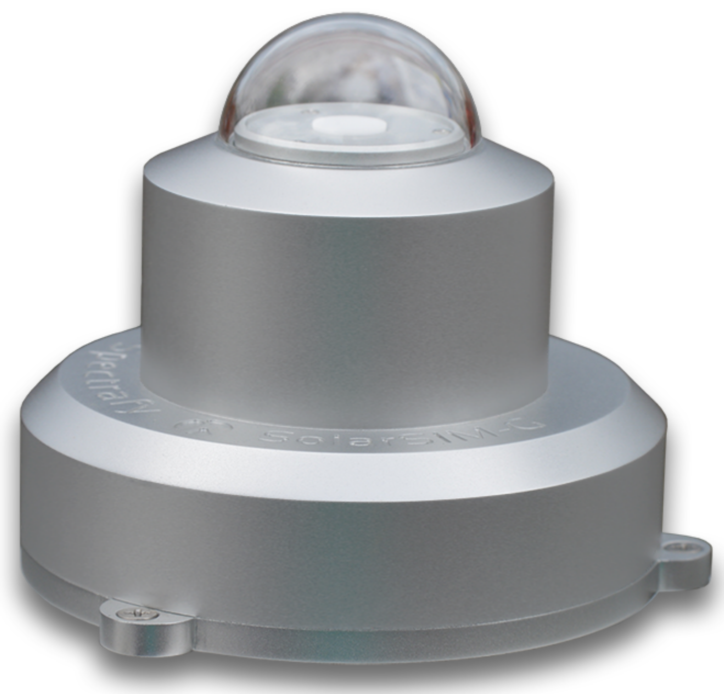
User Manual:

Solar Spectral Irradiance Meter

SolarSIM-G



User information

Spectrafy Inc. strongly recommends reading this instruction manual prior to installation and operation of your global Solar Spectral Irradiance Meter (SolarSIM-G).

If you have any comments about this manual or our products, please send them to:

Spectrafy Inc. Inc.
4 Florence St, Suite 204
Ottawa, Ontario, Canada
K2P 0W7
Tel: 1-613-237-2020
info@spectrafy.com
www.spectrafy.com

Spectrafy Inc. reserves the right to make modifications to the user manual without prior notice.

Warranty and liability

Spectrafy Inc. guarantees that the Solar Spectral Irradiance Meter (SolarSIM-G) has been thoroughly tested to ensure that it meets all of the stated specifications. A two year warranty is provided from date of invoice, subject to correct installation and operation. Spectrafy Inc. accepts no liability for any loss or damages arising from improper usage of this product.

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Introduction

Dear customer, thank you for purchasing the Solar Spectral Irradiance Meter (SolarSIM-G) from Spectrafy Inc. Please become familiar with this instruction manual for a full understanding of the use of your SolarSIM-G.

The SolarSIM-G is designed to be a cost-effective tool for accurately determining the solar spectrum and global horizontal/tilted irradiance (GHI/GTI) as part of on-site solar resource assessments and module performance characterization studies. The instrument uses silicon photodiodes, integrated with hard-coated bandpass filters to measure the solar spectral irradiance in nine narrow wavelength bands. The SolarSIM-G's proprietary software uses these measurements to resolve the global solar spectrum and the global irradiance.

If you have any questions, please feel free to contact a Spectrafy representative or e-mail `info@spectrafy.com`

1 Main components

The side view of SolarSIM-G components is shown in Figure 1, which includes

- a glass dome,
- an enclosure,
- bandpass filters,
- bubble level,
- a connector, and
- a backplate.

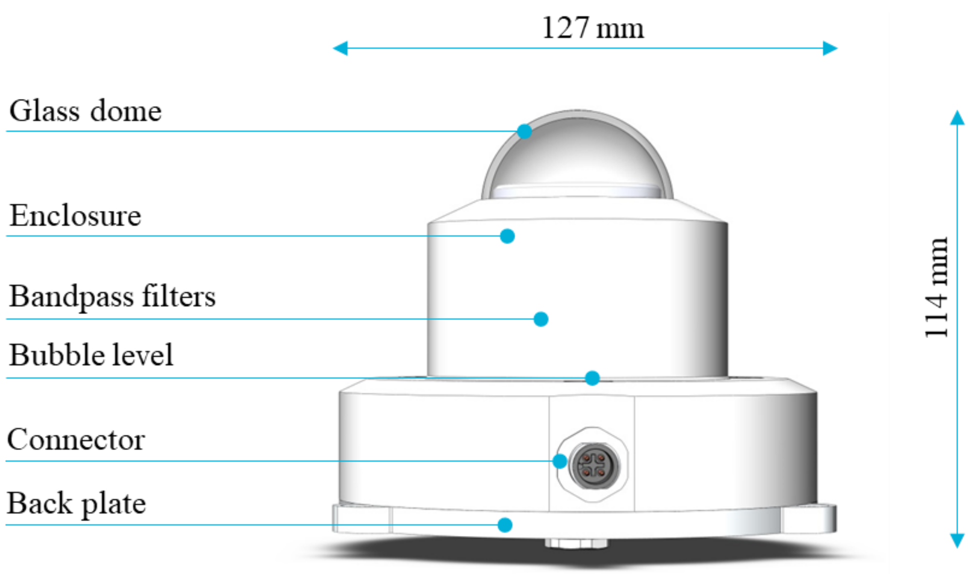

Figure 1: SolarSIM-G components and main dimensions.

1.1 Glass dome

The glass dome prevents the ingress of moisture and debris.

1.2 Enclosure

The anodized aluminum enclosure secures SolarSIM-G components in place, while providing robust protection from the environment.

1.3 Bandpass filters

Nine bandpass filters transmit a narrow band of spectral irradiance to the detectors.

1.4 Bubble level

The bubble level ensures the SolarSIM-G is leveled when measuring the irradiance in global horizontal orientation.

1.5 Connector

The connector provides the power and communication to the SolarSIM-G electronics.

1.6 Backplate

The anodized aluminum backplate seals the back of the enclosure with four screws.

2 Installation

2.1 Contents of delivery

Per each ordered SolarSIM-G the received package should contain:

- a SolarSIM-G ×1,
- a communication cable ×1,
- a SolarSIM-G Communication Box ×1 (optional),
- a mounting plate ×1 (optional),
- mounting screws ×3,
- mounting springs ×3, and
- a USB key loaded with the SolarSIM-G software.

