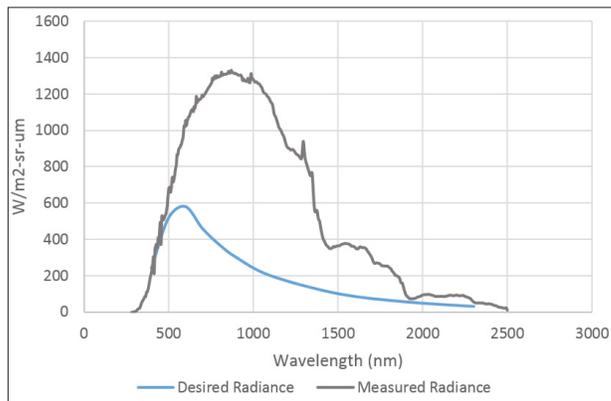


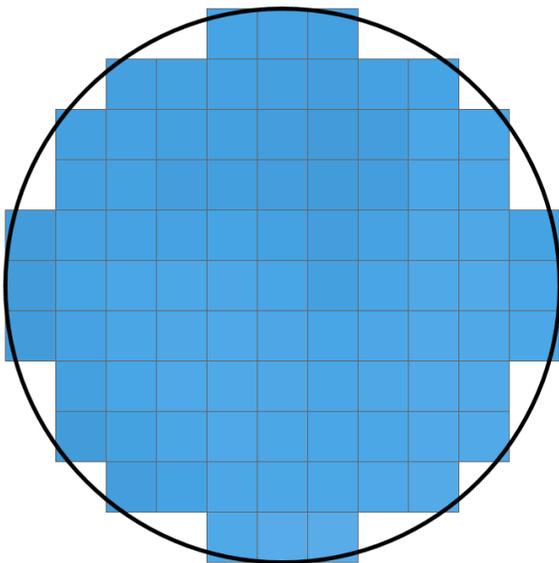
Custom Uniform Source for Hyperspectral Calibration



Spectral Radiance



Spatial Uniformity - 98.5%



Technical Challenge

Calibrating a hyperspectral camera requires an accurate reading of luminous intensity for many wavelength bands across the range over which the camera will operate. A national research center needed a calibration source for a hyperspectral camera it was developing with a focal length of 330 mm and an aperture size of f/1.4. The camera was designed to detect wavelengths ranging from the visible spectrum to well into the infrared spectrum, and their testing geometry required the exit port to be .4 meters in diameter.

Labsphere's Solution

Due to the size of the exit port, the sphere was approximately one meter across and used eleven light sources to achieve the desired spectral radiance. Our HELIOS® system is designed for similar applications, however; several application-specific features were necessary to meet the client's specifications:

- Two variable attenuators to allow for adjustable low light levels
- Four cooling fans to prevent the system from going over 50°C
- Fifteen bandpass (BP) filters covering bands from 400 to 2400 nm
- Two automatic filter wheels with slots to hold eight filters each
 - Silicon detector for reading spectral radiance in shorter wavelengths
 - InGaAs detector for reading spectral radiance in longer wavelengths
- Two port reducers with diameters of 300 mm and 200 mm
- HELIOSense software with individual control over every lamp and live data collection and visualization
- Full computer system, including mouse, keyboard, and monitor

Through the bandpass filters, the detectors could make measurements of the luminous intensity at certain wavelengths. Making these measurements across the active range of the hyperspectral camera establishes accurate and reliable reference data to compare to the data collected by the camera.

Benefits

- The motorized filters allow the user to quickly and automatically gather spectral data and calibrate the system
- Broad spectral control and availability, allowing fine-tuned adjustment of spectral radiance, color temperature, and wavelength distribution with Labsphere's HELIOSense software
- Full calibration reports were provided, including uniformity, continuous adjustability, radiance stability, and individual tests through each BP filter
- With 98.5% spatial and 99.2% angular uniformity, the system ensures accurate results on every test