

SunSpec Alliance

By

Title:

Date

In order to expedite the process, if we do not receive your signed reply by 12/12/17
we will assume your concurrence for the release of this document to the public.