OKTAL-SE
Synthetic Environment
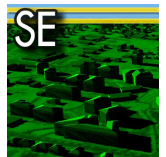
EO ✓
AEO ✗
RF ✗
GNSS ✗

RAY ✓

SE-IR-SENSOR

SE
FAST ✓

SENSOR MODELLING TOOL FOR SE-RAY-IR AND SE-FAST-IR

SE-IR-SENSOR is a library for 1st order modelling of generic optronic sensor technology. It provides state of the art infra-red sensor effects in SE-RAY-IR and SE-FAST-IR image rendering software.
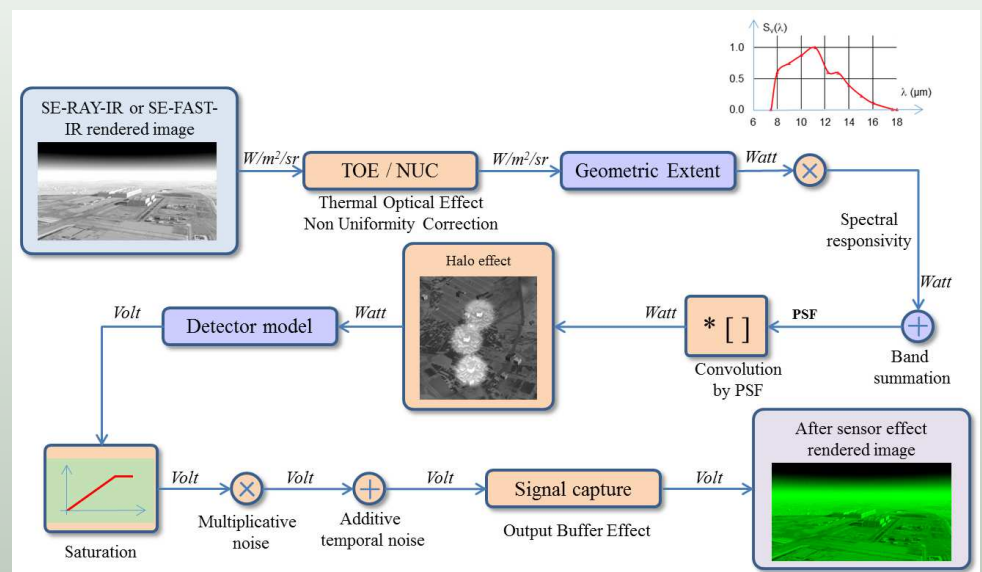
Features

- **32 bits floating point computation**

- **Easy sensor parameterisation with C API**

- **Integrated into SE-TOOLKIT**

- **Delivered with 10+ tutorials**

- **Compatible with SE-RAY-IR and SE-FAST-IR computation**

- **Spectral optical effects**

- **Modelling of optical, spatial and electronic Modulation Transfer Functions (MTF)**

- **Various types of noises**

- **Blooming and persistence effects**

- **Halo effects**

- **Non-linear detector model**

- **Thermal Optical Effects**

Synthetic Image Generator System

The SE-IR-SENSOR library is compatible with both the non real-time (SE-RAY-IR) infrared physical computation and the real-time (SE-FAST-IR) graphic board rendering.

The image produced by a real sensor is altered by its optics, self-structure, electronics for acquisition and by the sensor carrier dynamics.
The SE-IR-SENSOR library simulates these disruptive components to obtain a realistic sensor signal
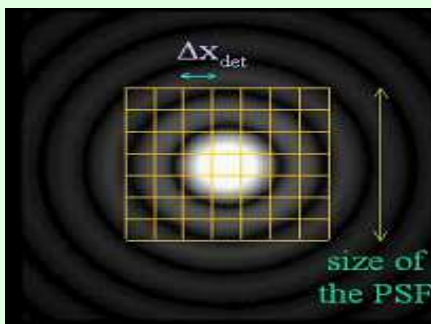

The sensor treatment pipe

Those features are accessible either through a Graphical User Interface (SE-SIGNAL-VIEWER) or using a C API.

