# OKTAL-SE
## Synthetic Environment
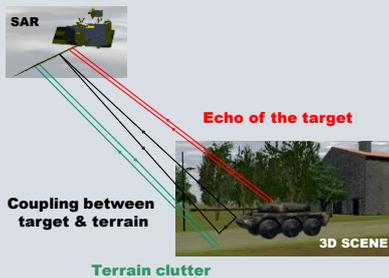
EO ❌
AEO ❌
RF ✅
GNSS ❌

# SAR image generator for DEEP LEARNING

## Training data enhancement using synthetic images

The common challenge for all Deep Learning application based on remote sensing images is the scarcity of high quality labelled dataset. This issue is all the more sensitive that some applications are Defense related for which it is almost impossible to find real data on public databases. The creation of synthetic dataset could appear as an attractive solution as long as it can be considered as "realistic" data. The physics-based SAR image generation tool suite created by OKTAL-SE has been used and validated by world-class laboratories and MoDs. This advanced package is now available for Deep Learning application where a large set of data must be created in an optimized lead time.

## Features

- **RF models validated by ONERA in France, FOI in Sweden and Fraunhofer FHR in Germany**

- **Fast SAR image creation process even on complex scene**

- **Includes the effect of target/background coupling**



SAR
Echo of the target
Coupling between target & terrain
Terrain clutter
3D SCENE

- **Easy-to-use product thanks to its dedicated GUI**

- **No need of specific SAR knowledge**

## Multi-scale applications

The OKTAL-SE SAR package can be used for various Deep Learning applications. From automatic target recognition (ATR) up to land cover classification, the same tools are used and provide realistic images with a tunable level of details.
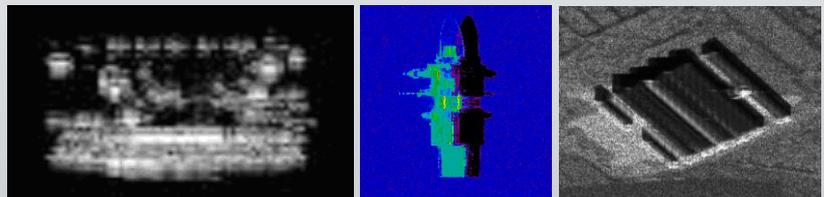


Target (vehicles, buildings) SAR signature using OKTAL-SE tools



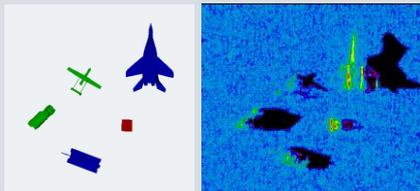SAR images of Large synthetic 3D scenes

## Background variability

This package comes with a set of realistic background for rural, mountain, airport, urban, desert, urban and maritime environment.

# OKTAL-SE
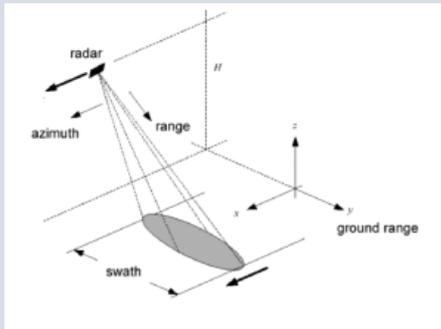## Synthetic Environment

## Benefits

- An efficient tool to generate a large amount of realistic SAR image

- Automatic labelling process (object ID layer)



- Library of objects (meshed for 1GHz to 100GHz SAR)
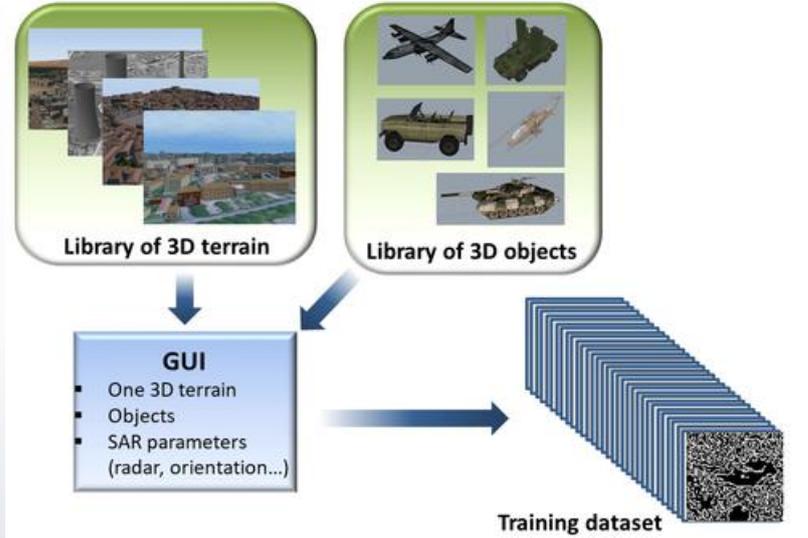


- Simple set of input parameters



## Simple Interface

Even if the tool relies on the validated ray-tracing kernel (SE-RAY-EM), to compute the SAR echo of the 3D scene, OKTAL-SE provides a simple interface that eases the input settings of training data generation.



## Automatic labelling

With the simulation approach, the "truth" is known. Position and identification of each entity of the 3D scene are available at any time. An automatic labelling is provided including the object ID layer.

## Optimized physics based process

This Deep Learning dedicated SAR package takes the most of the validated asymptotic method using ray-tracing technics in the frame of a rapid image computation pipe. This SAR tool suite has been used for more that 10 years by our partners and customers all over the world (ONERA-France, FOI-Sweden, DSO-Singapore, ADD-Korea, TERMA-Denmark…). It has been specifically optimized to enable the computation of SAR images in short time.

## Flexible offer

Besides the standard SAR Deep learning package that contains a first set of backgrounds and objects, OKTAL-SE can enhance this 3D library by any type of new 3D synthetic environment and objects to fit with some specific application.



## System requirements

 Windows
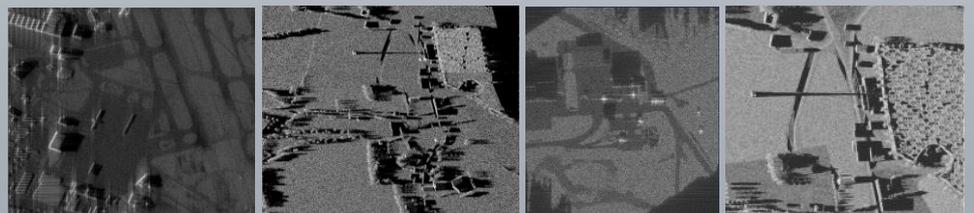
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