

TracePro® Simulation of Instrument Panels and Display Systems

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

Running TracePro is a simple four-step process. First, either enter the 3D system geometry inside TracePro's CAD window or import SAT, IGES or STEP files. Next, create sources by either defining a grid of rays, adding source characteristics to system geometry, or importing measured Radiant Imaging sources. Next, apply material and surface properties to the geometry by opening property dialog boxes and clicking on system geometry. Finally, define ray-tracing characteristics, including wavelengths, thresholds, and propagation characteristics, then click on the source emission icon to start the ray-trace.

Further, TracePro has the capability to create 3D rendered, wireframe, and silhouette views with rays traced to show scatter, absorption, refraction, polarization and reflection interaction within the system geometry. This output continually shows the user how energy is propagated surface by surface and how it was absorbed, reflected, polarized, scattered or absorbed.

TracePro creates models of single or multiple arc lamps, fluorescent lamps, LEDs, incandescent bulbs, and laser diodes as display sources. Source models can be defined as flux, irradiance or blackbody emitters in either photometric or radiometric units.

TracePro's interface excels in finding problems using an advanced ray sorter. The ray sorter tracks down problem areas by showing flux loss by a change in ray color. Figure 2 shows the highest intensity rays in red and the lowest in blue. Additional dialog selections allow the user to step through the system surface by surface or as a percentage of the rays traced.

