Import ANSI/IESNA Photometric Data to TracePro

With TracePro® Opto-Mechanical Design Software's IES Import Utility

TracePro's IES Import Utility helps users import photometric data in ANSI/IESNA standard electronic file formats to generate TracePro File Sources and Surface Source Properties. This utility is for use with all TracePro editions.

The setup files and instructions for installation of the IES Import Utility may be downloaded:

http://www.lambdares.com/technical_support/tracepro/utilities/

IESNA Standard File Format

The Illuminating Engineering Society of North America (IESNA) publishes "IESNA Standard File Format for the Electronic Transfer of Photometric Data and Related Information." The most recent publication, LM-63-02, was ANSI approved September 12, 2002 and is available at www.techstreet.com. The TracePro IES Import Utility adheres to this most recently published standard. For a detailed description of all file data, please refer to the copyrighted published standard.

The IES Import Utility supports Photometric Type B and Type C. Refer to IESNA-75-01 for a detailed explanation of goniometer types.

Modeling Sources with TracePro

TracePro

TracePro is a comprehensive, versatile software tool for modeling the propagation of light in opto-mechanical systems. Models are created by importing design files from a lens design program or a CAD program or by directly creating the solid geometry in TracePro. Optical and mechanical properties are applied to materials and surfaces. Source rays propagate through the model with portions of the flux of each ray allocated for absorption, specular reflection and transmission, phosphorescence, and scattering.

From the model, analyze:

- Light distributions in illumination and imaging systems
- Lumens exiting, absorbing, and incident at the component and system levels
- Candela distributions
- Optical efficiency, luminance and radiance metrics
- Luminance effects and lit appearance
- Fluorescence effects of phosphors

Modeling Optical Sources in TracePro

There are three methods of defining rays that launch into the model for ray trace – Grid, Surface and File sources. Most useful for modeling LEDs and lamps for commercial lighting applications are Surface Sources and File Sources.

A Surface Source emits rays from a user-defined source type in an angular distribution and spectrum from one or more surfaces of a solid object. The example that follows makes use of the Surface Source method of defining rays that launch into the model for ray trace.
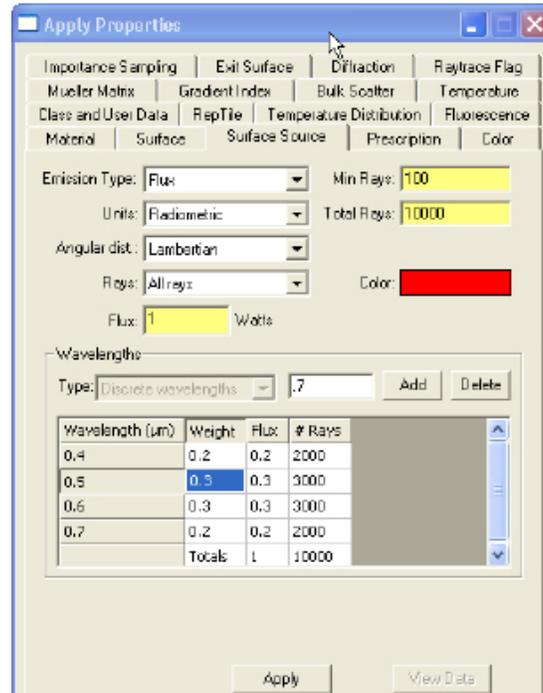
A File Source contains ray data and can be inserted into a TracePro model. Data consists of XYZ starting points for each ray, XYZ direction vectors for each ray, and a flux. A File Source allows the user to:

• include actual measured source distribution data from companies offering LED or lamp characterization services such as Radiant Imaging, Inc. (www.radiantimaging.com)
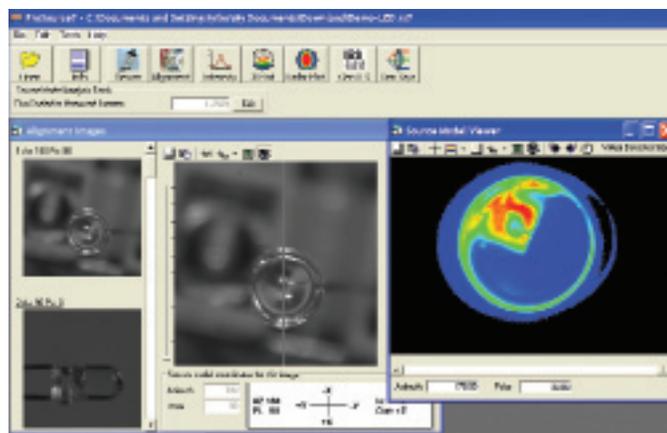
• include properties from IES files
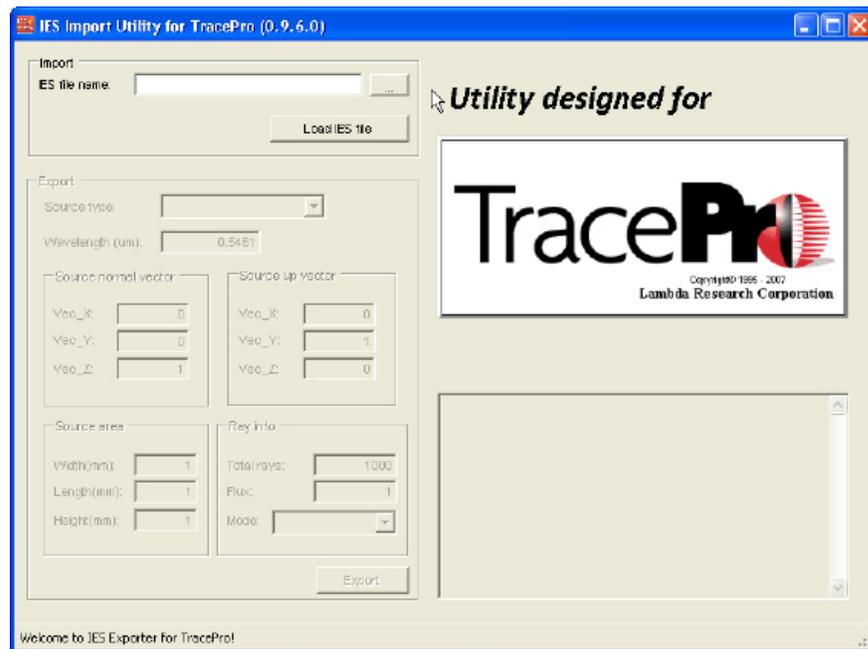
TracePro IES Import Utility

