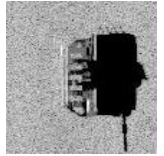


EO
 AEO
 RF
 GNSS

SE-RAY-NBSAR



RAY **ADVANCED NARROW BEAM SAR SIMULATION TOOL** **FAST**
COMPUTES REALISTIC NARROW BEAM SAR IMAGES

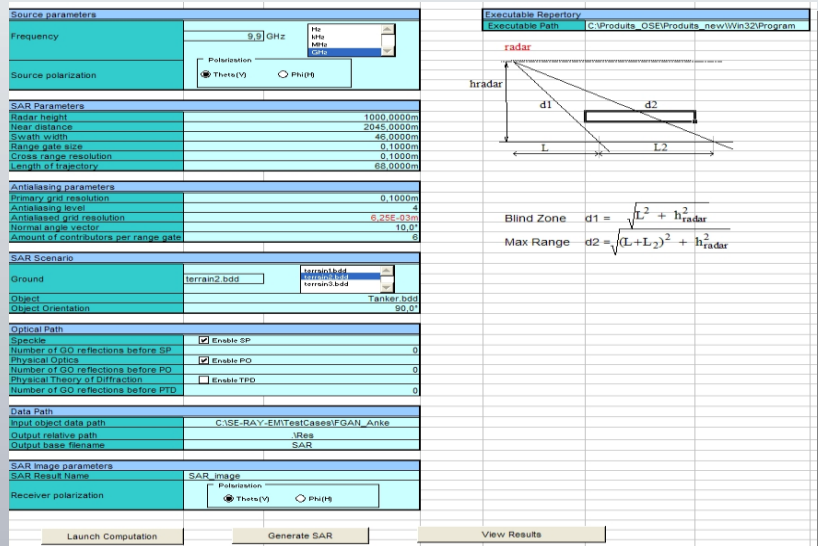
SE-RAY-NBSAR takes advantage of the recent improvements in the field of 3D graphics to compute very efficiently a Radar Image of a scene containing a very complex target (up to 100 GHz)

Features

- RF models validated by ONERA in France, FOI in Sweden and Fraunhofer FHR in Germany
- Very efficient computation kernel, for very detailed objects
- Can compute objects coated with dielectric layers including diffraction by edges
- Can deal with almost all popular CAD formats thanks to its associated 3ds Max® and Sketchup® plug-ins
- Easy-to-use product thanks to its dedicated GUI

Key Advantages

- Complex 3D target management
- Robust electromagnetic models
- Dedicated user friendly GUI
- NBSAR images can also be computed on large 3D database



The screenshot shows the SE-RAY-NBSAR GUI with the following sections:

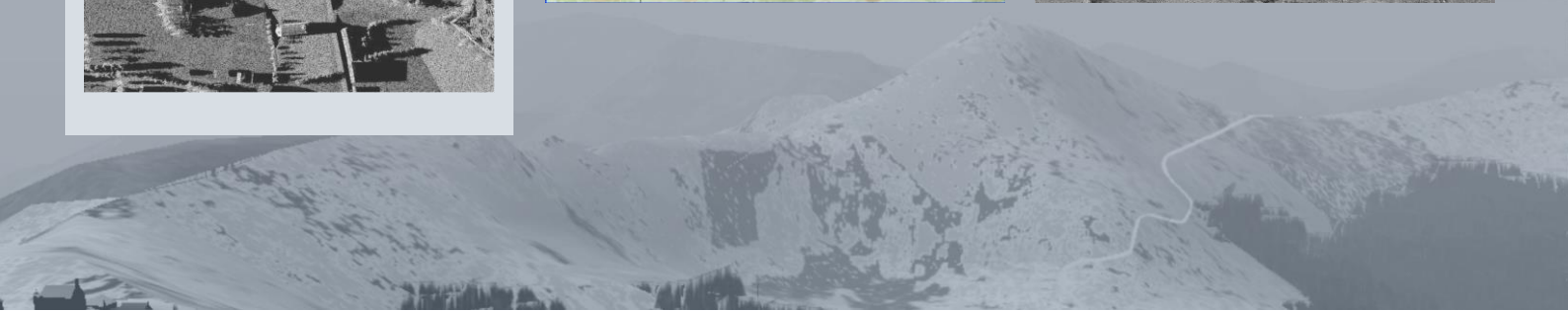
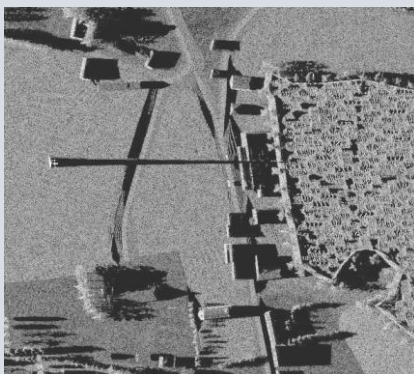
- Source parameters:** Frequency: 9.9 GHz, Polarization: Theta(V), Phi(H)
- SAR Parameters:** Radar height: 1000.0000m, Near distance: 2045.0000m, Swath width: 48.0000m, Range gate size: 0.1000m, Cross range resolution: 0.1000m, Length of trajectory: 68.0000m
- Antialiasing parameters:** Primary grid resolution: 0.1000m, Antialiasing level: 4, Antialiased grid resolution: 6.25E-03m, Normal angle vector: 10.0°, Amount of contributors per range gate: 8
- SAR Scenario:** Ground: terrain2.bdd, Object: Tanker.bdd, Object Orientation: 90.0°
- Optical Path:** Speckle: Enable SP, Physical Optics: Enable PO, Physical Theory of Diffraction: Enable FPD
- Data Path:** Input object data path: C:\SE-RAY-EMTestCases\FGAN_Anke, Output relative path: Res, Output base filename: SAR
- SAR image parameters:** SAR Result Name: SAR_image, Receiver polarization: Theta(V), Phi(H)