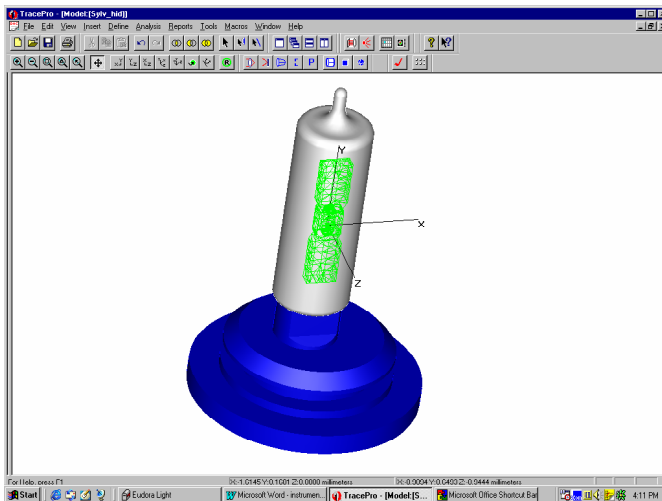


Figure 1. Sylvania Arc Lamp Bulb

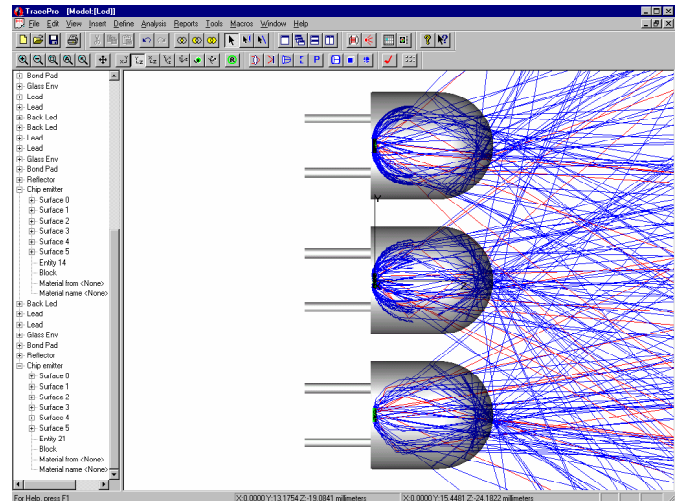


Figure 2. Silhouette view of 3 common LEDs shown emitting

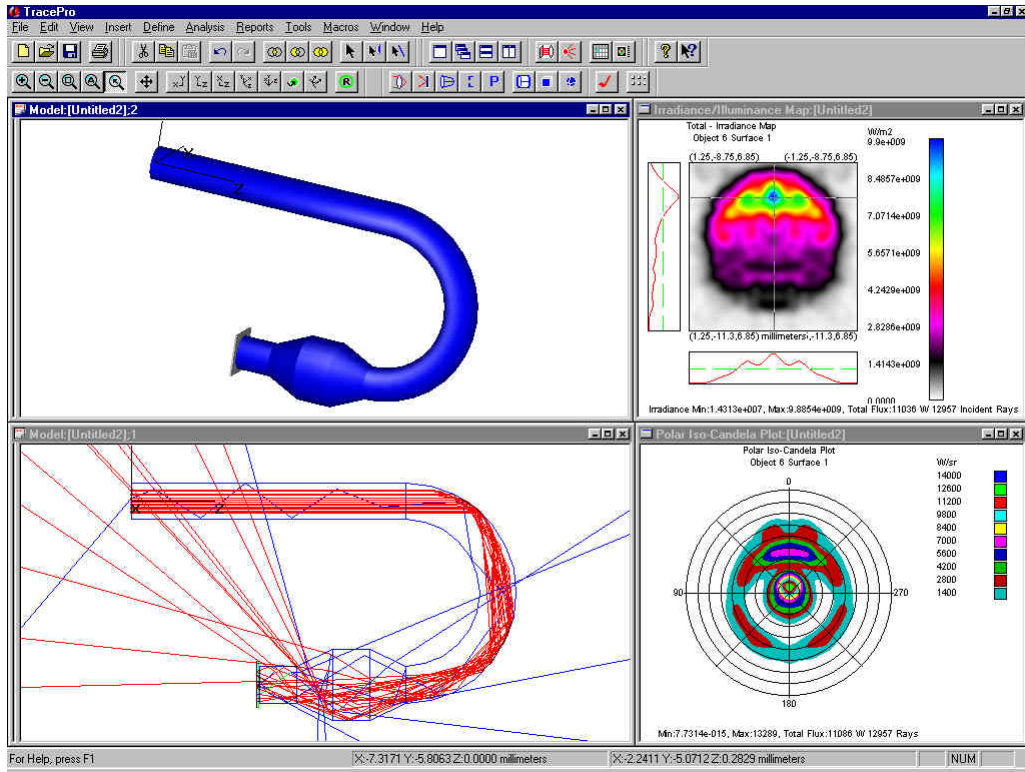


Figure 3. Rendered light pipe with rays traced, irradiance and iso-candela maps shown