IESNA File

With the IES Import Utility, specifications from an IES file can be directly exported to a Surface Source Property or File Source and used in an open TracePro model.   Contents of the IES file that export to TracePro source models include:

- Source output as a function of luminaire tilt angle
- Number of sources and lumens per source
- Candela value multiplier
- Number of vertical and horizontal angles
- Photometric Type B or Type C
- Dimensions, shape, and units of luminous area or volume
- Input watts
- Vertical and horizontal angles
- Candela values for vertical and horizontal angles

User Interface

The IES Import Utility user interface consists of:
- Import IES file (upper left)
- Export to TracePro source property (lower left)
- 3-D viewer (upper right)
- IES text file viewer (lower right)

IES Import Utility User Interface

Import IES File
To import an IES file, browse, select file and press "Load IES File". As an example, browse and load the file, OSRAM O-STAR-test.ies. When loaded, the data from the IES file is displayed in the 3-D Viewer and the IES Text File Viewer.

3-D Viewer
Options for viewing the source are accessible with a right mouse click on the 3-D Viewer window. They include "Light", "Wired/Solid", "XY View" and "XZ View". Additional features for viewing include:

- Mouse wheel to zoom in and zoom out
- Left mouse button + mouse move to rotate view
- Alt + mouse left button + mouse move to translate view
- Double click left mouse bottom to move the viewing center to origin
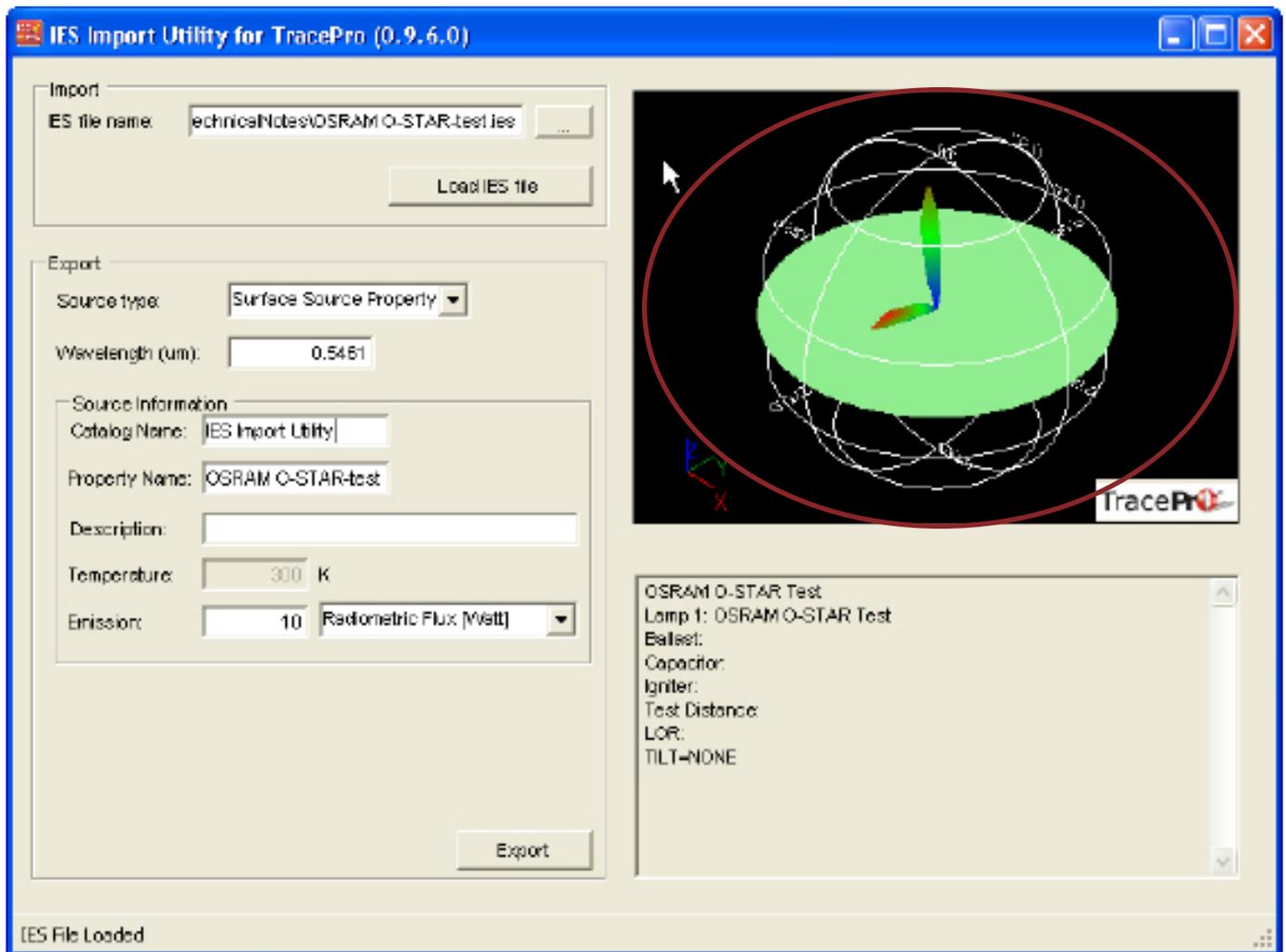
3-D Viewer

Export to TracePro
The Utility exports to either a TracePro Surface Source Property or a TracePro File Source.