Please check the contents of the package and note if any damages have occurred during shipment. A claim should be filed with the shipment carrier should this be the case. Additionally, please contact a Spectrafy representative to facilitate the repair or replacement of the instrument and/or its accessories.

2.2 Mechanical installation

The SolarSIM-G installation requires fastening it to the mounting plate via three M4 screws and springs, as demonstrated in Figure 2. The mounting plate is 7.3 mm thick and has three slots with a 132 mm diameter that are 4.5 mm wide for external fastening, as shown in Figure 3. The screws for external mounting are not provided. The procedure for mechanical installation is described as follows:

1. Place the SolarSIM-G on the mounting plate as per Figure 3.
2. Place the spring under the SolarSIM-G so that it roughly aligns with one of the mounting holes on the SolarSIM-G.
3. Insert the mounting screw through the SolarSIM-G's mounting hole and the spring. Then thread the screw into the mounting plate for a few revolutions, only.
4. Repeat steps 2 and 3 for the remaining two screws and springs.
5. Tighten all screws to compress the springs by about 10 mm.
6. Adjust the mounting screws until the bubble level is centered with the bulls eye.

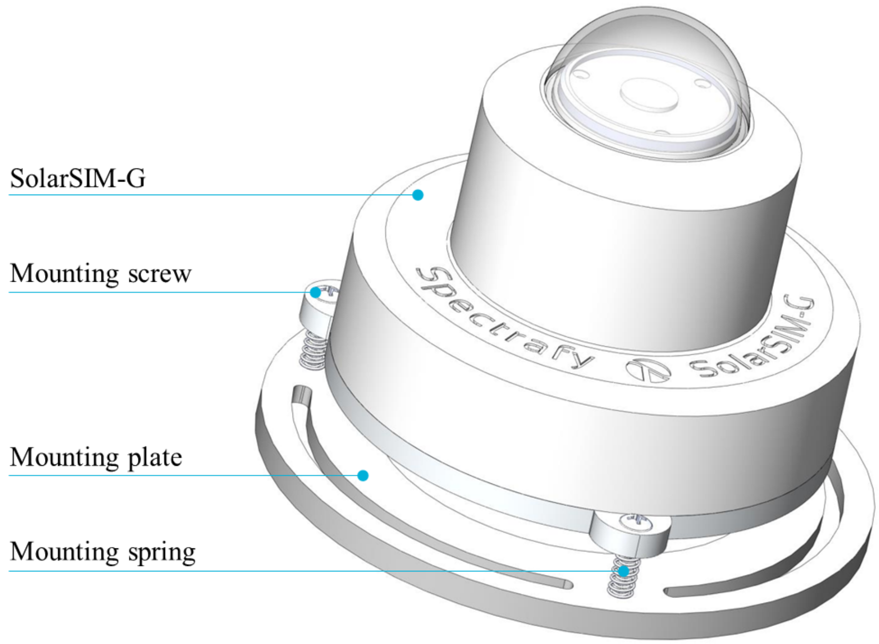

Figure 2: Assembled SolarSIM-G on a mounting plate.

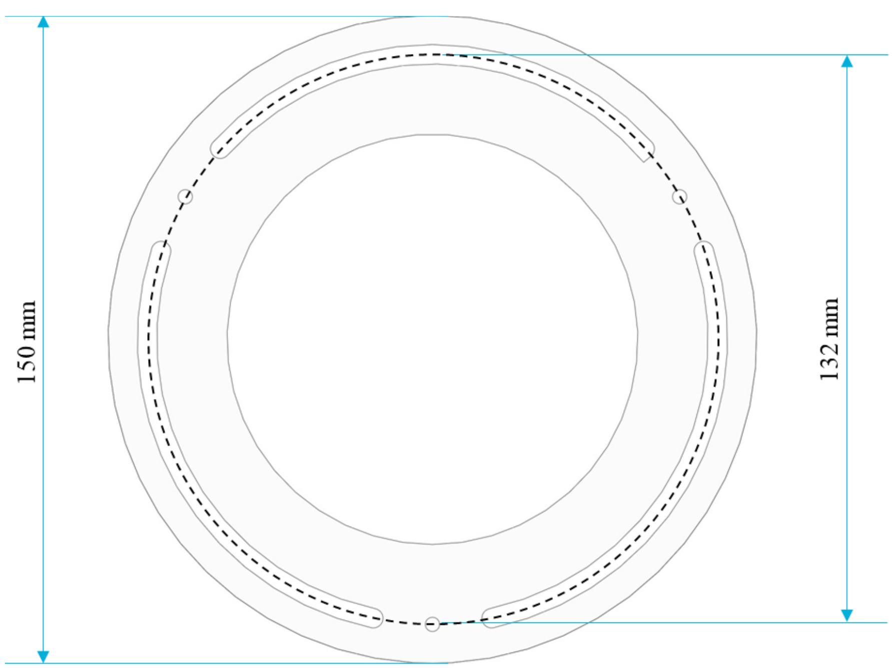

Figure 3: Dimensional drawing of a mounting plate.

3 Maintenance

The SolarSIM-G requires very little maintenance. The most important task is to make sure that the glass dome of the SolarSIM-G is clean at all times, as the accumulation of dirt can lead to misrepresented data. Furthermore, the horizontal alignment of the SolarSIM-G should be checked periodically.

3.1 Cleaning

As a general rule, we recommend cleaning the SolarSIM-G's front glass with a dry, non-abrasive cloth, or paper towel, once per week, in order to maintain optimum performance. This frequency can be altered depending on your local climatic conditions.

3.2 Alignment

With each cleaning, it is also advised to check the leveling of the instrument using the bubble level. If the bubble is not centered within the circle, adjust the appropriate mounting screws to re-level the SolarSIM-G.

3.3 Desiccant

The desiccant is used to maintain an appropriate humidity level within the SolarSIM-G. The internal humidity of the device is reported within the daily summary data files and can therefore be monitored over time. The lifetime of the desiccant is expected to exceed two years, although it may vary based on local climatic conditions. The desiccant can be replaced as part of the SolarSIM-G's re-calibration procedure.

