Imaging Sphere for Scatter and Appearance Measurement
IS-SA™

Applications

- BRDF (bi-directional reflectance distribution function) measurement
- BTDF (bi-directional transmission distribution function measurement)
- Scatter characterization for BEF, anti-reflection films and other display components
- Material characterization and classification based on scatter for metals, plastics, paper, textiles and more
- Surface treatment characterization and classification based on scatter for cleaners, polishes, paints, coatings, and more
- Quality control sampling
- Generation of accurate, complete appearance models for optical design and rendering applications

Benefits

- Complete BSDF and TIS measurement in seconds for many materials
- Cost effective solution for a broad range of related measurement applications
- Fastest, easiest way to build BSDF libraries for arbitrary materials

Fast, flexible system for comprehensive scatter and appearance measurement

The IS-SA (Imaging Sphere for Scatter and Appearance measurement) provides **rapid, comprehensive measurement** of scatter distribution functions for almost any material, including films, metals, plastics, papers, textiles, and surface treatments such as cleaners, polishes, coatings and paints.

Designed for use in both R&D and production quality control applications for material characterization, quality assessment, and for generating libraries of BSDF (bi-directional scatter distribution function) measurements for computer **modeling and rendering**.

The IS-SA takes advantage of a novel optical configuration to measure $2\pi$ steradians (a full hemisphere) of scattered light at once, **dramatically reducing the time required to obtain a BSDF measurement**.

The IS-SA comes with Radiant’s sophisticated IS-SA control & analysis software providing flexible measurement set-up and intuitive operation. Extensive **data analysis and display functions**, including isometric plots, cross-sectional graphs, radar plots, bit maps and color graphs, are also included with the IS-SA software.

With an **optional tunable light source**, the IS-SA can be used to measure BSDF as a function of wavelength. Additional options include a Transmission Arm attachment for BTDF (transmission) measurement, and a goniometric positioning stage to automatically move and rotate the material sample.

Optional software extensions allow the IS-SA user to perform view angle performance measurement for displays or luminous intensity distribution measurement for small light sources. A further option allows the IS-SA ProMetric imaging colorimeter to be used in **stand-alone mode** for direct measurement.

Radiant Imaging offers a **full line of Image Spheres** including the IS-LI TE for luminous intensity distribution measurement, IS-LI for luminous intensity measurement, and the IS-VA for display view angle performance measurement.

To see how much information is captured by an Imaging Sphere and how easy it is to use, visit www.radiantimaging.com and **download the demo** IS-SA software.
Key Features

- Support for photopic, colorimetric, and spectral scans
- Full, automated control over illumination angle of the light source
- Extensive configuration options for light source and sample control
- Easy to use control and analysis software interface
- Data can be exported for use in optical design and rendering tools

Specification*

Optical Specifications

- CCD type: Full-frame, cooled and temperature stabilized CCD
- CCD bit depth: 16-bit (65,536:1) dynamic range
- Resolution: Either 512x512 or 1024x1024 pixel CCD options
- Field of view: Approximately 2n steradians
- Neutral density filters: ND0, 1, and 2 standard
- Standard illumination angle: Continuous to 80° (reflection)
- Continuous 110° to 180° (transmission option)
- Illumination source: Metal Halide or Halogen
- Sensitivity: Less then 5% reflectivity
- System accuracy: BSDF: ±5%, TIS (total integrated scatter): ±5%
- Minimum measurement time: Photopic: 1 sec, Color: 5 sec

Mechanical Specifications

- Overall size: 88 cm x 66 cm x 110 cm
- Orientation: Rotatable to vertical, face-down or face-up positions
- Angular resolution: 0.5° for illuminator positioning
- Weight: 120 kg
- Construction: Integrated imaging dome and imaging colorimeter
- Maximum sample size: Unlimited for reflectance measurement
- Illumination area: 10 mm or 20 mm

Control and Analysis Software Specifications

- Measurement capability: BRDF, CCBRD, BTDF, CCBTDF, TIR (Total Integrated Reflectance), TIS (Total Integrated Scatter), Gain, Relative Color: CCT, CIE x,y, u,v; ΔE

IS 1.x Software

- Measurement set-up and image capture control
- Gray-scale and false color display
- Cross-Sections of scatter & relative color
- 3D surface plot of scatter & relative color
- Isometric plot of scatter & relative color
- Graph and image comparison for multiple captures
- Export BSDF data to optical design & rendering tools
- Reports of TIS, TIR, and color
- Process measurements (rotate, add, threshold, etc.)

Optional Equipment

- Transmission arm for BTDF measurement
- XYΦ Stage for automated sample positioning and rotating
- Automated specular light removal
- Calibration samples
- Aperture mask calibration device
- Monochromator for automated spectrally tunable illumination

* Specifications subject to change without notice

System Requirements

- 2.0 GHz or faster processor
- 1GB or greater RAM
- Windows®, XP, Vista or 7 (32-bit)
- USB 2.0 interface