Export to TracePro Surface Source Property
The Utility exports a TracePro Surface Source Property. As an example, select "Surface Source Property" as the "Source type".
Select "Export" and specify the location and name of the saved TracePro Surface Source Property *.txt file.
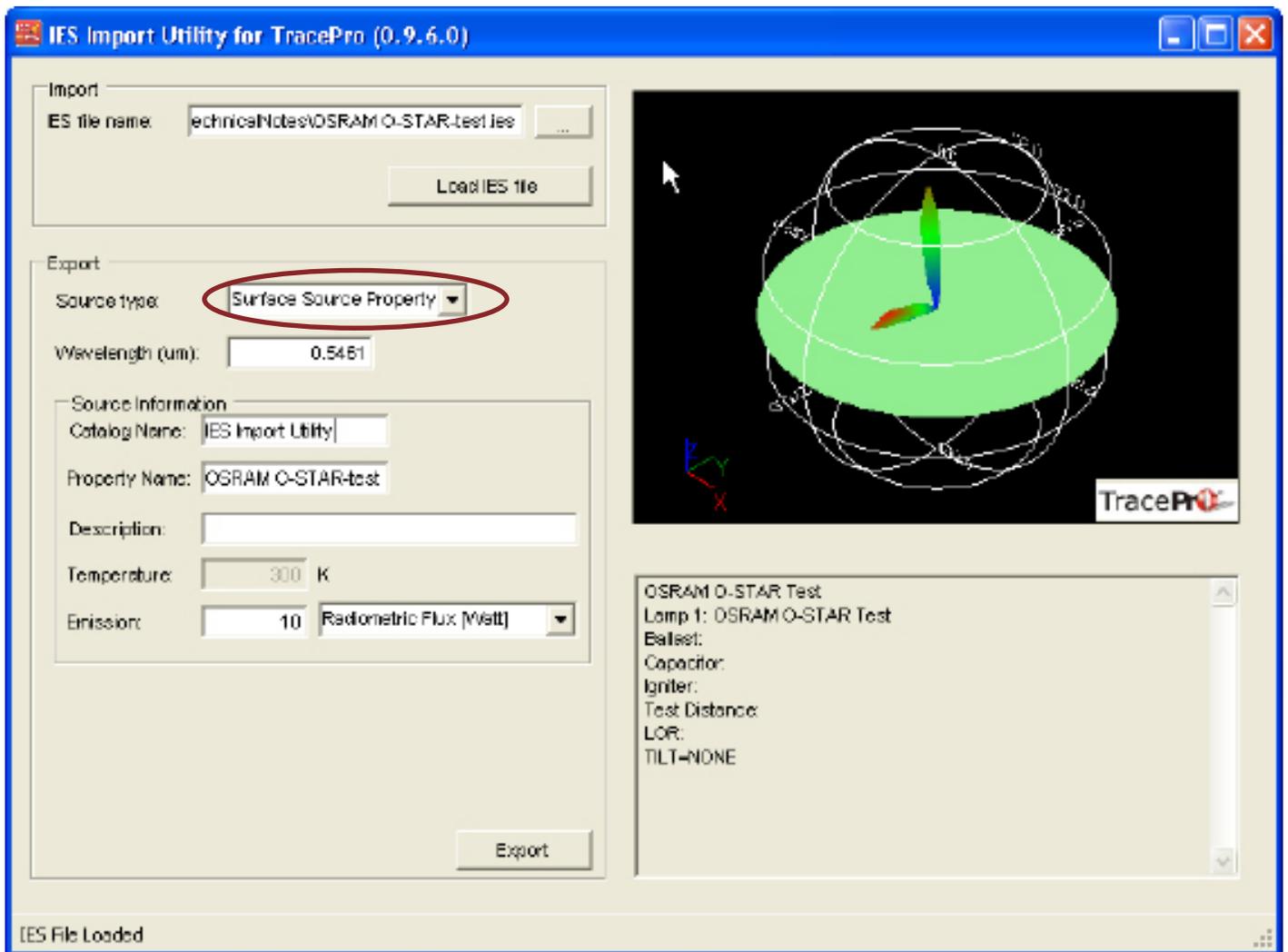
Surface Source PropertyExport

