OKTAL-SE
Synthetic Environment

EO ✓
AEO ✓
RF ✗
GNSS ✗

RAY ✓

SE-3D-CLOUDS

CREATION OF 3D CLOUDS

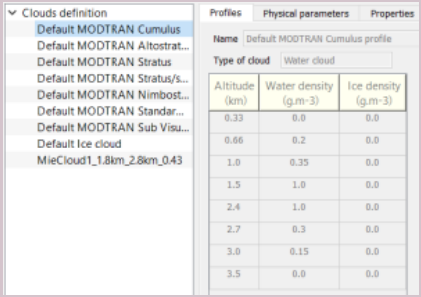
FAST ✓

SE-3D-CLOUDS, extension of the SE-Workbench-EO, is a set of tools and data dedicated to the physics-based 3D clouds modelling. This package is the perfect solution for people who need the 3D representation of clouds

Features

- Realistic 3D representation of any type of clouds
- Spectral rendering in the visible, SWIR, MWIR and LWIR band

- Compatible with SE-RAY-IR and SE-FAST-IR
- Fast design option with pre-defined MODTRAN® settings



- Advanced interface to control all the physical parameters of clouds

MODELLING CHALLENGE

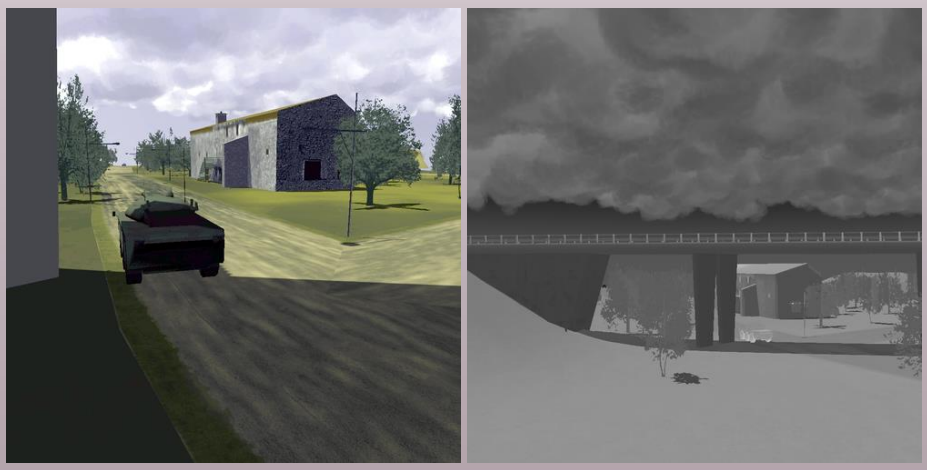
Representing 3D clouds in a physics-based electro optic synthetic environment is a complex challenge due to the specificity of this "object" that is highly variable. Its morphology and shape change with the wavelength, which is not true for a standard solid object. The boundary of a cloud is not well defined so the distance to a cloud is meaningless. The only distance we can consider is the optical length that is highly dependent of the wavelength

OKTAL-SE has decided to meet this challenge by providing a complete solution to:

- **Set the physical parameters of various cloud types**
- **Compute radiative properties of this scattering environment**
- **Design the cloud coverage of the synthetic environment**
- **Render the clouds in real-time mode in visible and infrared bands**

EO/IR rendering

3D clouds can be rendered in the full electro-optic domain from the visible to the long wave infrared band (LWIR). The output of SE-3D-CLOUDS is compatible with both the real-time (SE-FAST-IR) and the ray-tracing (SE-RAY-IR) rendering



The cloud radiometry is computed thanks to a physical model that takes into account microscopic and macroscopic parameters. The resulting radiance values are consistent with the MODTRAN® computations