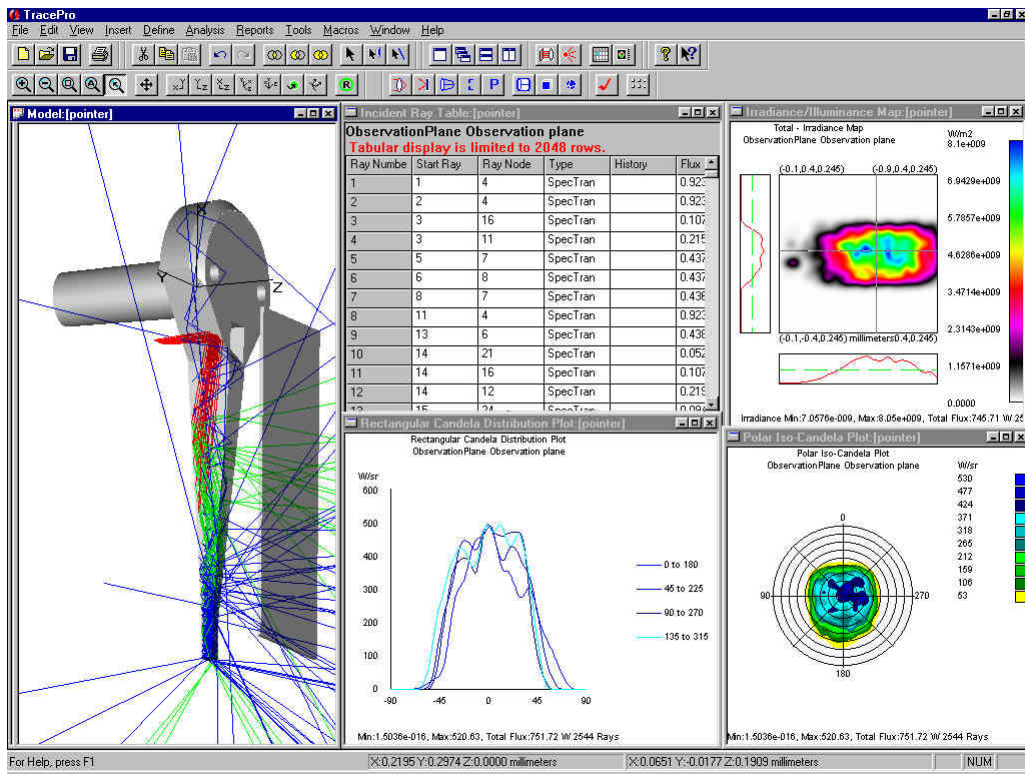


Figure 4. Rendered speedometer pointer with rays traced, rectangular and regular iso-candela plots and irradiance map. Also a tabular ray history of the first 12 rays that reached the observation plane

TracePro simulates 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.

TracePro's outputs include both the standard 2D and 3D irradiance/illuminance, and iso-candela plots. Further data manipulation is accomplished using simple Windows clipboard commands to cut and paste data to other Windows clipboard-compliant programs like Excel. TracePro is the only program to produce 3D irradiance plots on curved system geometry. The program is also capable of tracking 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.

Creating 3D source emitters is a simple task. Simply import Radiant Imaging source files or import any photometer created file using our import source file format. We will even write a translator if your source file is not in our 3D format.