The Surface Source Property text file can be opened in a Text Editor application.
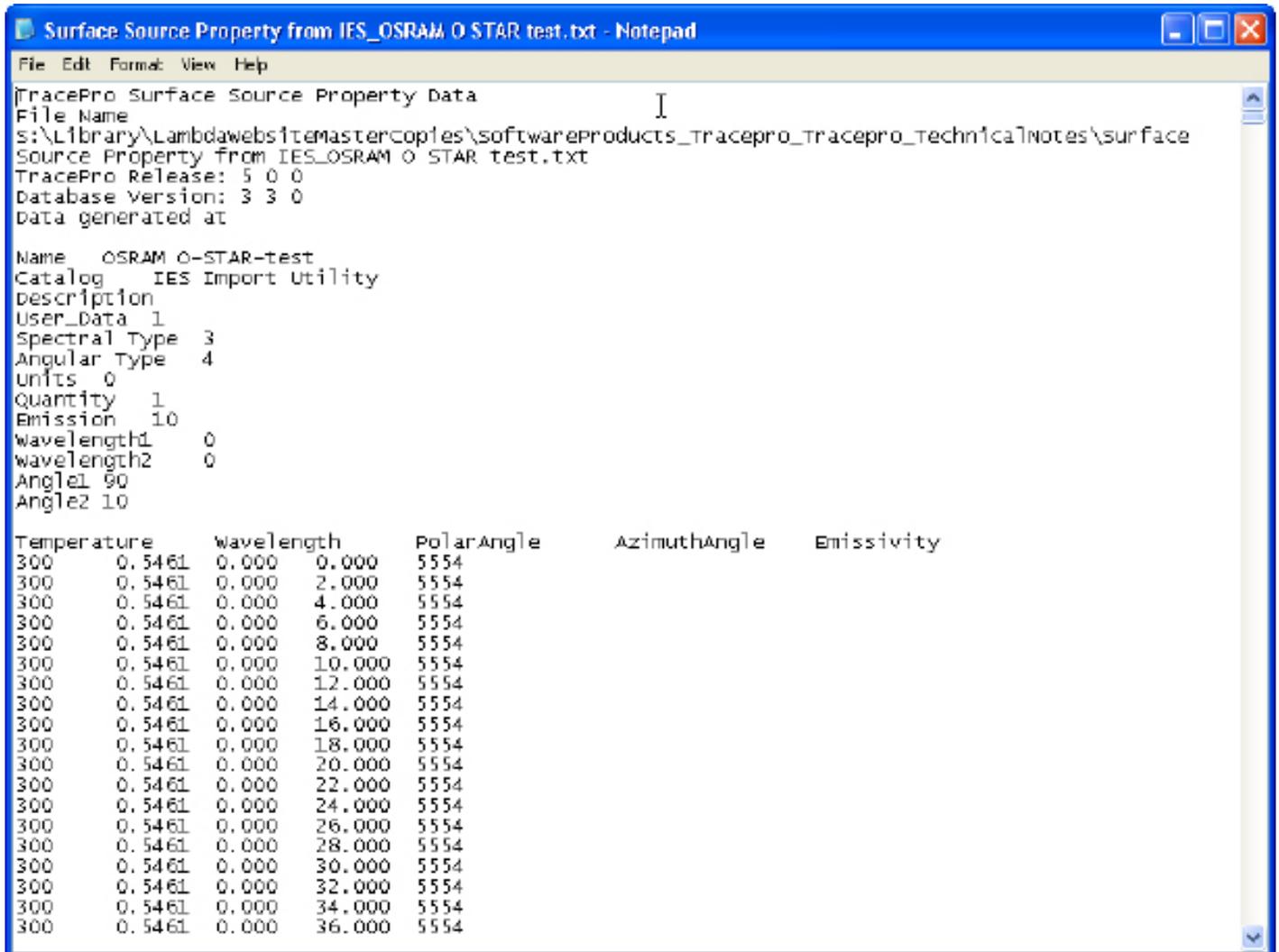
```
Surface Source Property from IES_OSRAM O STAR test.txt - Notepad
File  Edit  Format  View  Help

TracePro Surface Source Property Data                    I
File Name
s:\Library\LambdaWebsitemastercopies\softwareProducts_Tracepro_Tracepro_TechnicalNotes\surface
Source Property from IES_OSRAM O STAR test.txt
TracePro Release: 5 0 0
Database Version: 3 3 0
Data generated at

Name    OSRAM O-STAR-test
Catalog     IES Import Utility
Description
User_Data   1
Spectral Type   3
Angular Type    4
units   0
Quantity    1
Emission    10
wavelength1     0
wavelength2     0
Angle1 90
Angle2 10

Temperature      wavelength         PolarAngle        AzimuthAngle      Emissivity
300       0.5461   0.000    0.000    5554
300       0.5461   0.000    2.000    5554
300       0.5461   0.000    4.000    5554
300       0.5461   0.000    6.000    5554
300       0.5461   0.000    8.000    5554
300       0.5461   0.000    10.000   5554
300       0.5461   0.000    12.000   5554
300       0.5461   0.000    14.000   5554
300       0.5461   0.000    16.000   5554
300       0.5461   0.000    18.000   5554
300       0.5461   0.000    20.000   5554
300       0.5461   0.000    22.000   5554
300       0.5461   0.000    24.000   5554
300       0.5461   0.000    26.000   5554
300       0.5461   0.000    28.000   5554
300       0.5461   0.000    30.000   5554
300       0.5461   0.000    32.000   5554
300       0.5461   0.000    34.000   5554
300       0.5461   0.000    36.000   5554
```
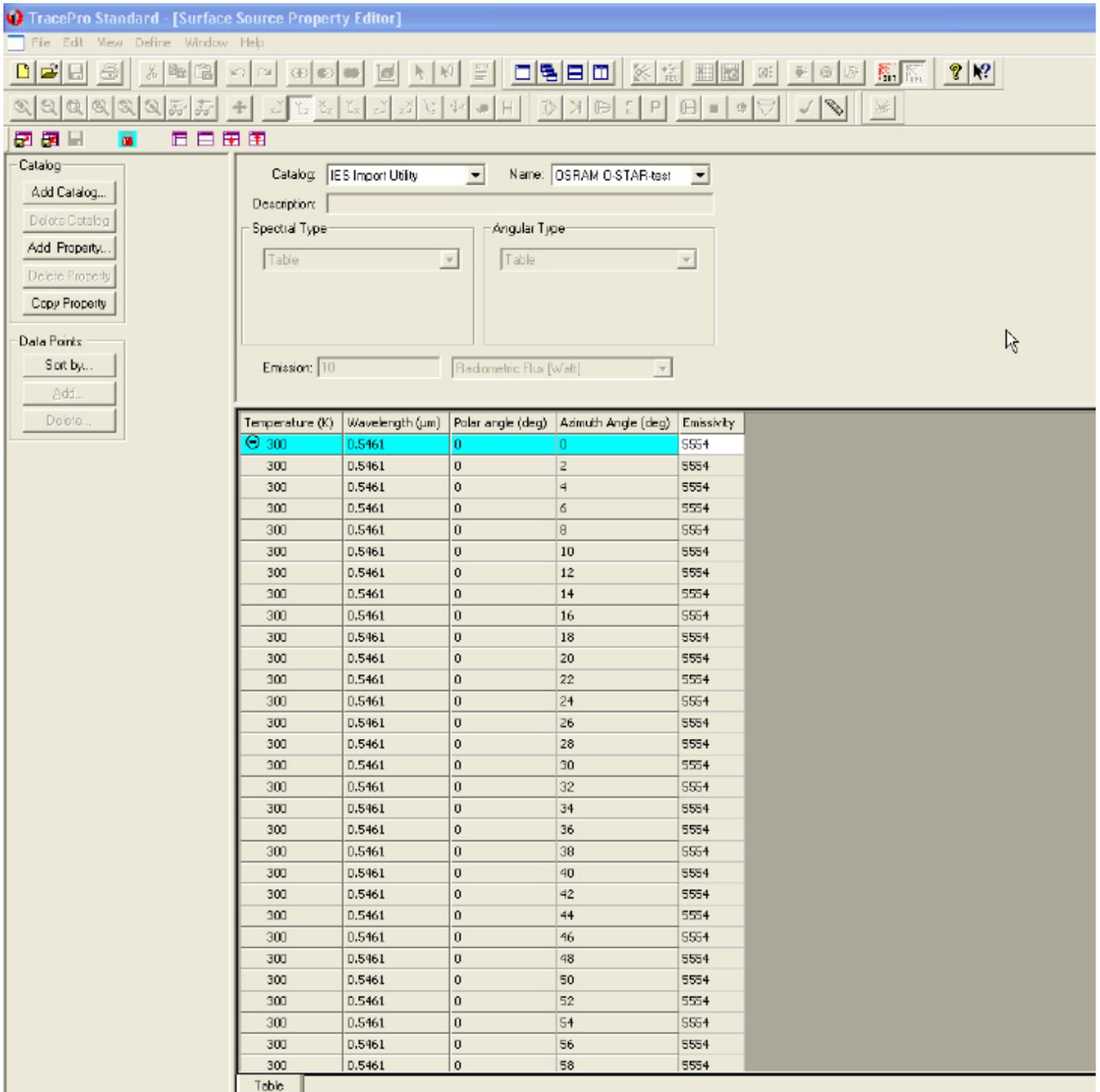
TracePro *.txt Surface Source Property file