3.4 Recalibration

We recommend that the SolarSIM-G is returned to Spectrafy for recalibration `every 1-2 years` in order to maintain the SolarSIM's specified measurement accuracy.

4 Connectivity

The SolarSIM-G offers various connectivity options suitable for most use case scenarios. The connectivity solutions include:

1. A SolarSIM ComBox
2. A serial-over-Ethernet converter, or
3. A datalogger.

Option 1 uses the SolarSIM Communication Box (ComBox) - a seamless link between a PC and the SolarSIM-G, as shown in Figure 4. A standard 6 ft USB cable is connected from the ComBox to a PC. On the other side, a 10 m RS-485 communication cable is connected from the ComBox to the SolarSIM-G. This option is ideal for test sites and locations where one has the access to a personal computer (PC) or when quick, in-field spectral measurements are necessary with a laptop.

Option 2 allows the user to interface with the SolarSIM-G via a serial-over-Ethernet converter, provided there is Internet access. For this option the user must manually connect the power and communication wires to the SolarSIM-G by following the wiring guide in Section 4.2. This option is ideal for test sites and locations which have Internet access, but no PC nearby. Both options 1 and 2 make use of the SolarSIM-G DAQ graphical user interface, which must be installed on a Windows-based PC or a server, as explained in Section 5.

Option 3 uses a datalogger to acquire raw data from the SolarSIM-G. This raw data must be specifically formatted by the user into a .csv file, which is then fed into the SolarSG software to generate the complete SolarSIM-G data set, as further detailed to in Section 6.3. This option is ideal for remote test sites and locations with existing datalogger systems.

Figure 4: The ComBox is necessary to interface the SolarSIM-G wih a PC.

4.1 SolarSIM-G Communication Box

The ComBox is the best option for stable communication between a PC and the SolarSIM-G. Please follow these steps to install the ComBox:

1. Connect one end of the communication cable to the SolarSIM-G.
2. Connect the other end to the ComBox.
3. Connect one end of a male-to-male USB cable to the ComBox.
4. Connect the other end of a male-to-male USB cable to a PC. A blue LED on the top of the ComBox indicates power to the SolarSIM-G.
5. Wait for the PC to install the FTDI drivers, which may take a few minutes.
6. Once the FTDI drivers are installed, restart the PC.

4.2 Serial-over-Ethernet converter

For remote test site applications the SolarSIM-G can be connected to a networked PC via a suitable serial-over-Ethernet (SOE) converter - such as the ICP DAS I-7188-E2[1]. The user must connect the SolarSIM-G communication cable wires as per Table 1. More specifically, the D+ and D− lines, brown and black wires, respectively, must be connected to the corresponding terminal block inputs on the SOE device, while the blue and white wires - to the positive and common ground sides of the 12 VDC power supply, respectively. The SOE converter and the power supply must have a common ground. Note, supplying the SolarSIM-G with the voltage higher than 12 VDC will damage the SolarSIM-G electronics.

The network must assign a static IP address to the SOE converter. Afterwards, a virtual communication link can be established via the VxComm software[2]. The latter must be configured as per Figures 5 and 6. Once properly configured, the VxComm software

[1] https://www.icpdas-usa.com/i_7188e2.html
[2] http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/vxcomm_driver/windows/

Table 1: Wiring guide for the SolarSIM-G.

Colour	Label	Function
Blue	V_{in}	Input voltage (+12 VDC)
White	GND	Common ground
Black	D−	Negative RS-485 input
Brown	D+	Positive RS-485 input

*12 VDC only

creates a virtual serial port on the networked PC, which the SolarSIM-G DAQ application uses to communicate to the SolarSIM-G.

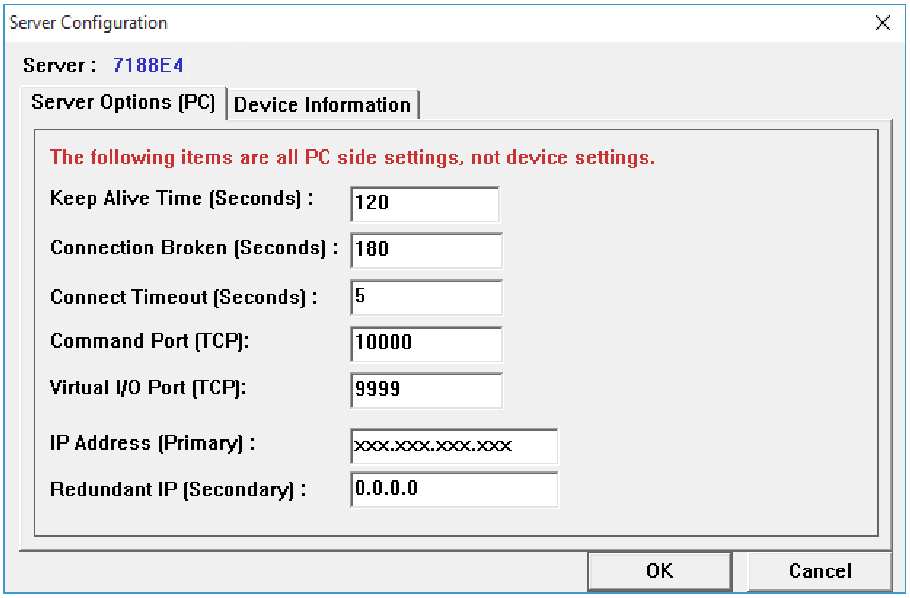

Figure 5: Server configuration for VxComm software. Note, the SolarSIM-G supports only the ASCII RS-485 communication mode.

