

Custom Tunable Source for Camera Optimization



Technical Challenge

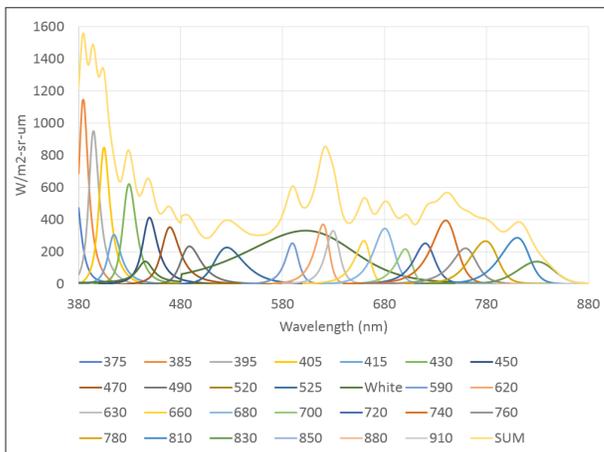
In developing a camera system, a client required a tunable source for calibration and testing. They requested that the upper hemisphere be replaced with a cylinder of the same diameter in order for the exit port to be large enough to cover the camera's entire field of view. A number of colors from the Macbeth ColorChecker® and standard illuminants were selected to use for testing, and it was important to match their spectrums as closely as possible.

Labsphere's Solution

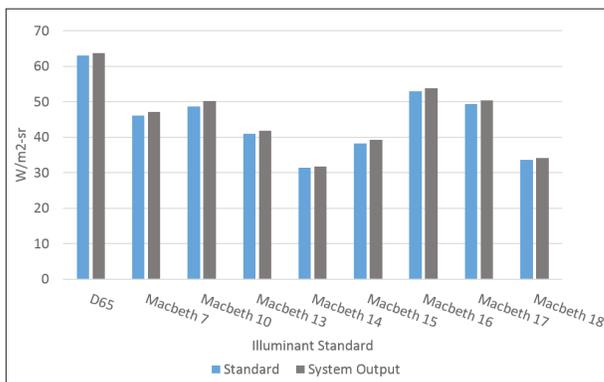
Labsphere's CCS technology presents a number of advantages over the ColorChecker by offering direct control of spectrum and intensity of a single surface. This custom system uses a light engine with additional channels and an optimized selection of light sources for an improvement of the fitting and an increase of the spectral range.

- 23 LEDs distributed over a plurality of wavelengths from 375 to 830 nm
- Spectrometer for real-time measurement of output spectrum and an incandescent source for its calibration
- Cylindrical upper portion with an exit port 10 inches in diameter
- Diffuser filter over exit port for increased uniformity
- Thermoelectric cooling unit for active temperature control
- Labsphere's CCS software for fine-tuned adjustability with added application-specific features

Spectral Radiance With Each LED at Maximum Output



Spectral Radiance of Illuminant Standards with System Output



Benefits

- With an average settling time of 0.4 seconds, the user can easily cycle through colors and perform tests faster
- Interior baffling and the diffuser give the system an 84% uniform output, even after straying from the traditional integrating sphere design
- The cylindrical design allows the client to calibrate cameras with larger viewing areas without having to acquire a larger sphere
- With an LED for every visible wavelength and Labsphere's CCS software, the user can generate any spectral output or choose from a list of presets, with a maximum radiance of 63 W/m²-sr
- The custom CCS software automatically generates solutions for standard illuminants and Macbeth colors, saving on calculation time and effort
- The thermal electric cooling unit operates automatically and ensures no components will experience heat damage