Spectrafy
solar spectral sensors

Case Study

PV Research Stations

Trusted worldwide to provide **critical** spectral, broadband and atmospheric data

MULTI-FUNCTIONAL

The SolarSIMs are uniquely capable of resolving multiple solar irradiance and atmospheric data streams within a single sensor.

ADAPTABLE

Deploy the functionalities you need, when you need them. Deploy a SolarSIM as a pyranometer today, and upgrade it later to a full-range spectral irradiance, via a simple software upgrade.

TRUSTED

Relied on to provide the highest quality of critical solar and atmospheric data at dozens of top tier research sites worldwide.

RELIABLE

Elegant, rugged hardware coupled with sophisticated software enable the most reliable solar spectral data. Calibrations traceable to the WRR and NIST.

University of New South Wales, Australia

UNSW's School of Photovoltaic and Renewable Energy Engineering (SPREE) is renowned as a world-leader in the research and commercialization of high-efficiency solar technologies. In 2015 UNSW researchers acquired a SolarSIM-D2 to enable accurate, on-sun characterisation of their multi-junction, spectrum-splitting prototypes (see photo above).

In 2018, UNSW acquired an additional solar spectral measurement system for their meteorological suite, consisting of a SolarSIM-D2 and SolarSIM-G connected to a preconfigured datalogger and mounted on a dual axis tracker. This rapidly deployable solution provides the high-quality spectral data needed by UNSW researchers to advance a range of research programs, including irradiance and PV performance modelling, PV performance and loss mechanism analysis, nowcasting, uncertainty mitigation and degradation analysis.

Canadian Solar Spectral Network (CanSIM)

In 2017, Canada's Ministry of Natural Resources (NRCan) launched the world's first, real-time, solar spectral measurement network. Powered by Spectrafy's innovative spectral sensors, the CanSIM Network is designed to enable state-of-the-art environmental and photovoltaic analysis today, while also being future proofed for the needs of tomorrow.

Designed, deployed and commissioned by Spectrafy at seven sites across Canada, each CanSIM station is equipped with a SolarSIM-D2 and a SolarSIM-G, thereby enabling the measurement of more than 20 different solar spectral, broadband and atmospheric data streams.

In collaboration with PV industry partners, government researchers are using data from the CanSIM network to understand spectral effects and reduce the uncertainties in PV performance model for Canadian climates.

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Case Study: PV Research Stations


University of Jaen's CPV test station

McMaster University, Canada

With theoretical efficiencies for single-junction PV devices limited to ~30%, McMaster University's Laboratory for Advanced PV Research is exploring routes to higher efficiencies via multijunction solar cells.

In 2018, with prototypes ready to progress out of the lab for on-sun testing, McMaster turned to Spectrafy to provide a state-of-the-art, turn-key solar spectral test site. The site possesses a comprehensive suite of SolarSIM sensors for measuring direct, global horizontal and latitude tilt solar spectral irradiance, in addition to a BSRN-grade irradiance monitoring station and a second dual-axis tracker for PV prototype testing. Designed, deployed and commissioned by Spectrafy, McMaster's new facility enables state-of-the-art on-sun characterisation for the PV technologies of tomorrow.

University of Agder, Norway

One of the focus areas for the University of Agder's Energy Materials group is performance evaluation of novel PV technologies. After first learning about Spectrafy SolarSIM sensors at PVSC-44, Spectrafy was subsequently selected, via competitive tender, to supply uAgder with a comprehensive solar spectral measurement suite capable of evaluating any class of PV technology under any atmospheric conditions.

The system consists of three SolarSIMs for measuring direct, global horizontal and tilted solar spectral and broadband irradiance. To simplify installation, uAgder selected to use Spectrafy's innovative Combox USB/power adapters, that allow the SolarSIMs to be connected directly to, and powered by, a PC or laptop.


University of Agder's PV test site

University of Jaen, Spain

Numerous studies have shown CPV to be the most spectrally sensitive of all the commercial PV technologies. As such, it is necessary to characterise the solar spectrum, not just the total irradiance, in order to accurately understand performance at all stages of the CPV value chain; from R&D through to power plant design, financing and onsite O&M.

When the University of Jaen's IDEA Solar Energy Research Group needed a way to evaluate real world CPV performance and develop models for optimizing energy yield, they turned to Spectrafy's SolarSIM-D2 as the only sensor capable of providing both full-range direct spectral and broadband irradiance.

The SolarSIM-D2s unique ability to also resolve atmospheric aerosol and precipitable water vapour data also facilitates the groups research work on CPV performance prediction.