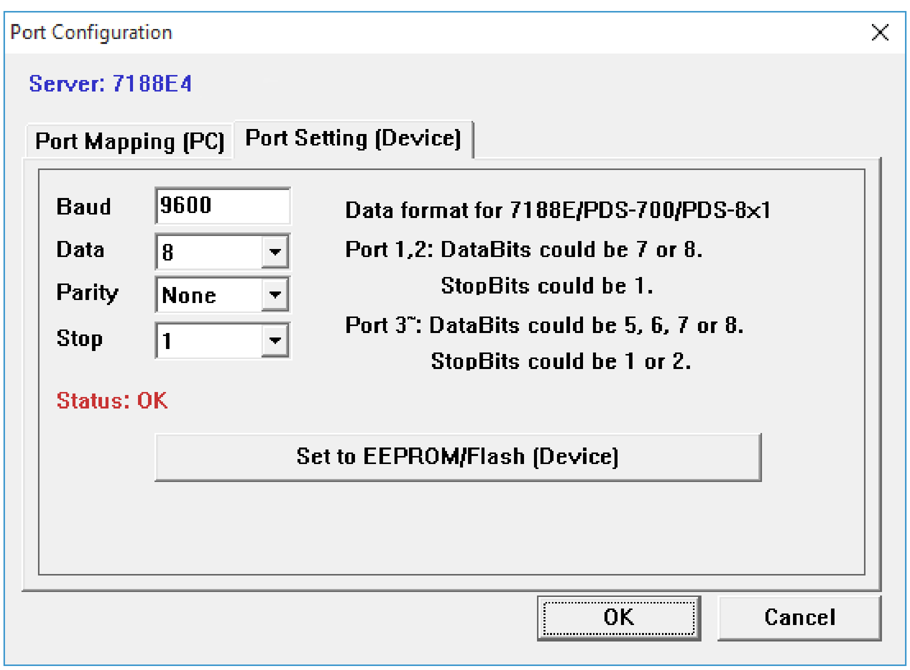

Figure 6: Port configuration for VxComm software. Note, the SolarSIM-G supports only the ASCII RS-485 communication mode.

4.3 Datalogger

The connectivity with a datalogger is similar to the SolarSIM-G's integration with the SOE converter. The SolarSIM-G communication cable is connected to the corresponding datalogger inputs as per Section 4.2. The datalogger must have a spare RS-485 port.

5 SolarSIM-G DAQ Application

The SolarSIM-G DAQ application provides the user with the real-time status of the instrument, data acquisition and storage, and daily data plots. The SolarSIM-G DAQ software communicates via a serial port and thus can be used with either a ComBox or a SOE converter. This section will go over the software installation, the program settings, and the general know-how for using the SolarSIM-G DAQ.

5.1 Software installation

The software installation is performed by executing the setup.exe inside the `SolarSIM setup` folder located on the provided USB key, as shown in Figure 7. The user should follow the installation instructions as prompted by the software.

5.2 Software settings

Once the SolarSIM-G software is installed, the user must define the location-specific geographic settings for the SolarSIM-G to work properly. This process can be accomplished