Buttons at the bottom: Launch Computation, Generate SAR, View Results

Diagram: A geometric diagram showing radar geometry with parameters: hradar, d1, d2, L, L2.

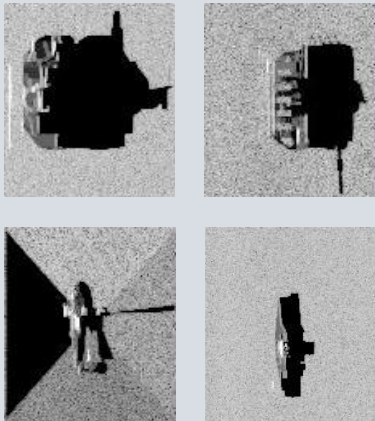
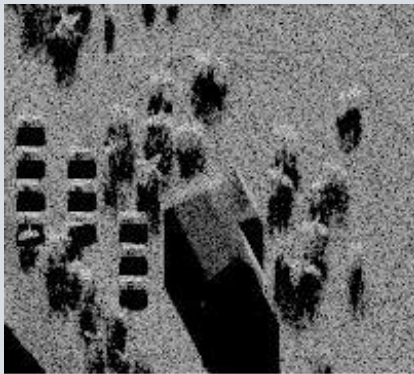
Equations:

$$\text{Blind Zone } d1 = \sqrt{L^2 + h_{\text{radar}}^2}$$

$$\text{Max Range } d2 = \sqrt{(L+L2)^2 + h_{\text{radar}}^2}$$


Benefits

- An efficient tool for target radar signature analysis
- NBSAR images of 3D targets can be computed in few seconds

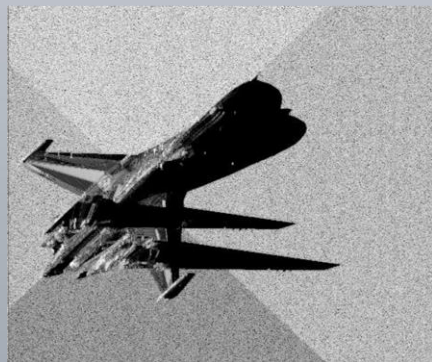
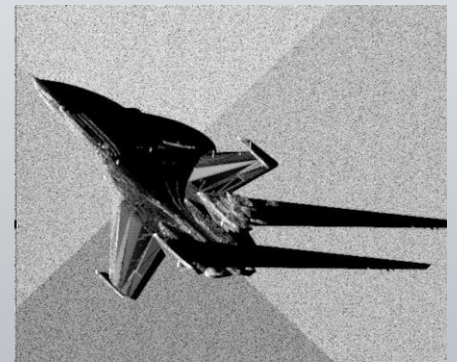
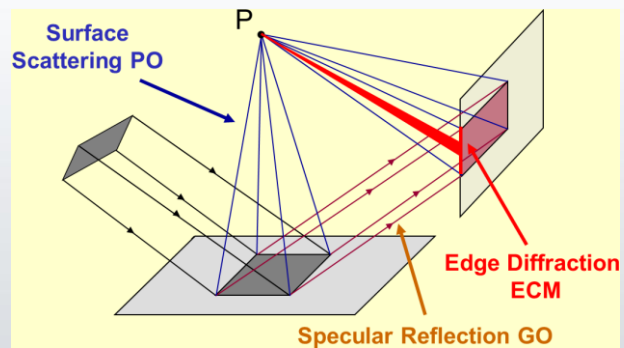


System requirements



Physical model features

- Association of shooting and bouncing ray technique (ray tracing) & electromagnetic asymptotic formulations
- Scattering computation using Physical Optics
- Multiple reflections computation using Geometrical Optics
- Edge diffraction computation using the Equivalent Current Method of Michiell extended to targets covered by dielectric materials
- Reflection and scattering on multilayer dielectric materials
- Model dedicated to clutter materials including speckle effects



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