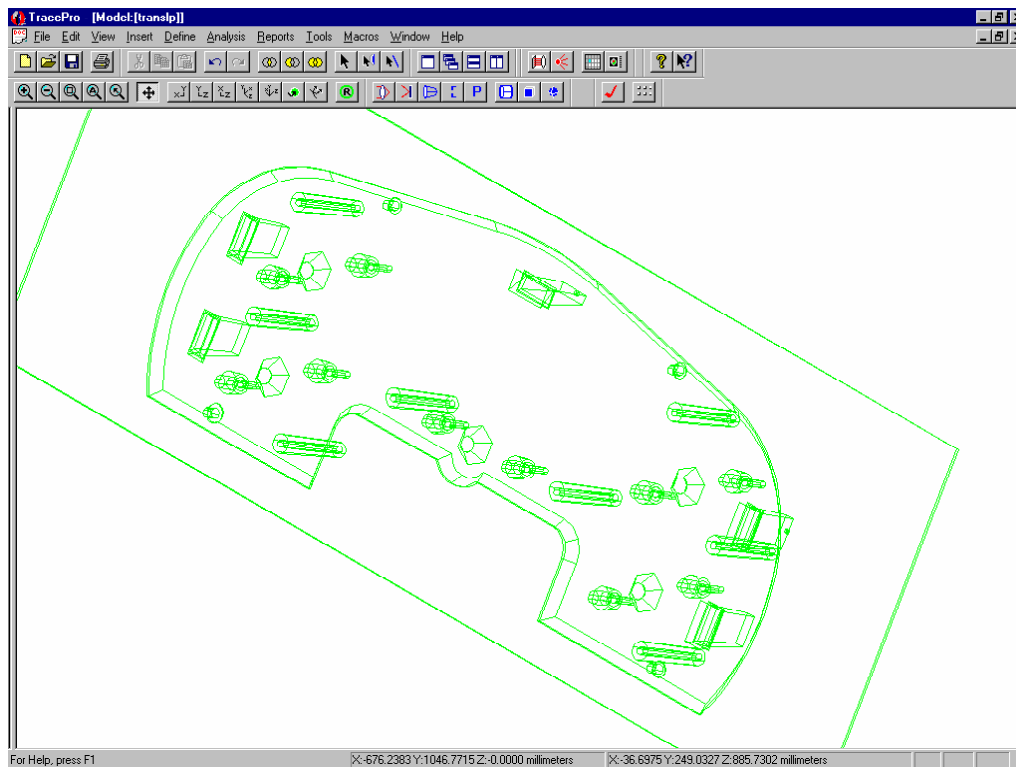


Figure 5. Dashboard Instrument Panel in Isometric Silhouette View, This system was first created in ProEngineer and exported as an IGES file and then imported into TracePro.