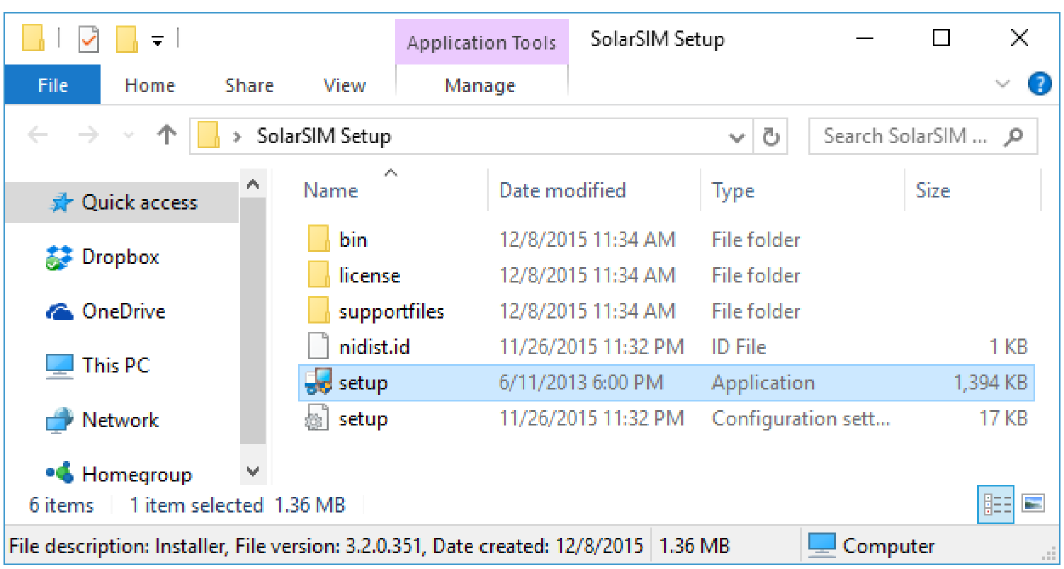

Figure 7: Installation of the SolarSIM-G software

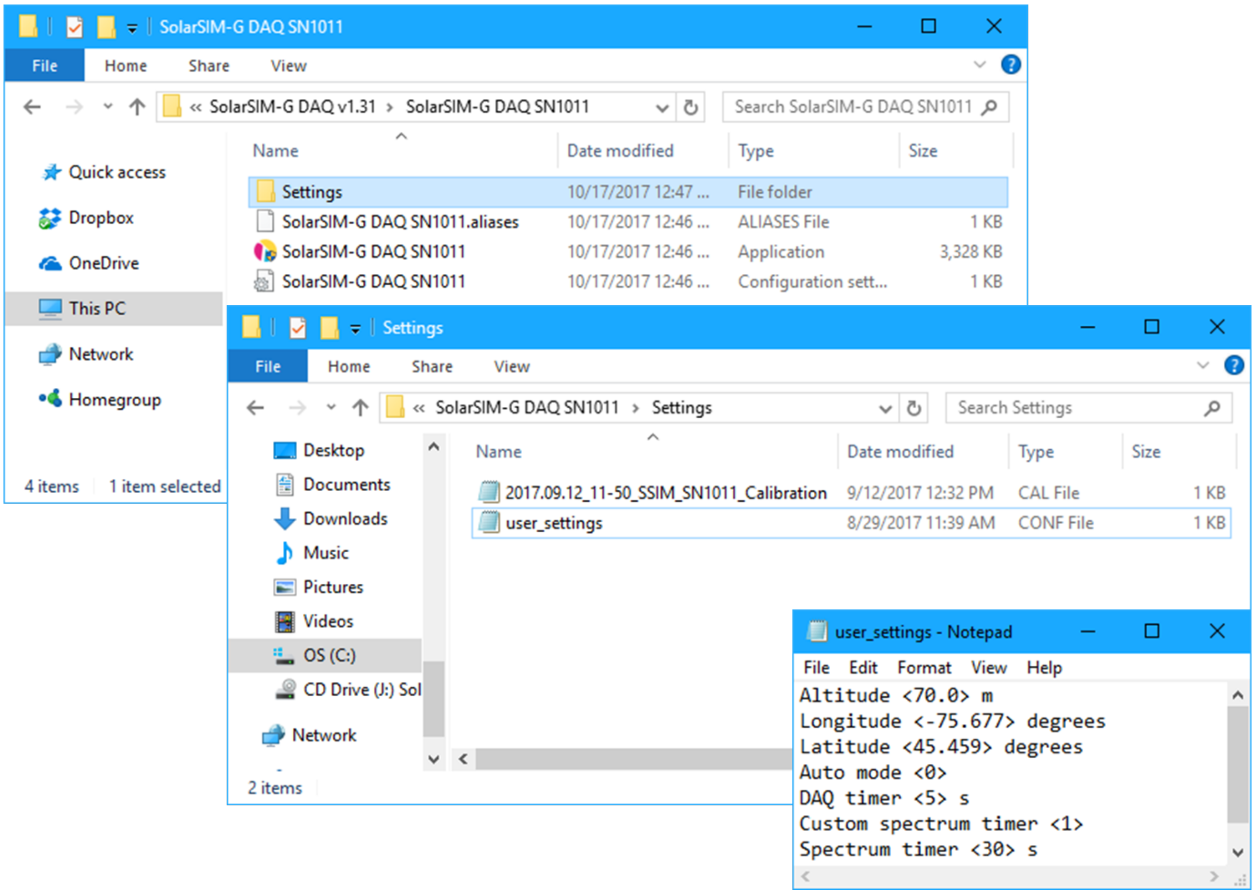

Figure 8: Adjustment of the SolarSIM-G user settings.

in two ways. The first option is for the user to change the values for altitude, longitude, and latitude in the user_settings.conf file, located in the Settings folder of the installation directory, as shown in Figure 8. The second option is to modify these parameters when automatically prompted by the software, as will be explained in Section 5.3. The modifications of the remaining parameters is optional. If Auto mode is ON, upon launching, the application does not interact with the user and begins the data collection automatically. The DAQ timer sets the data acquisition rate for the entire SolarSIM-G data set. If it is desired to have a separate data rate for the spectral data, the user can turn ON the Custom spectrum timer and change the spectral data acquisition to a desired rate via the Spectrum timer. Please refer to Table 2 for the summary of the user settings.

5.3 Using the software

The SolarSIM-G software is launched by double-clicking the SolarSIM-G DAQ.exe in the installation directory. The application runs automatically in the administrator mode, as it

Table 2: SolarSIM-G DAQ program settings.

Setting	Value range	Units
Altitude	0.0 to 9000.0	metres
Longitude	0.00 to 180.00*	degrees
Latitude	0.00 to 90.00**	degrees
Auto mode	0 or 1	OFF or ON
DAQ timer	1.0 to 3600.0	seconds
Custom spectrum timer	0 or 1	OFF or ON
Spectrum timer	0 or 1	OFF or ON

*longitude is negative for western hemisphere
**latitude is negative for southern hemisphere

is a prerequisite to save data in the Program files directory. Once launched, the program automatically searches for the SolarSIM-G calibration file. If none is found, the SolarSIM-G DAQ will prompt the user to browse to the calibration file's directory, as shown in Figure 9. Browse to the provided USB key and select the appropriate calibration file. The application then copies this file to the Settings folder and will not ask for it again. If the SolarSIM-G DAQ detects multiple calibration files, the application will prompt the user to select the desired SolarSIM-G, as shown in Figure 10.

Once the calibration file is loaded, the SolarSIM-G DAQ software searches for the serial port to which the SolarSIM-G is connected. If the SolarSIM-G is not detected, the program displays the message as shown in Figure 11 and exits. In this case, please ensure that your PC detects the serial port by viewing the available serial or COM ports in the Device manager. If similar problem arises with the SOE converter, please double-check the setup procedure as explained in Section 4.2.

Once the SolarSIM-G is found, the SolarSIM-G DAQ prompts the user to verify and/or change the geographic settings, which include altitude, longitude and latitude, as shown in Figure 12. If these parameters are incorrect, the user can change them by modifying the appropriate values in the pop-up window. When ready, press Apply, and the program will save these settings permanently by writing them to the user_settings.conf file. Please note that the latitude and longitude must be negative for southern and western hemispheres, respectively.

The SolarSIM-G DAQ is depicted in Figure 13. The software displays the daily plots of the photodiode currents, the ambient temperature and pressure, the GHI in the 350–1830 nm and the 280–4000 nm ranges, the aerosol optical depth, the ozone content, the water vapour amount, and, elevation and azimuth angles. Data for all plots, other than the ambient temperature and pressure, is recorded between the sunrise and the sunset. Furthermore, the real-time plot of the solar spectrum is provided.

The desired DAQ timer rate (left of the Start DAQ button) should be set before begin-

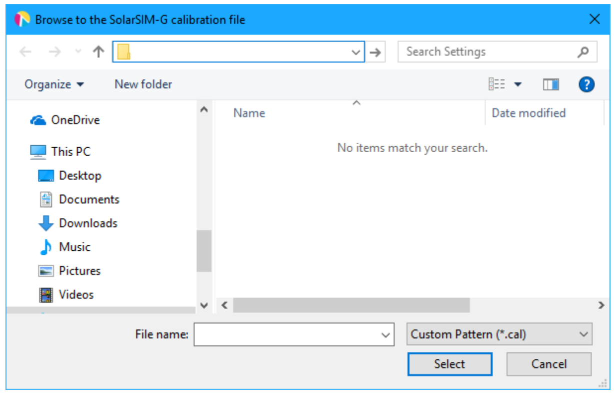

Figure 9: Browsing to the calibration file.