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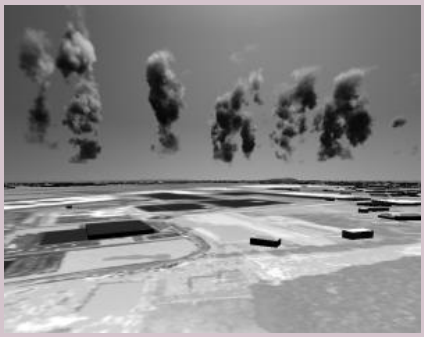
Benefits

- Localisation of cloudy zones can be controlled in terms of coordinates and cloud type
- The computed radiances of 3D clouds are consistent with MODTRAN values
- Possibility to create its own cloud reference database
- Various clouds types can be mixed in the same 3D environment2



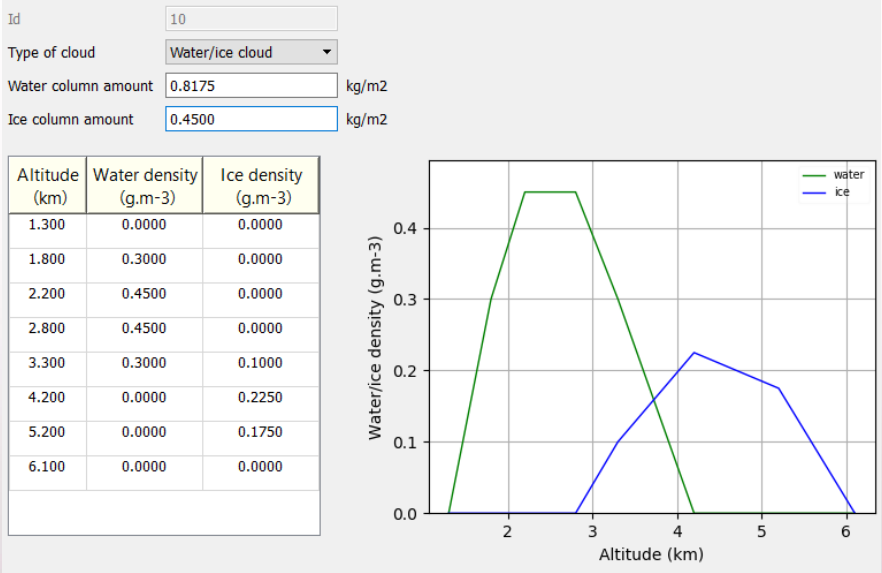
System requirements

Windows

Linux

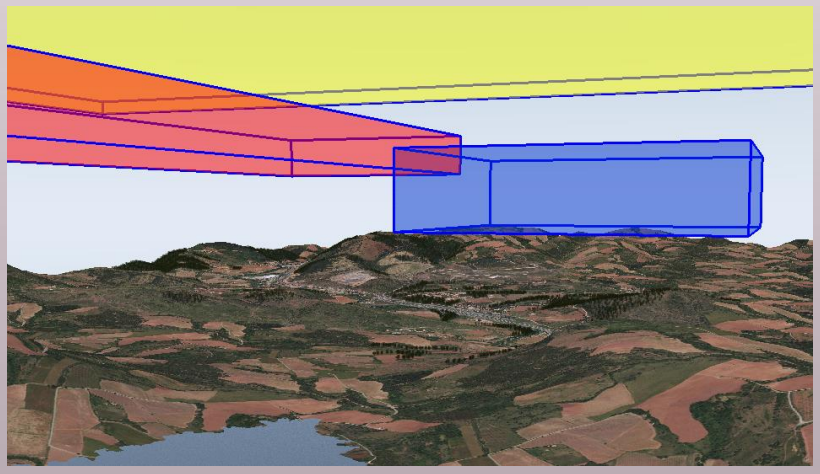
Physical parameters

The creation of a 3D cloud relies on a set of physical parameters that can be either taken from MODTRAN® database or created by the end-user. Those parameters are water (and/or ice) vertical profiles and spectral data like extinction and absorption coefficients. New spectral data can be added by using the Mie theory for water droplet clouds



Cloud landscape

A cloud landscape can be made of various types of clouds. Each of them must be localized in volumes that are designed by the end-user directly in the SE-SCENARIO interface



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