

SE-RAY-IR

Spectral

ELECTRO OPTICAL

Reflection

Propagation



Thermal

Compute Electro Optical high realistic and physically accurate images

Advanced EO Scene Generation Tool

SE-RAY-IR is a ray-tracing software, which enables to compute high realistic images both in visible and the infrared spectrum issued from complex scenarios runs including 3D terrain, 3D targets, atmospheric conditions, sensors models and associated trajectories.

SE-RAY-IR features

Original concept using physical model that computes images band per band, as opposed to other ray-tracing software

Simulation results have been validated by numerous test and measurement campaigns

Friendly GUI available for all scenario edition functionalities: objects, paths and sensors

Specific advanced parameters:

- Adaptive antialiasing,
- Sensor spectral response parameterisation,
- User defined spectral band

Distributed computation based on a multi-threading mechanism

Thermal shadows automatic calculation with a default limited resolution

Requirements:

Requires SE-ATMOSPHERE for atmospheric propagation input file

Requires 3D geometrical data, thermal input data (computed by SE-THERMAL), enhanced with physical materials

Physical model features

- Thermal emission
- Reflection (diffuse and specular) and multiple reflections (specular)
- Sky irradiance
- Atmospheric interactions

Specials features

- Use of voxels for special dynamic effects: clouds, smokes, flares, and decoys
- Use of dynamic 3D textures for local deformations (e.g. sea surface simulation)
- Bump-mapping and roughness management
- Bi-directional parameters: BRDF, emissivity, scattering dielectric coefficient
- Computation of the thermal shadows by default with limited resolution. Extended resolution requires SE-THERMAL-SHADOWS license acquisition.
- Possible additional use of Photon-Map method to deal with global illumination and render thermal interaction both between surfaces and within volumes



Manipulated files

File extension	File description
scn (ASCII)	SE-RAY-IR scenario file
scnx (XML)	A complete scenario refers to : an atmospheric file (.atm), a horizon file (.bdd), one or several objects (.bdd), one or several sensors (.cpt), one or several paths (.trj or .trjx).
bdd (ASCII)	Description of objects and horizon files
atm (ASCII/binary)	Atmospheric file. An atmospheric file is required to get the scene irradiance
cpt (ASCII)	Sensor configuration file A sensor configuration file is required for each sensor of SE-RAY-IR scenario.
trj (ASCII)	Path file. A trajectory is in SDM format.

Additional modules

Image distribution: the computation of a single image can be dispatched on several CPUs sharing the same memory with a multi-threading mechanism.

The SE-SPECIAL-EFFECT library enables to enhance the image rendering realism:

- Particles: special effects rendering based on dynamic particles systems.
- Flares: flares defined in a scenario.
- Clouds: clouds defined in a scenario.

Benefits:

GUI based on QT
Fast and modular ray-tracing

System requirements :

Windows 2000 and XP
Linux Red Hat Enterprise 4