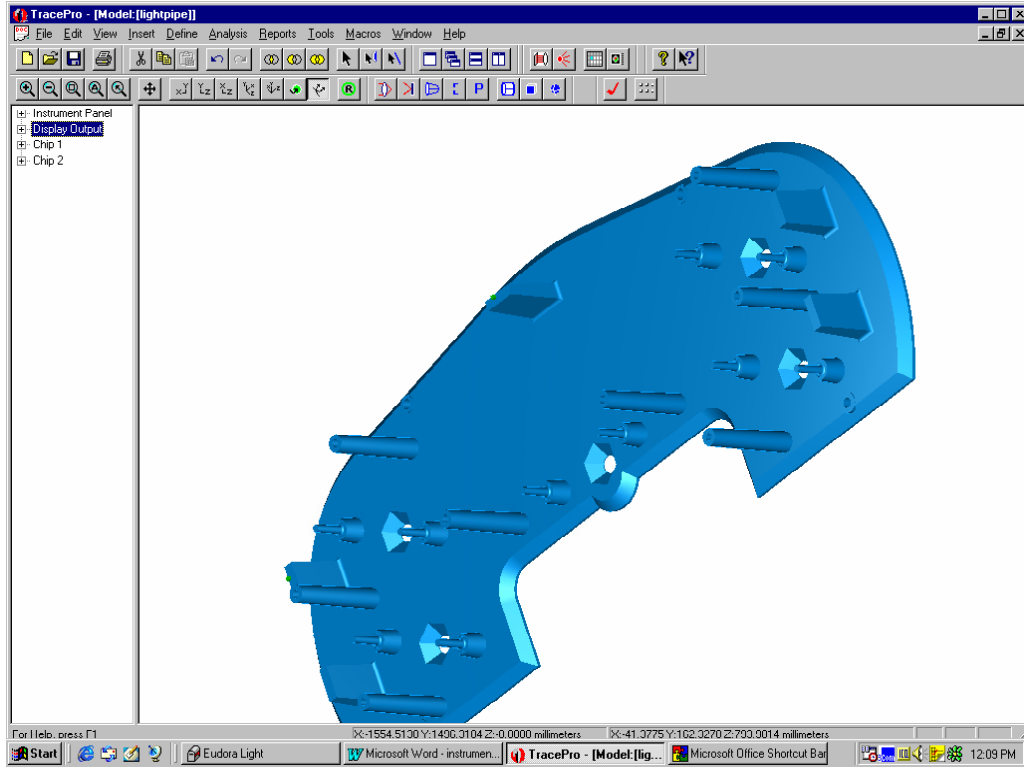


Figure 6. Isometric rendered view of the back of the instrument panel

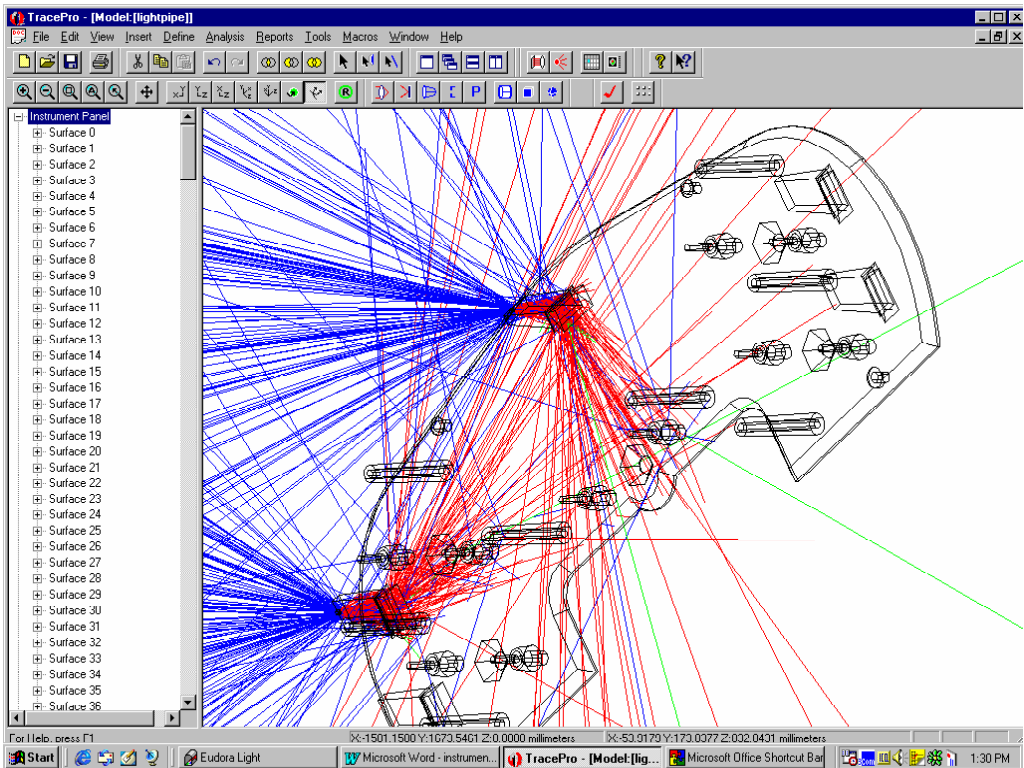


Figure 7. Two LEDs emitting into the polycarbonate instrument panel

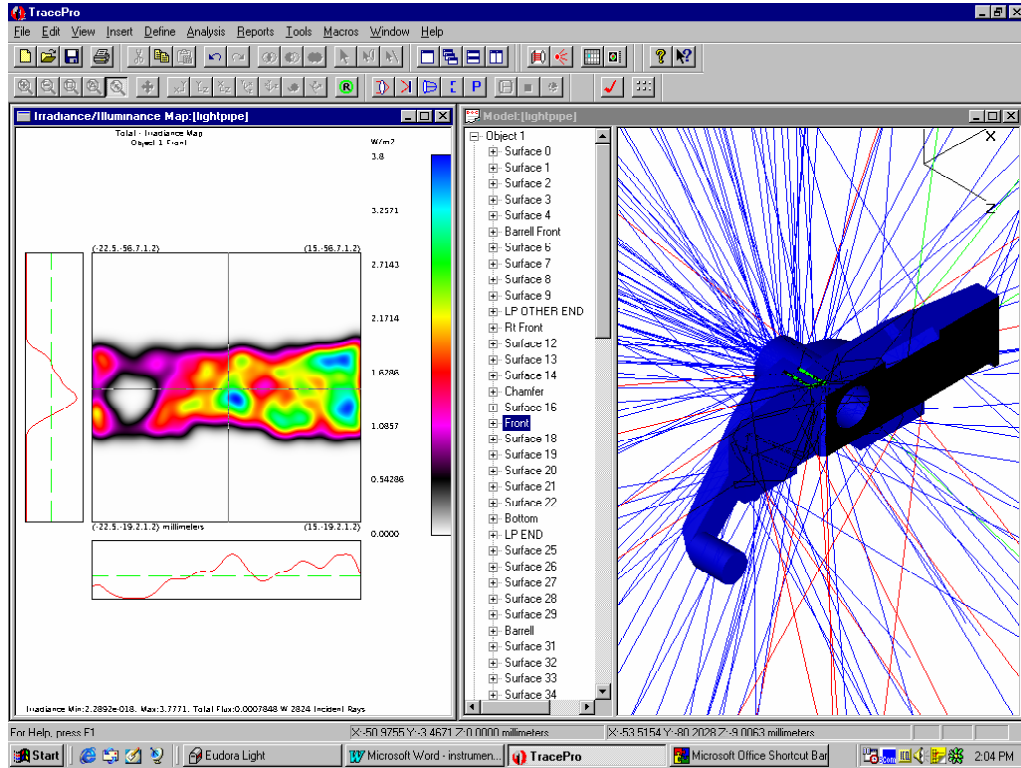