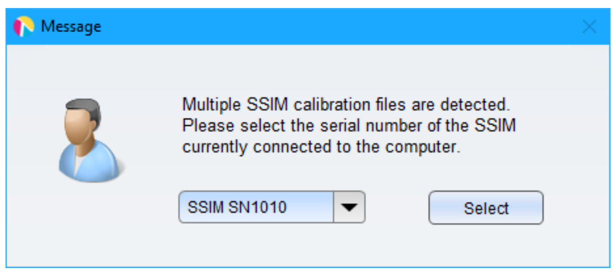

Figure 10: Selecting multiple calibration files.

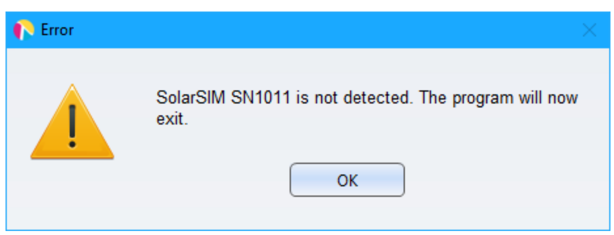

Figure 11: Failing to detect the SolarSIM-G.

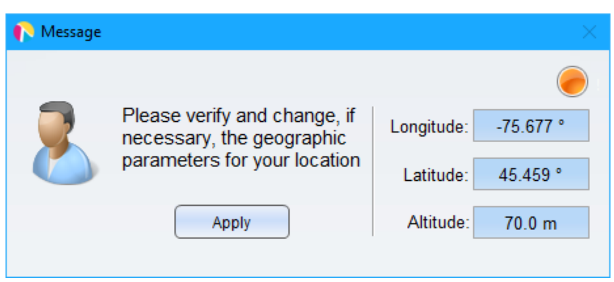

Figure 12: Changing and verifying geographic settings.

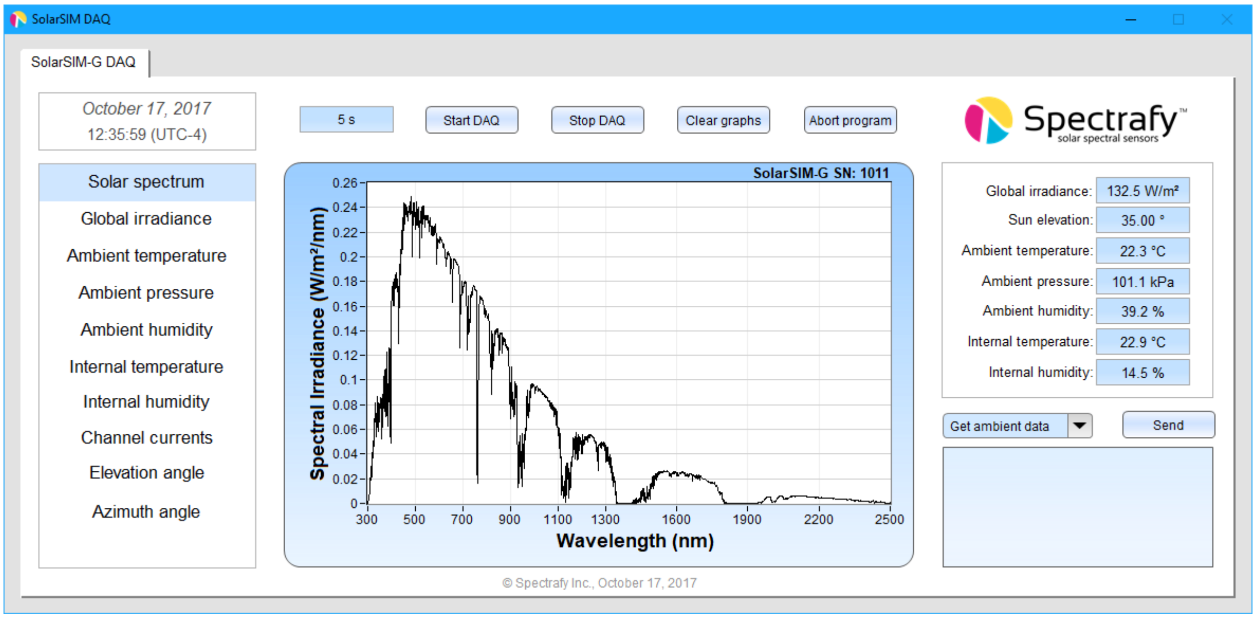

Figure 13: SolarSIM-G DAQ application

ning the data acquisition. It has a default value of 5 s, but it can be changed by modifying the user_settings.conf file. The DAQ timer value can be set between 1.0 s and 3600 s (1 hr) with 0.1 s resolution. Finally, the user can press the Start DAQ button to begin data collection from the SolarSIM-G.

5.4 Data type and storage

The SolarSIM-G DAQ stores the SolarSIM-G data in the Data folder, located in the installation directory. The software outputs two data files types: the solar spectral files and the daily summary data files. The spectral data is stored in the Data\Spectra\yyyymmdd directory, where yyyy, mm, and dd correspond to the year, month, and day, respectively. A snippet of the SolarSIM-G spectrum file is presented in Figure 14. As shown, the wavelength column is not included in order to minimize the file size. Rather the 3721 values of the spectral irradiance in units of $W/m^2/nm$ are presented in a single column format. The value in row 2 corresponds to the spectral irradiance at 280 nm, while the value in row 3722 corresponds to the spectral irradiance at 4000 nm.

The daily summary data files are stored in the Data folder. A snippet of the SolarSIM-G data file is shown in Figure 15. It contains the values for the elevation and azimuth angles, the ambient temperature, the ambient pressure, the internal humidity, the GHI in the 280–4000 nm ranges, custom range GHI values (optional), and the currents from the detectors for each timestamp.

5.5 Data collection size

At 5 s data acquisition resolution the daily summary file's size is ∼2MB or ∼115 bytes per measurement. The spectral file size is ∼37 KB per measurement. The size of the entire spectral file data set depends on the amount of daily sunlight, but with 5 s data acquisition resolution and with 8 hr of continuous sunshine, it adds up to ∼210 MB. The user is advised to use the Custom spectrum timer and Spectrum timer options in the user_settings.ini file to reduce the daily spectral data set size as desired.