To import the Surface Source Property in TracePro, select Define/Edit Property data/ Surface Source Properties to open the Surface Source Property Editor. Then select File/Import to import the property text file..
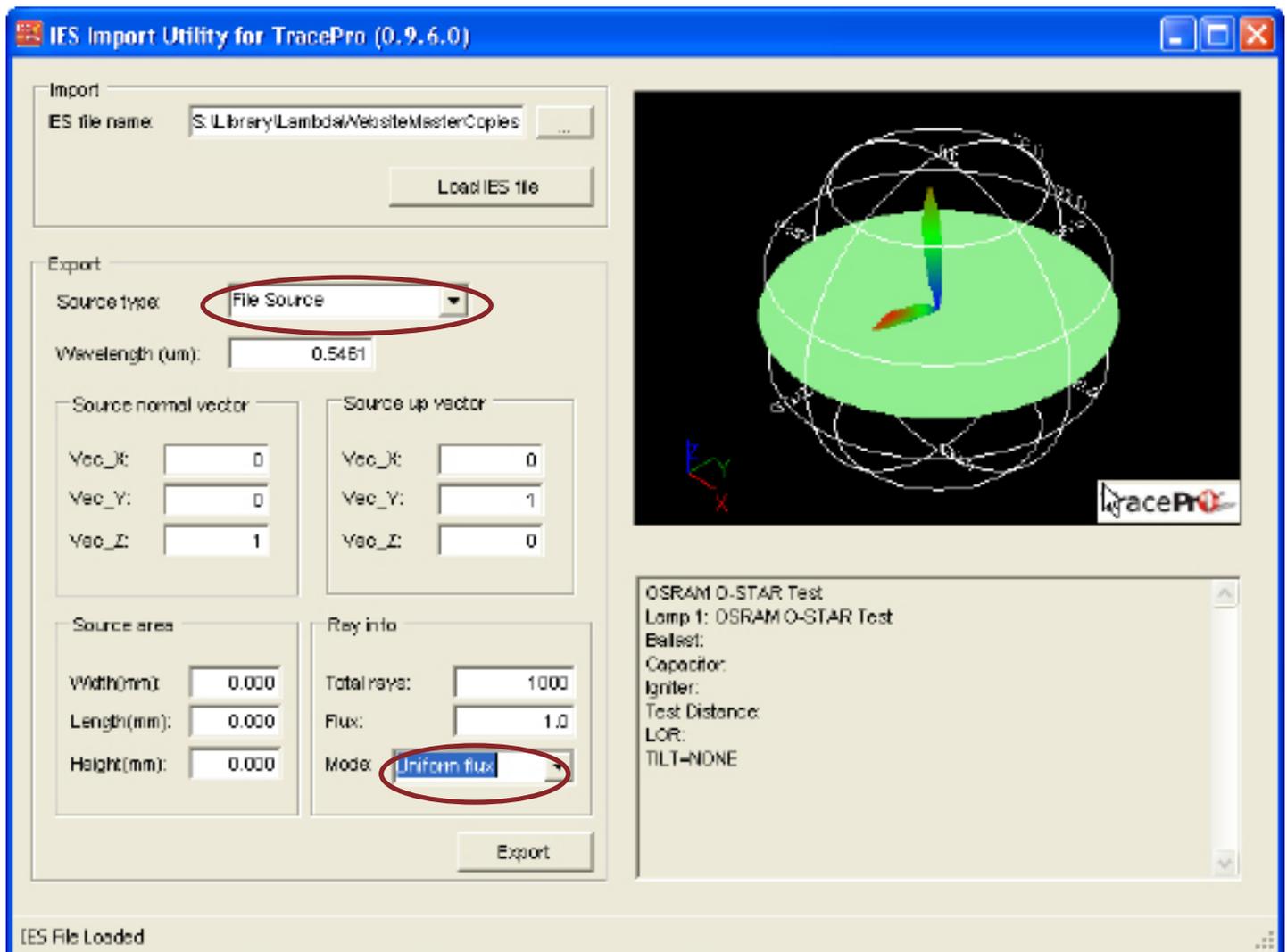
Export to TracePro File Source

