National Solar Spectral Network Launched

Earlier this fall, Canada's Natural Resources Ministry (NRCan) launched the world's first real-time solar spectral network. Powered by Spectrafy's innovative spectral sensors and backed up by Hukseflux's SR20 pyranometer, the CanSIM network is designed to enable the most accurate analysis of the solar technologies of today, while also meeting the needs of tomorrow.

From the outset, NRCan wanted the CanSIM Network to be spectral - a requirement necessary to enable the most accurate analysis of photovoltaic performance.

Historically, a high-quality solar spectral and environmental measurement network would have been financially impractical – requiring multiple expensive, high-maintenance sensors that would push the per-station cost into the hundreds of thousands of dollars, while also burdening the Ministry with significant ongoing operating costs.

NRCan turned to Spectrafy to provide a state-of-the-art spectral network solution within the fiscal constraints of modern government. Thankfully, Spectrafy was up to the task. By combining elegantly simple hardware with advanced software, Spectrafy's sensors combine multiple measurement functions into a single, compact, rugged sensor. As a result, the cost and operating expense of advanced solar spectral and environmental monitoring has been drastically reduced.

Figure 1: CanSIM Station

Unique among spectral sensors, Spectrafy's SolarSIMs provide measurements of both spectral *and* broadband irradiance. This capability enables the continuous and inexpensive validation of a SolarSIM's spectral data by comparing its broadband data against an independent thermopile pyranometer. Trust in the output from each station is increased through the cross-validation enabled by mounting two independent sensors. Needless to say, the pyranometer selected for the task had to be a proven performer, with a reputation for stability and accuracy. The SR20 by Hukseflux was a natural choice.

Over a period of twelve months, Spectrafy collaborated with NRCan personnel to design, deploy and commission the first seven CanSIM stations throughout Canada. Together with Hukseflux's SR20, each station is equipped with a SolarSIM-D2 and a SolarSIM-G to enable measurement of a comprehensive suite of spectral, broadband, and environmental parameters (see "CanSIM Measurands").

CanSIM Measurands

- *Spectral GHI, DNI and DHI (280-4000nm)*
- *Broadband GHI, DNI and DNI*
- *Aerosol optical depth (280-4000nm)*
- *Spectral and total column ozone*
- *Spectral and total column PWV*
- *Ambient temperature*
- *Atmospheric pressure*
- *Relative humidity*

Spectrafy Cloud

In addition to employing Spectrafy's innovative sensors, each station is connected over the cellular network to the Spectrafy Cloud - our turn-key data management and visualization platform. Data is accessible over the internet, in real-time, via a clean, intuitive, graphical dashboard, thereby maximizing NRCan's ability to disseminate CanSIM data to all relevant stakeholders in industry, government and academia.
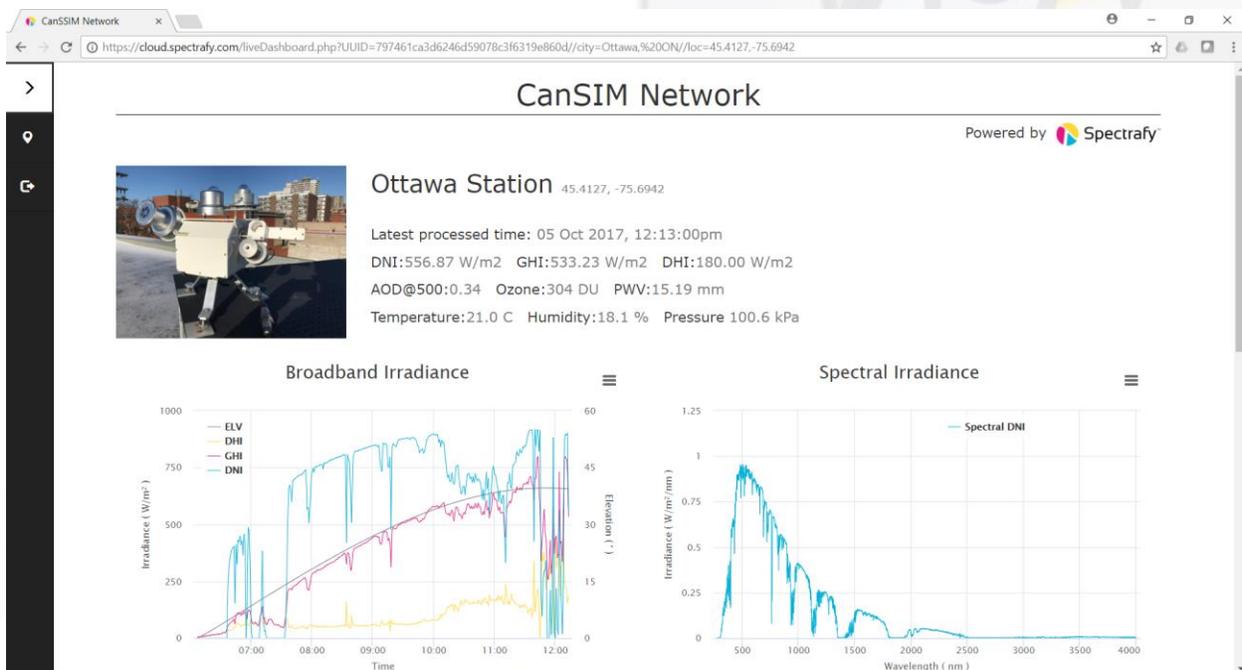

Figure 2. Screenshot of the CanSIM data visualization platform

The CanSIM network sets a new standard for highly advanced, yet affordable and sustainable solar and atmospheric monitoring. In an era of climate change, advanced environmental monitoring is arguably more important than ever, and the CanSIM network is already providing new insights that will be vital in responding to the decades of climate change ahead. Moreover, CanSIM data will help underpin the financing and deployment of solar power plants for years to come, reinforcing Canada's leadership in renewable energy, and her international commitments to a low-carbon future.