	A	B	C	D	E	F	G
1	Spectral irradiance (W/m2/nm) from 280 nm to 4000 nm						
2	3.21E-85						
3	1.55E-77						
4	5.83E-69						
5	2.08E-64						
6	6.89E-58						
7	3.61E-53						
8	2.40E-48						
9	1.05E-43						
10	3.47E-38						

Figure 14: SolarSIM-G spectrum data file snippet.

A	B	C	D	E	F	G	H
Time stamp	Time zone (hr)	Elevation (deg)	Azimuth (deg)	Ambient temperature (C)	Ambient pressure (kPa)	Ambient humidity (%)	Internal temperature (C)
2017-09-19 08:36:05	-6	20.156	105.923	16.33	80.77	25.5	17.2
2017-09-19 08:36:10	-6	20.172	105.938	16.33	80.76	25.4	17.2
2017-09-19 08:36:15	-6	20.187	105.953	16.33	80.76	25.4	17.19
2017-09-19 08:36:20	-6	20.202	105.968	16.34	80.77	25.4	17.17
2017-09-19 08:36:25	-6	20.218	105.983	16.34	80.76	25.3	17.2
2017-09-19 08:36:30	-6	20.233	105.998	16.35	80.76	25.3	17.2
2017-09-19 08:36:35	-6	20.249	106.013	16.36	80.76	25.3	17.2
2017-09-19 08:36:40	-6	20.264	106.028	16.36	80.76	25.2	17.24
2017-09-19 08:36:45	-6	20.279	106.043	16.37	80.76	25.2	17.19

I	J	K	L	M	N	O	P	Q	R	S
Internal humidity (%)	Global irradiance (W/m2)	I1 (nA)	I2 (nA)	I3 (nA)	I4 (nA)	I5 (nA)	I6 (nA)	I7 (nA)	I8 (nA)	I9 (nA)
11.4	99.65	0.064433	0.287745	0.707668	0.952053	0.876677	0.885683	0.367529	0.101879	0.014915
11.5	99.78	0.064487	0.28801	0.708257	0.952947	0.877445	0.886518	0.367987	0.101986	0.014982
11.4	99.88	0.064567	0.28821	0.708778	0.953937	0.87816	0.887167	0.368271	0.102085	0.015025
11.5	100.4	0.064598	0.28852	0.709505	0.954688	0.87915	0.88812	0.368626	0.102237	0.014992
11.4	100.06	0.064674	0.288873	0.7101	0.955773	0.879818	0.888955	0.369053	0.10233	0.015031
11.4	100.15	0.06477	0.289195	0.710905	0.956792	0.880812	0.889868	0.36943	0.102417	0.015008
11.4	100.29	0.064839	0.289519	0.711827	0.958042	0.881905	0.890858	0.369847	0.102518	0.015059
11.3	100.37	0.06494	0.289865	0.712852	0.959165	0.882922	0.891827	0.370226	0.102607	0.015032
11.4	100.51	0.065022	0.290325	0.713653	0.960375	0.884062	0.8928	0.370758	0.102695	0.015066

Figure 15: SolarSIM-G daily summary file snippet.

6 Datalogger setup

The SolarSIM-G can be interfaced with any datalogger, provided the latter has the RS-485 functionality. However, compared to other SolarSIM-G connectivity options, this approach is slightly more involved. In a nutshell, the user must execute the following steps to process the data from the SolarSIM-G:

1. Setup the serial communication between the datalogger and the SolarSIM-G.
2. Send the serial command from the datalogger to the SolarSIM-G.
3. Retrieve the raw data from the datalogger.
4. Format the raw data into a specific format.
5. Place the formatted raw data files into the SolarSG software's directory and run the application.

This section discusses in detail how to proceed with each step, including the serial port configuration, sending and parsing the serial command, formatting the SolarSIM-G raw data into a required format, and how to use the SolarSG software.

6.1 Serial port configuration

Prior to configuring the serial port on a datalogger, the user must wire the SolarSIM-G by following instructions from Section 4.2. The serial port is then configured with standard serial parameters as per Table 3.

6.2 Serial commands

There is only one serial command that one needs to use to acquire the SolarSIM-G data:

`Nxxxx_E`

where `xxxx` corresponds to the 4-digit serial number of your SolarSIM-G. In return, the SolarSIM-G sends an ASCII string with the ambient pressure, external temperature, internal temperature, relative humidity, and seven voltages from the detectors. The following ASCII string is a sample output:

Table 3: SolarSIM-G serial port configuration.

Parameter	Value
Baud rate	9600
Parity	None
Data bits	8
Stop bits	1

N1010_2500.000,1013.120,4750.000,2600.000,1050.000,2500.032,4999.999, 0000.001,1274.004,2746.321,3291.214, 3924.385,1900.500,0500.123/r/n

The aforementioned string can be parsed as:

N"serial number"_"$(T_{\text{out}} + 50) \times 75$","$P_{\text{out}} \times 10$","$H_{\text{out}} \times 100$","$(T_{\text{in}} + 50) \times 75$","$H_{\text{in}} \times 100$", "$V_1$","$V_2$","$V_3$","$V_4$","$V_5$","$V_6$","$V_7$","$V_8$","$V_9$","end of line character"

where T_{out}, P_{out}, H_{out}, T_{in}, H_{in}, and V_{1-9} are the ambient temperature, the ambient pressure, the ambient humidity, the internal temperature, the internal humidity, and the nine voltages from the detectors, respectively. The aforementioned example string is parsed in Table 4.

Table 4: Processed output example for Nxxxx_E command.