Figure 8. Lightpipe for illuminating the air conditioning controls in a car. The irradiancemap at left shows the Output of the lightpipe on it front right face in false color which is highlighted in black in the right plot.

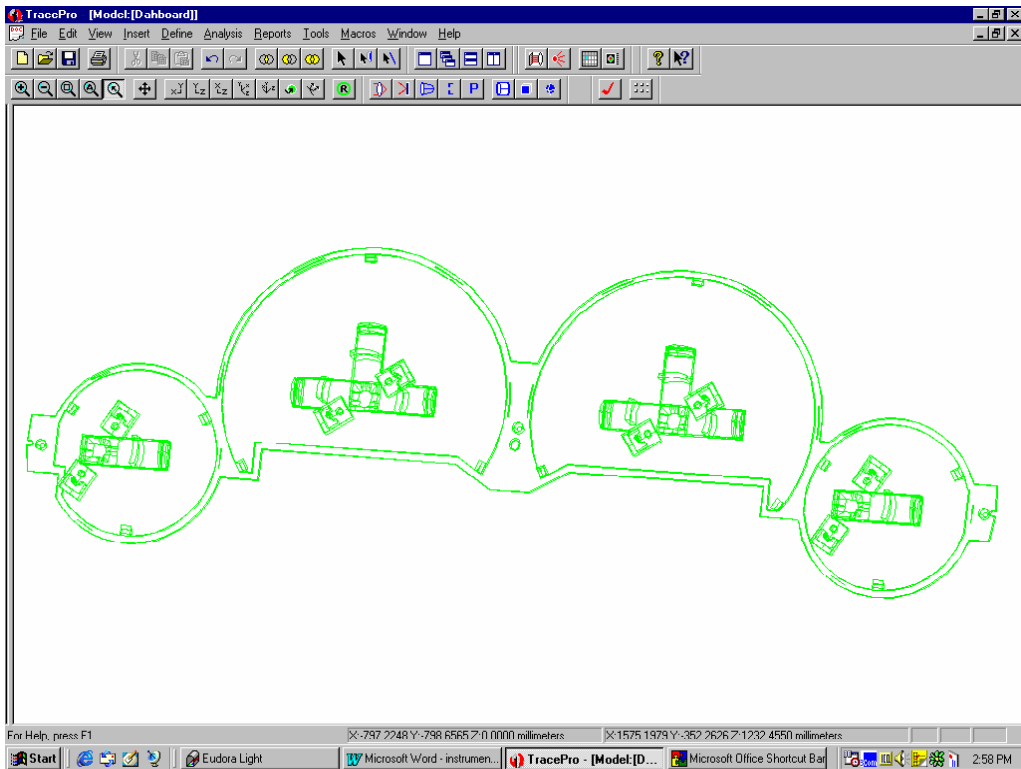


Figure 9. Second dashboard, 4 instrument design. This file was imported from a CATIA Step file.