The Utility exports to a TracePro File Source Property. The "Source normal vector", "Source up vector" and "Source area" data fields are used to generate the ray information. The IES Import Utility randomly generates the origins of rays within the specified source area. Each ray direction is determined by the IES file and the normal vector and up vector of the source. After the file source is generated, it is possible to modify the source position and direction in the TracePro model.

The Utility accommodates two options to make the far field measurement similar to the distribution defined in the IES file - "Uniform flux" and "Uniform angle".

When "Uniform flux" is selected, each ray carries equal flux, but it is possible that the angular distribution is weighted over the angles defined in the IES file. When "Uniform angle" is selected, each ray carries a different and weighted flux, but the distribution is normally distributed over angle.

As an example, select "File Source" as the "Source type". Select "Uniform flux" for "Mode". Select "Export" and specify location and name of the saved TracePro Surface Source Property *.txt file.
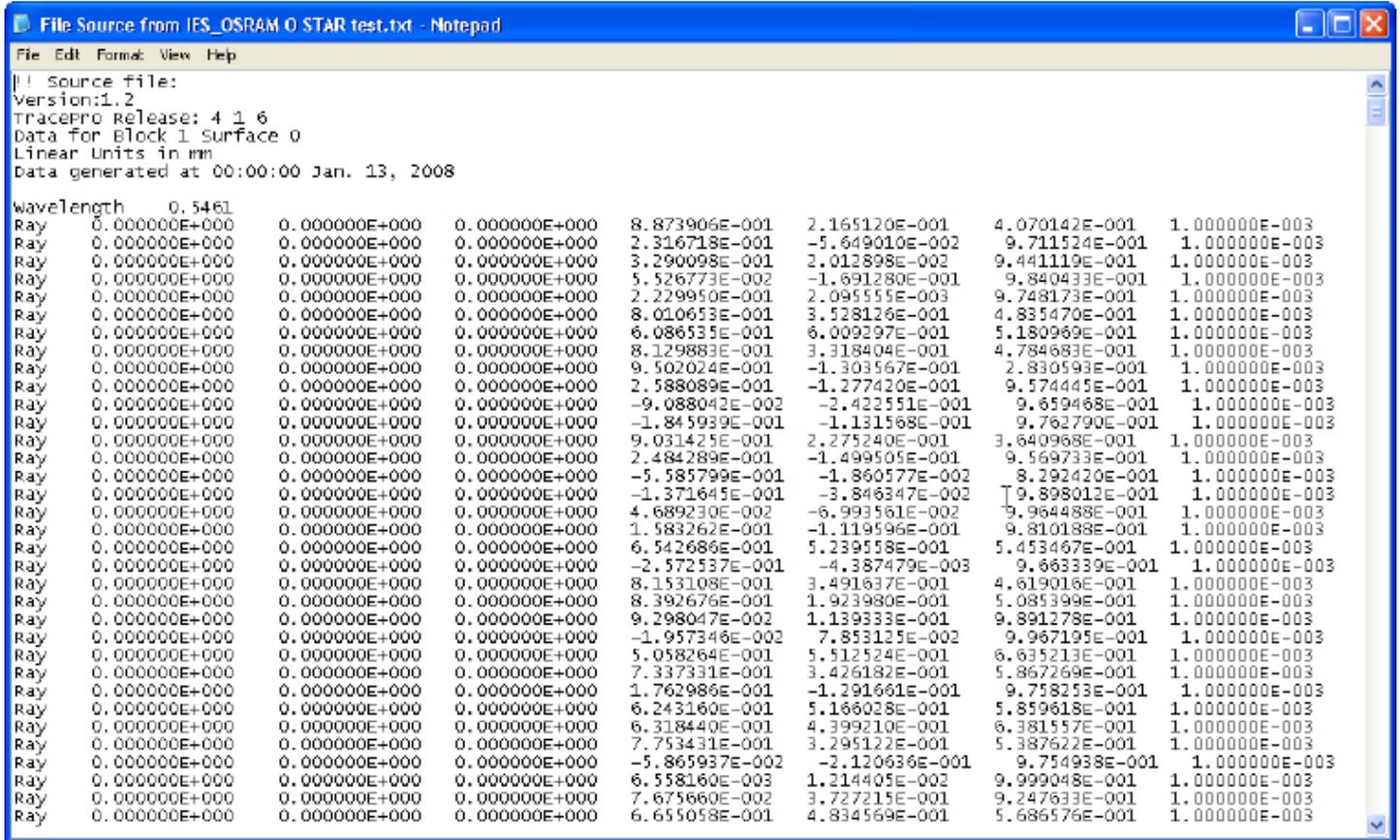


