TRACEPRO Simulation of Lighting Systems

TracePro® simulates all types of lighting systems, from Troughers to down light systems. The product is based on Spatial Technologies' ACIS® engine creating compatibility with 170 other ACIS based programs, like AutoCAD, CADKEY, and Solidworks. Full non-sequential ray tracing is built into the program in a fully C++ graphical user interface integrated environment.
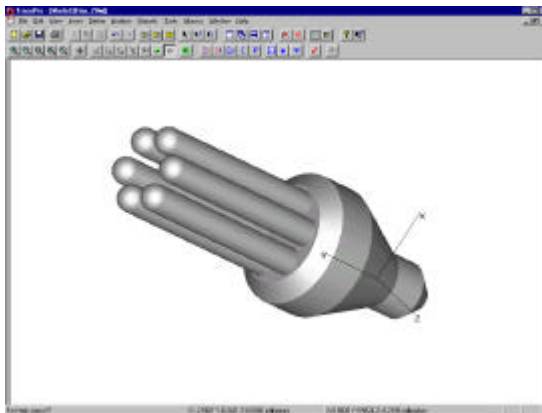

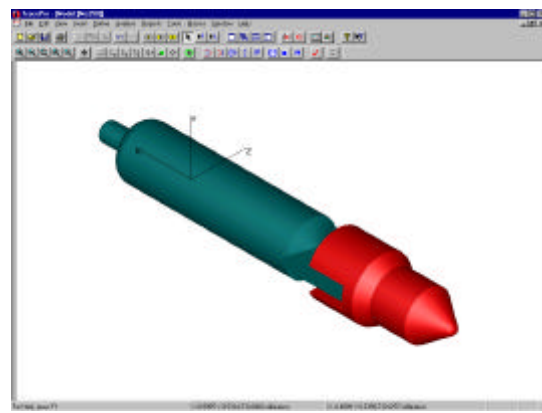Figure 1 – Rendered BiaxW_20 bulb

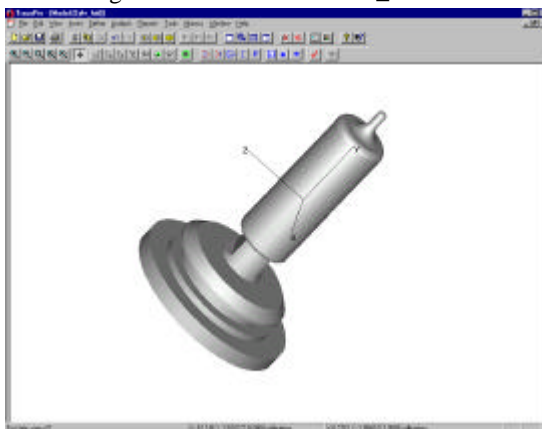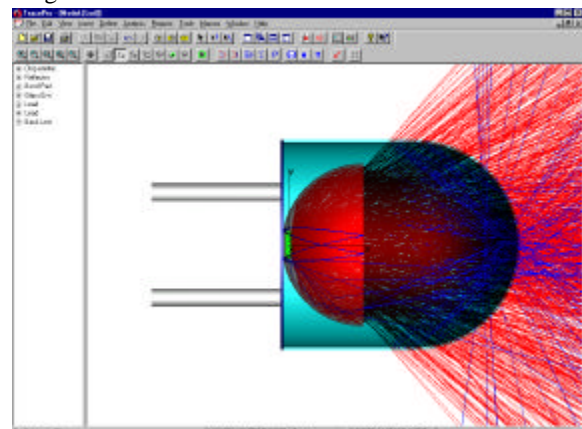Figure 2 – Rendered MC 250 bulb

Figure 3 – Sylvania HID

Figure 4 – Silhouette view of an emitting LED

Source modeling is easy in TracePro, either by importing the geometry from any SAT compliant product, importing an IGES or STEP file or creating the source geometry inside of TracePro. Since TracePro's CAD system is built into the product, it is an easy process to add source geometries, irradiance, flux or blackbody characteristics and then simulate the light source using Monte Carlo ray tracing. TracePro is completely non-sequential, rays are emitted as source surfaces or grid emitters. These emitted rays then intersect each surface and the ray flux is tracked as the rays reflect, transmit, scatter and absorb at each surface.

