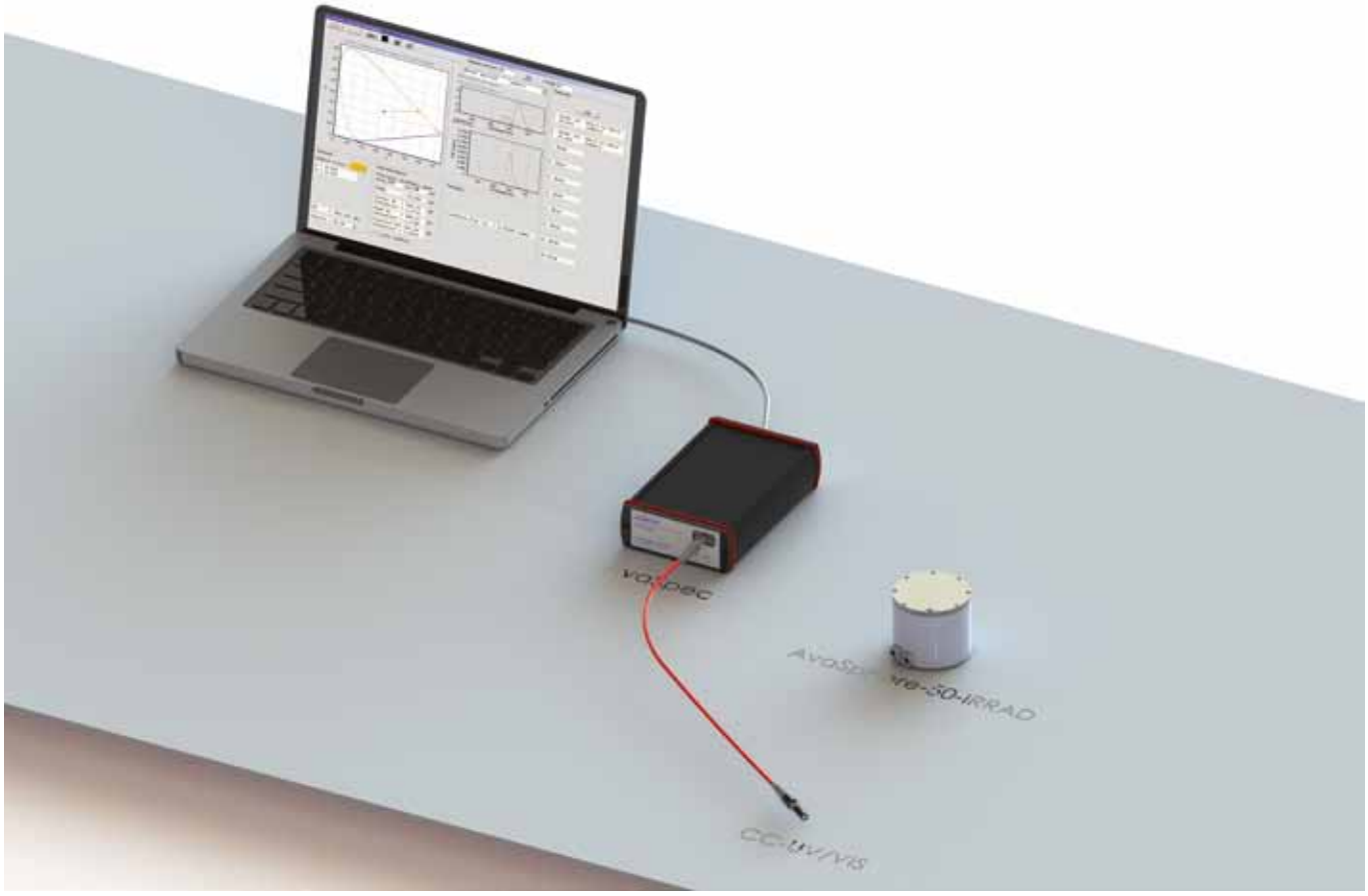
Irradiance measurements

Radiometry deals with the measurement of all optical radiation inclusive of the visible portion of this radiant energy. Irradiance is a parameter of radiometry. It describes the amount of radiant power impinging upon a surface per unit area. Irradiance measurements can be done in the UV, VIS and NIR wavelength ranges.