Scan line effect

Δx_{det}

size of the PSF
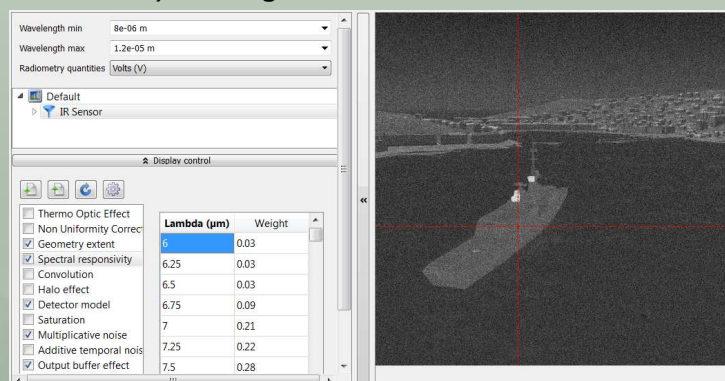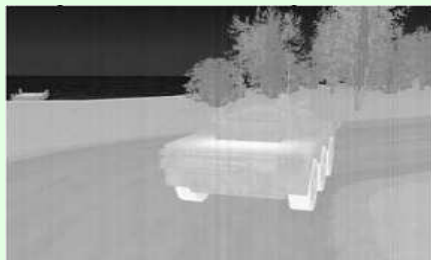
Representation of the blur effect

Flir Cameras effect

- **SE-IR-SENSOR creates simulated images of FLIR Systems products. FLIR camera DATAsheets are integrated.**


System requirements

 Windows

 Linux

Tutorials

SE-IR-SENSOR is delivered with a set of tutorials (including source code and documentation) that present case studies in terms of sensor effects modelling.

- **Scan Line Effect** : a micro bolometer can be used as an infrared radiation detector. SE-IR-SENSOR simulates the scan line effect present on the image.

- **Diffraction Effect** : because of light's wave nature, an optical system with a finite-sized aperture can never produce a perfect image. SE-IR-SENSOR simulates the diffraction effect through convolution matrices.

- **Histogram Equalization** : SE-IR-SENSOR computes the best Look Up Table that changes the value of each pixel of the image into a more appropriate value.
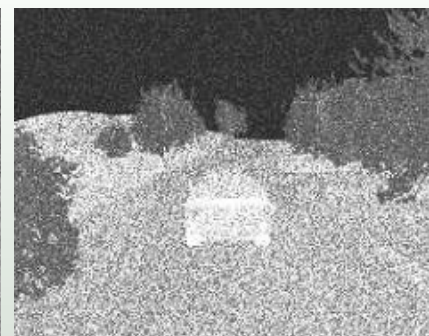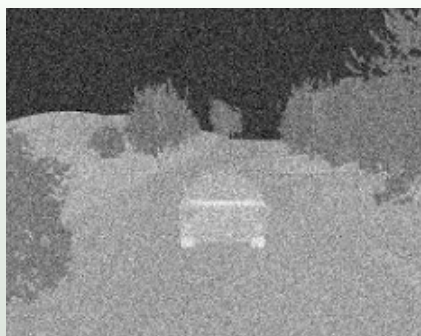

Sensor In Operation Effects

- **Jitter Effect** : Sensor motion is often a major cause of image degradation. SE-IR-SENSOR simulates the image degradation in the case of sinusoidal vibrations at high vibration frequencies.

- **Blur Motion Effect** : Image quality is degraded when either the objects, either the image receiver or the optical-system line of sight move during an exposure. SE-IR-SENSOR simulates blur effect as a signal post treatment.
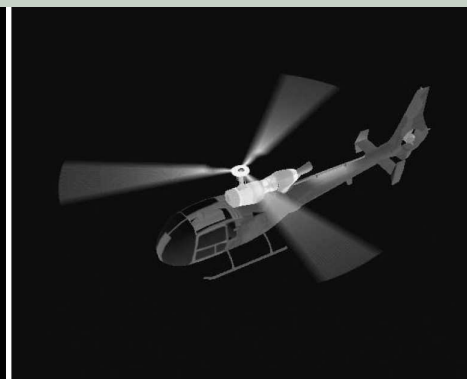
SE-RAY-IR rendering   SE-FAST-IR rendering

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