TracePro excels by showing where problem areas occur. TracePro has the capability to both create rendered, wireframe and silhouettes views with rays overlaid on top of the system geometry to show scatter, absorption, refraction and reflection. This output continually shows the user surface by surface as the rays are propagated until they are finally absorbed.
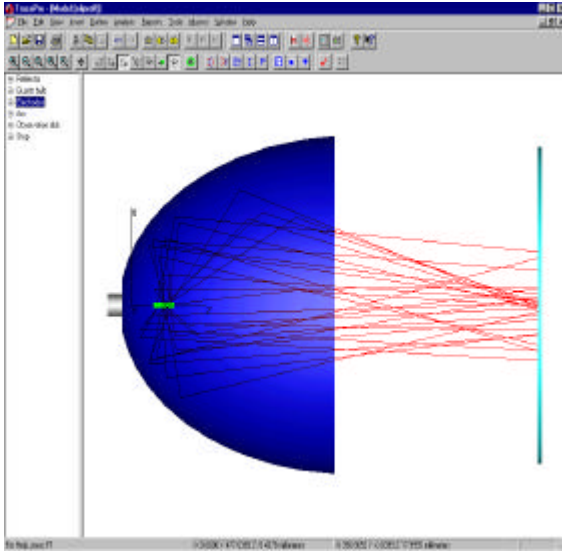
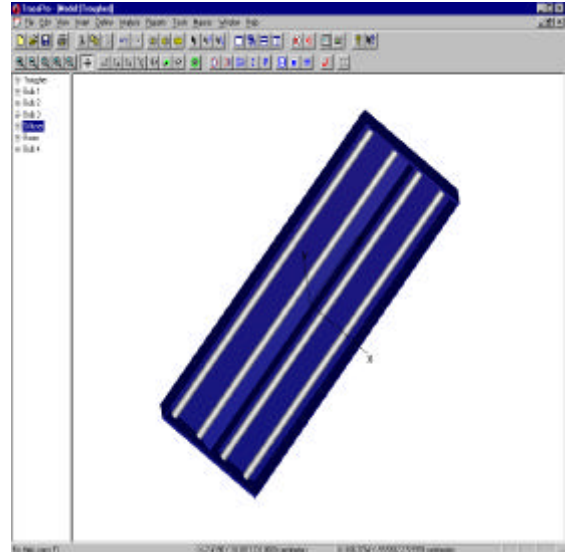Figure 5 – Down light reflector with arc lamp

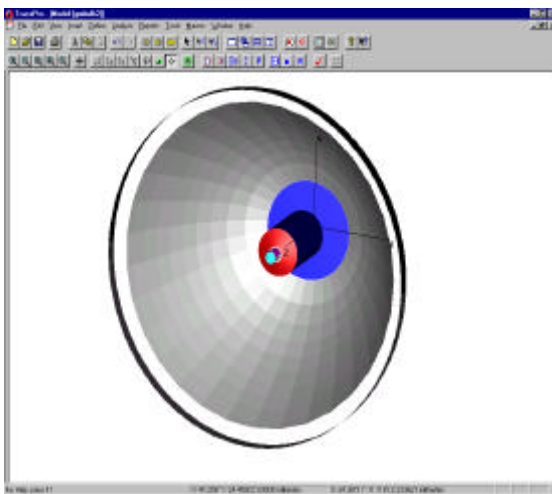Figure 6 – 4 Tube Trougher

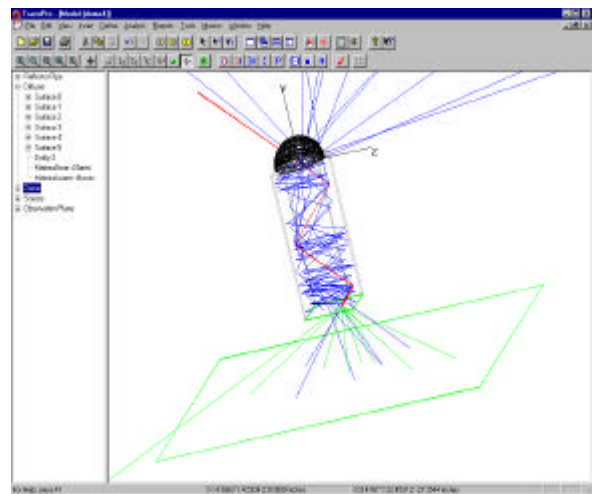Figure 7 – Solux Bulb and reflector

Figure 8 – Solar Tube skylight

After creating or importing the geometry, you can merge in existing source models or create your own. Add multiple source if needed and then Monte Carlo ray trace from the source. The program than absorbs, reflects, transmits, and scatters off each surface to singular or multiple observation planes. You can then see the output propagate on any surface keeping track of the energy distribution in both position in and direction space. Ray flux can be visually kept track of by TracePro's unique use of color to show ray flux, red shows high intensity rays while blue shows lower intensity rays.