Avantes works with a variety of irradiance applications ranging from pulsed solar simulator characterization to free space measurements of radiant sources such as street lights. The AvaSpec line of instruments provides exceptional resolution and stray-light rejection to ensure the accuracy of these measurements. Typical system configurations involve one or more spectrometers configured for the appropriate range 200-400 nm for UV irradiance, 360-1100 nm for VIS irradiance and 1100-2500 nm for NIR irradiance. While broadband configurations covering 200-1100 nm are feasible with one spectrometer, optimal performance is achieved with dedicated UV (200-400 nm), VIS/NIR (400-1100 nm) channels. The spectrometer or group of spectrometers is connected via fiber-optic cable to a diffuser with a known surface area and the entire system is calibrated against a NIST traceable source for irradiance. Avantes offers a variety of cosine diffusers and integrating spheres for irradiance applications. The calibrated system is shipped as an integrated system (connected together) and should remain in this configuration in order to ensure the integrity of the calibration. FC/PC connectors are recommended in lieu of the standard SMA, which enable repeatable disconnection and re-insertion of the fiber-optics, so the system may be disconnected for transportation.

Customers that wish to conduct their calibrations may consider one of Avantes' intensity calibration sources. The AvaLight-HAL-CAL is available for VIS/NIR wavelengths (360-2500 nm) and the AvaLight-DH-CAL is available for UV/VIS wavelengths (200-1100 nm).

The Avantes AvaSoft-IRRAD software module enables irradiance parameter measurements such as radiometric quantities - µWatt/cm², µJoule/cm², µWatt or µJoule, photometric quantities Lux or Lumen, color coordinates X, Y, Z, x, y, z, u, v, color rendering index and color temperature, and number of photons µMol/s•m², µMol/m², µMol/s and µMol. AvaSoft-IRRAD software also facilitates the performance of irradiance intensity calibrations.



Configurations used for irradiance measurement setups

	UV Irradiance	VIS Irradiance	NIR Irradiance
Spectrometer	AvaSpec- ULS2048-USB2-FCPC		AvaSpec-NIR256-2.5TEC-FCPC
	GratingUC(200-400nm),DUV, 50 µm slit, FC/PC connector	GratingVA(360-1100nm),50 µm slit, OSC, FC/PC connector	Grating NIR100-2.5 (1100-2500nm),50µmslit,OSF1000, FC/PC connector
	Grating UA (200-1100 nm), DUV, 50 µm slit, OSC-UA, FC/PC connector		-
Software	AvaSoft-Full and AvaSoft-IRRAD		
Calibration	IRRAD-CAL-UV (200-400 nm)	IRRAD-CAL-VIS (360-1100 nm)	IRRAD-CAL-NIR (1100-2500 nm)
	IRRAD-CAL-UV/VIS (200-1100 nm)		-
Light source for calibration (optional)	AvaLight-DH-CAL Calibrated Deuterium-Halogen light source with CC-UV/VIS	AvaLight-HAL-CAL Calibrated Halogen light source with CC- VIS/NIR	AvaLight-HAL-CAL extra NIR Calibrated Halogen light source with CC-VIS/NIR
Fiber-optics	1 pc. FC-UV200-2-FC-SMA fiber 200 µm UV/VIS, 2 m, 1FC/PC, 1SMA		FC-IR200-2-FC-SMA fiber 200 µm VIS/NIR, 2 m, 1FC/PC, 1SMA
Accessories	CC-UV/VIS or CC- VIS/NIR cosine corrector or AvaSphere-IRRAD integrating sphere		CC- VIS/NIR

Download the latest software for your AvaSpec at www.avantes.com