Parameter	Symbol	Value	Units
Ambient temperature	T_{out}	-16.67	°C
Ambient pressure	P_{out}	101.312	kPa
Ambient humidity	H_{out}	47.50	%
Internal temperature	T_{in}	-15.33	°C
Internal humidity	H_{in}	10.50	%
Voltage channel 1	V_1	2500.032	mV
Voltage channel 2	V_2	4999.999	mV
Voltage channel 3	V_3	0.001	mV
Voltage channel 4	V_4	1274.004	mV
Voltage channel 5	V_5	2746.321	mV
Voltage channel 6	V_6	3291.214	mV
Voltage channel 7	V_7	3924.385	mV
Voltage channel 8	V_8	1900.500	mV
Voltage channel 9	V_9	500.123	mV

6.3 Raw data file format

The SolarSG software requires a .csv file in a specific format based on the SolarSIM-G raw data output. The file must have the following headings with the corresponding data: Timestamp, Time zone (hr), Ambient pressure (kPa), Ambient temperature (C), Ambient humidity (%),Internal temperature (C), Internal humidity (%), V1 (mV), V2 (mV), V3 (mV), V4 (mV), V5 (mV), V6 (mV), V7 (mV),V8 (mV), and V9 (mV). Each data row must consists of comma separated values only, with no spaces in between. The timestamp must be strictly in the yyyy-mm-dd HH:MM:SS format, where yyyy, mm, dd, HH, MM, and SS is the year, month, day, hour, minute, and second, respectively. The SolarSG software uses the time stamp and the timezone from the raw data file to determine the UTC time, which is necessary for the solar position algorithm. Therefore, the user must ensure that each time stamp plus the timezone corresponds to the UTC time. The snippet of the raw data file is presented in Figure 16. The raw data file must be named as yyyy-mm-dd_SSIM_Raw_Data_SNxxxx.csv, where yyyy, mm, dd correspond to the year, month, and day when the raw SolarSIM-G data was generated, while xxxx is a 4-digit serial number of your SolarSIM-G.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Time stamp	Time zone (hr)	Ambient temperature (C)	Ambient pressure (kPa)	Ambient humidity (%)	Internal temperature (C)	Internal humidity (%)	V1 (mV)	V2 (mV)	V3 (mV)	V4 (mV)	V5 (mV)	V6 (mV)	V7 (mV)	V8 (mV)	V9 (mV)
2017-01-19 07:30:00	-7	7.82	80.29	26.6	6.48	10.5	817.175	2057.13	2941.546	2720.985	2670.353	1433.519	1329.233	2134.209	1298.752
2017-01-19 07:31:00	-7	7.87	80.29	26.6	6.56	10.5	816.631	2056.377	2933.9	2703.443	2668.867	1451.888	1327.345	2127.5878	1295.323
2017-01-19 07:32:00	-7	7.91	80.29	26.5	6.61	10.5	818.133	2059.579	2940.307	2714.741	2672.348	1455.057	1331.879	2133.19	1298.372
2017-01-19 07:33:00	-7	7.91	80.29	26.5	6.7	10.5	819.414	2061.906	2939.837	2699.993	2666.163	1457.512	1338.526	2130.2875	1295.987

Figure 16: SolarSG input file snippet.

6.4 SolarSG application

The SolarSG application is an executable that the user must run to process the raw data from the SolarSIM-G into the spectral data. This software is located on the provided USB key inside a folder with contents as per Figure 17, which initially include:

1. atmParam.data
2. SolarSG.exe
3. SSIM_Calibration_SNxxxx.json
4. user_settings.conf

Pleas note, the calibration file for the SolarSG application is in a .json format, in contrast to the .cal file format used by the SolarSIM-G DAQ. Prior to running the SolarSG application the user must configure the local geographic settings in the user_settings.ini file, by modifying the altitude, longitude, and latitude, corresponding to the location of your SolarSIM-G, as shown in Figure 17. Please refer to Table 2 for the allowed ranges and the positive/negative convention of these parameters. Finally, place the raw data .csv file(s) formatted as per Section 6.3 in the SolarSG directory and launch the application.

Once launched, the SolarSG application scans the directory for new raw data files. If raw data files are found, the software processes each file line-by-line. The SolarSG application creates three folders in the data folder - Processed Data\\Global. The daily_summary_files and spectrum folders contain identical data to that which SolarSIM-G DAQ generates as explained in Section 5.4. The archive folder contains all processed raw data files.

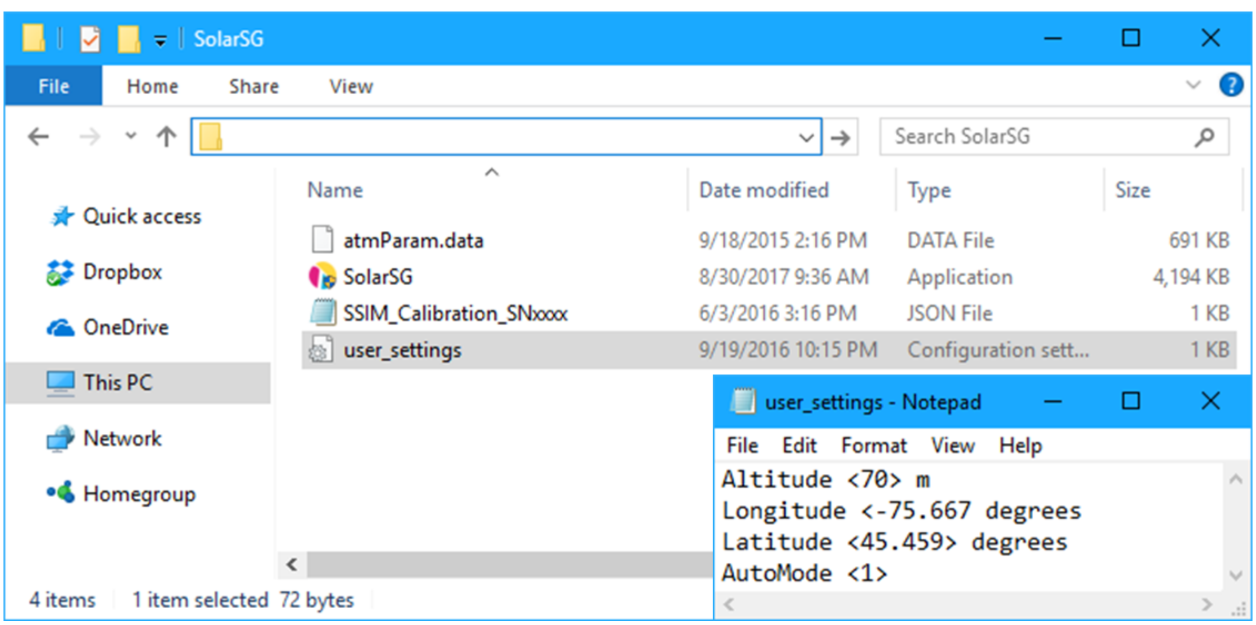

Figure 17: Modifying geographic settings for the SolarSG application.