Tracepro can handle unusual system geometry like prismatic structure, faceted reflectors, diffusers and bulk absorption of materials. The most important aspect of TracePro is its ease of use, typical users learn TracePro from our 50 page tutorial in PDF format within a week. Another important aspect is our complete 3D visualization of the system, bulb geometry, and rays traced showing flux intensity. The program is capable of a complete tabular breakdown of how the energy propagated through the system.
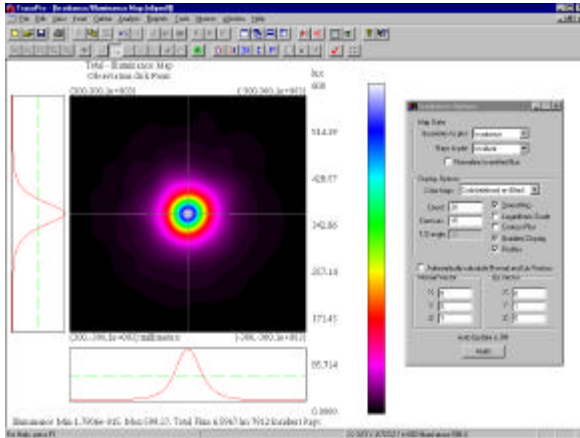
Figure 9 – TracePro irradiance map of the Down light in Figure 5, notice the cross-sectional views below And to the left of the pseudo-color plot
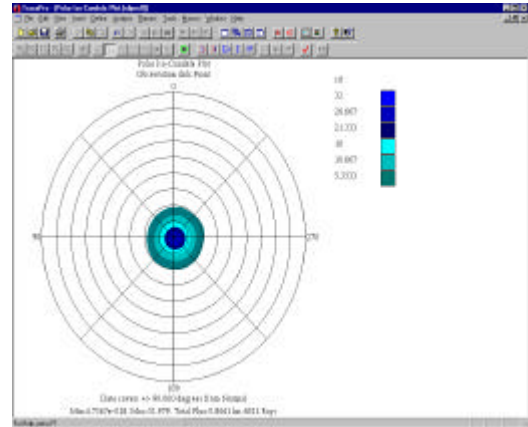
Figure 10 – Iso-Candela plot for the Down light in Figure 5. As expected most of the energy is collimated on axis

TracePros' outputs include both the standard 2D and 3D irradiance/illuminance, and isocandela plots but go further with direct output to any Windows clipboard compliant product. TracePro is the only program to product 3D irradiance plots on curved system geometry. Also track down exact information using tabular incident surface histories and ray propagation path history. The program has a complete flux report detailing the lost, absorbed and incident flux on every surface and object in the system.
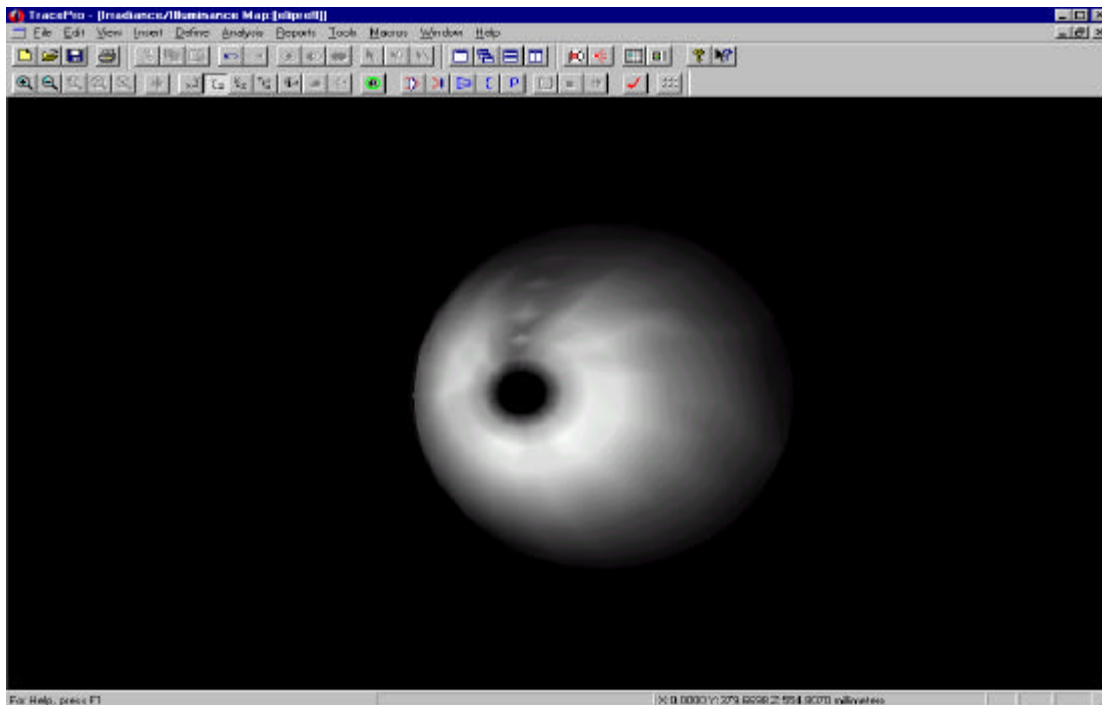

Figure 11 – 3D Irradiance map on the inside of the down light reflector