AvaSoft - Irradiance

Avantes spectrometers measure radiated optical energy, which can be quantified as a radiant flux, in energy per second (Watt) radiated from a source. The radiated optical energy can also be correlated with human vision (photometry), as defined in the CIE, to obtain a spectral luminous efficiency function to characterize the vision of an average human observer.

An Avantes irradiance calibrated spectrometer system can measure both radiometric as well as photometric quantities. Radiometric quantities are radiant energy (in Joule), Radiant power or flux (in Watt) or irradiance (Watt per cm^2). Related photometric quantities are luminous flux (lumen) or illuminance (lux or lumen per m^2).

The measured spectral distribution is used to calculate the above-mentioned para–meters. An intensity calibrated light source such as those in Avantes' factory calibration laboratory or our field calibration lamps, the AvaLight-HAL-CAL or AvaLight-DH-CAL, with known energy output (in $\mu Watt/cm^2/nm$) are used as a reference. Calibrations can be performed at Avantes' factory laboratory or in the field and stored on the EEPROM of the spectrometer (or an independent file) for future usage. AvaSoft-IRRAD Software is required for either type of calibration.

The color of light parameters can be expressed by the chromaticity coordinates x, y and z. These chromaticity coordinates are obtained by taking the ratios of the tristimulus values (X, Y and Z) to their sum. The tristimulus values X, Y and Z and the spectral irradiance are computed in a wavelength range from 380 nm to 780 nm, using a 1 nm interval. These parameters, as well as the coordinates u and v, and the color temperature of an external light source can be calculated and displayed in real-time in the AvaSoft-IRRAD module.

The CRI color-rendering index of a light source is also included in the AvaSoft IRRAD module. The color rendering index of a light source with a color temperature <5000K is a measure of how close a light source matches a perfect black body radiant. Additionally AvaSoft-IRRAD features a setting for auto-adjusting the integration time during a time sequence measure-ment, so a large dynamic range can be achieved for applications that have both a very high light level and a very low light level, such as solar measurements.

AvaSoft-IRRAD enables two ways to display and save calculated output:
- Data can be displayed as spectral irradiance in µWatt/nm versus wavelength. Additionally, the following output parameters can be displayed: radiometric quantities $\mu Watt/cm^2$, $\mu Joule/cm^2$, 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 $\mu Mol/s \cdot m^2$, $\mu Mol/m^2$, µMol/s and µMol. The AvaSoft-IRRAD module also displays raw data in Scope mode as well as the X-Y Chromaticity diagram, including parameters, which are useful for LED measurements, such as: Dominant Wavelength, Purity, Central Wavelength, Peak Wavelength, Centroïd, etc.
- In Time Measurement mode, any number of functions can be displayed simultaneously against time. For each function, a different radiometric, photometric, photon or color coordinate output parameter and/or wavelength range may be selected, as well as a different spectrometer channel.
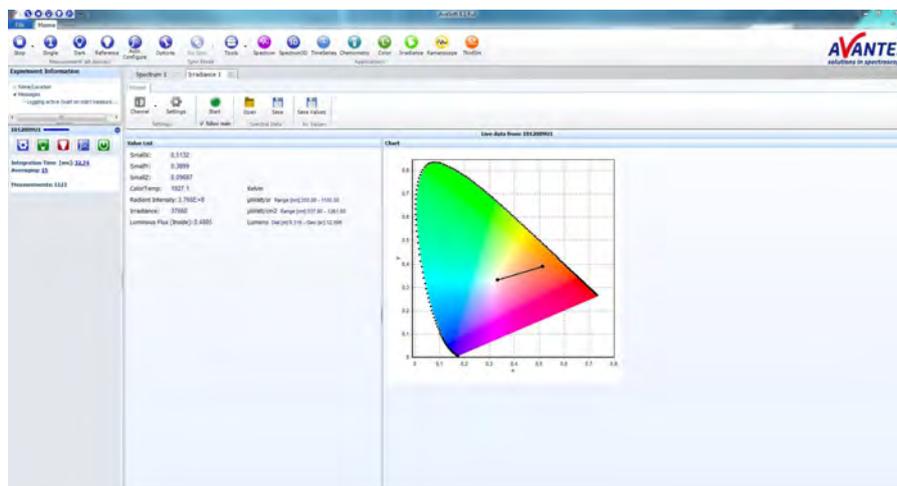
Ordering Information

AvaSoft-IRRAD	• Irradiance application add-on software, to be ordered with AvaSoft-Full
AvaSoft-All	• Full version AvaSpec software (includes AvaSoft-COL, -IRRAD, -Raman and, -ThinFilm)
IRRAD-DLL	• 32-bit DLL for Irradiance/LED application