File Source Export with uniform flux, weighted angle
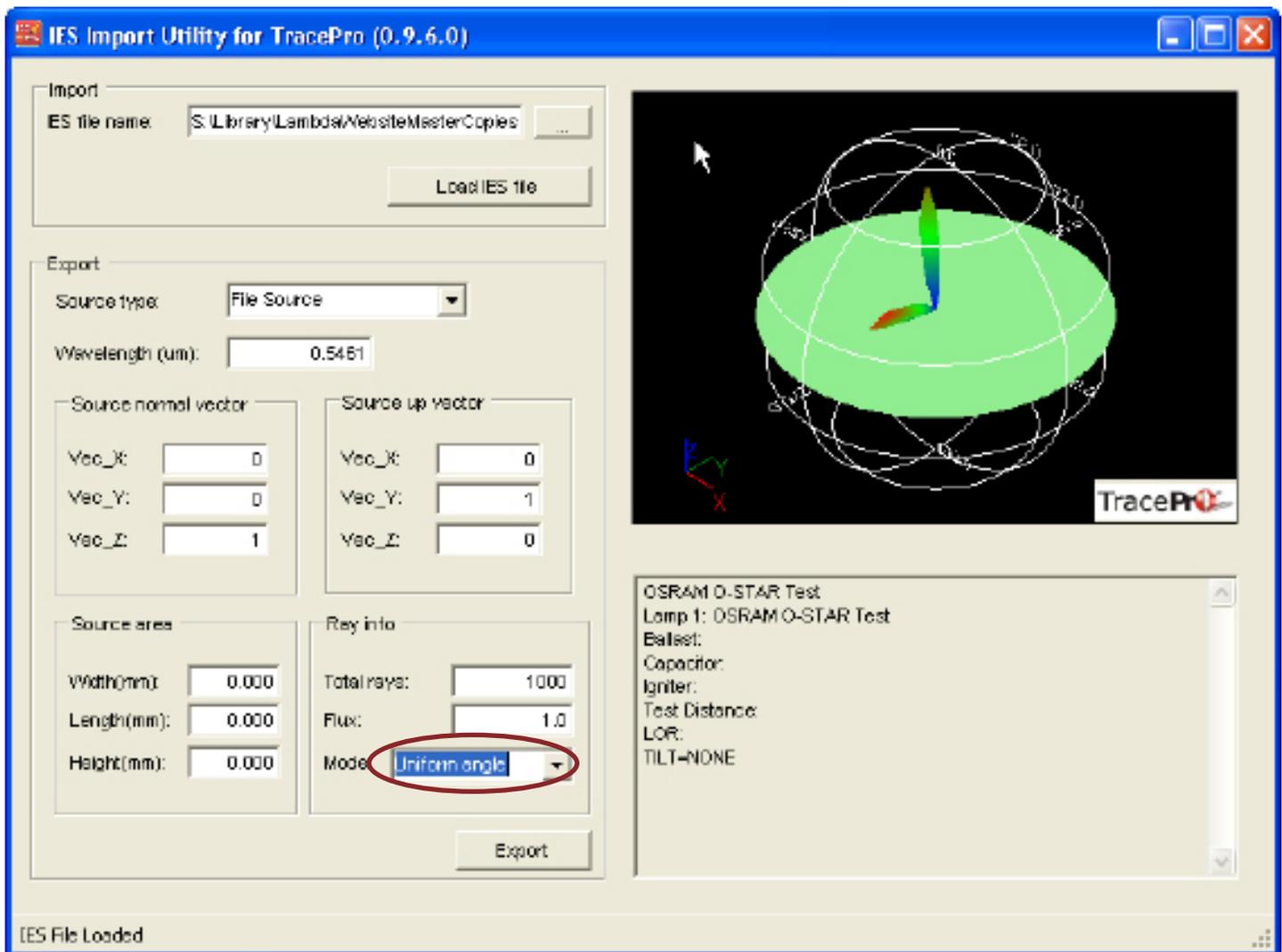
File Source Export with uniform angle, weighted flux

The File Source text file can be opened in a Text Editor application.

TracePro *.txt File Source Property file

To insert the File Source into a TracePro model, select Define/File Source to open the Surface Source Property Editor. Then select File/Import to import the property text file..
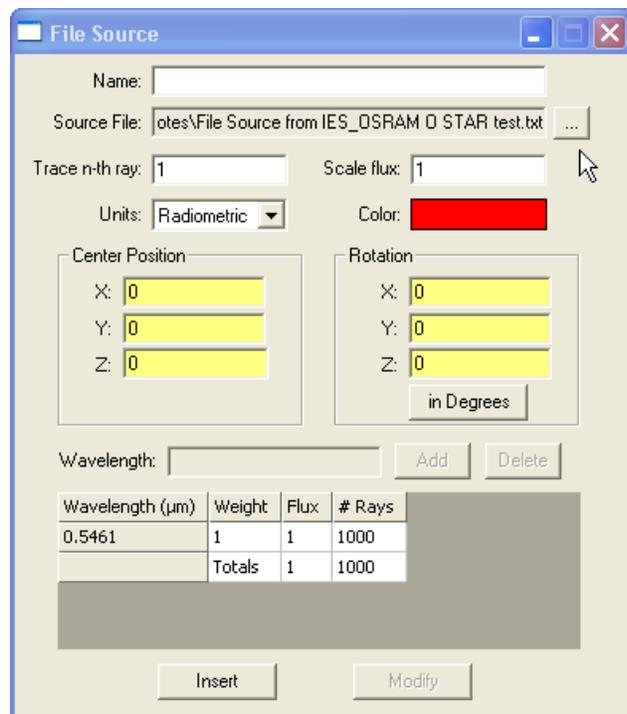
Compare TracePro Export Options

After performing a TracePro raytrace using each of the 3 IES Import Utility export options, the Rectangular Iso-Candela Plots below demonstrate that the results are quite similar (and would converge to the exact same result if enough rays are traced).
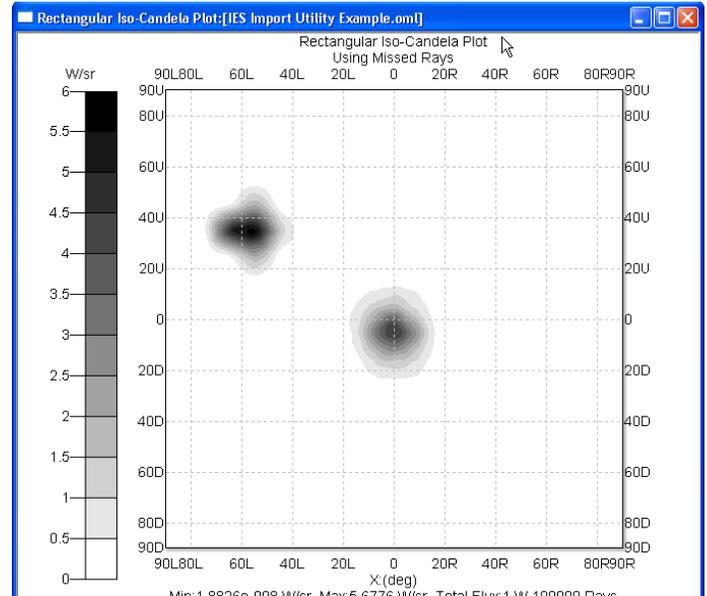
Export File Source Property where each ray has equal flux and weighted angular distribution
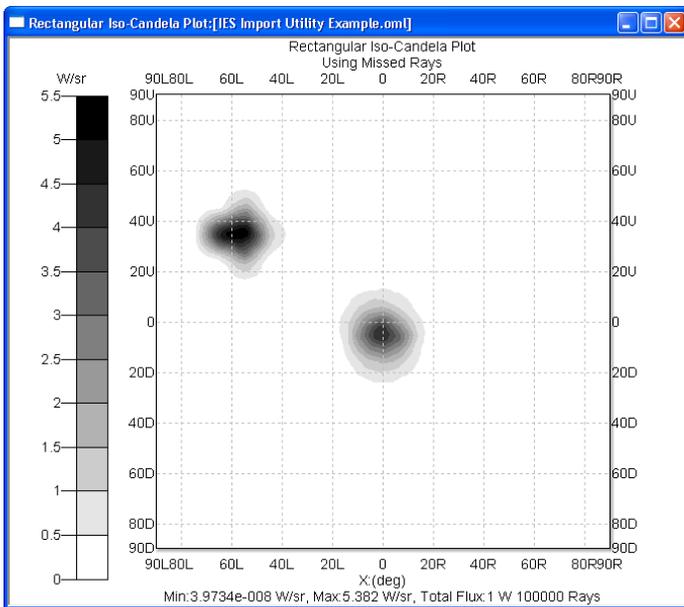
Export Surface Source Property
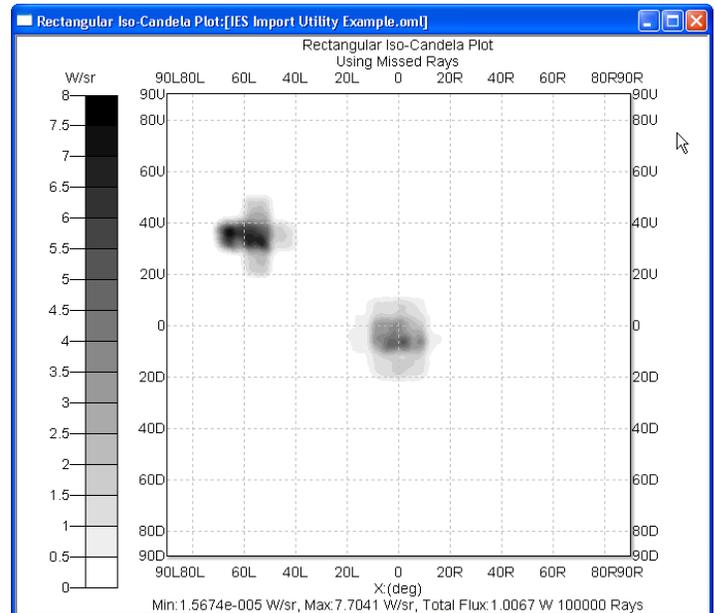
Export File Source Property where each ray has weighted flux and uniform angular distribution

Summary

In line with TracePro's simple, intuitive interface and short learning curve, the IES Import Utility allows users to quickly import measured data to TracePro source models. For more information, please contact Lambda Research's Application Engineers at sales@lambdares.com.