

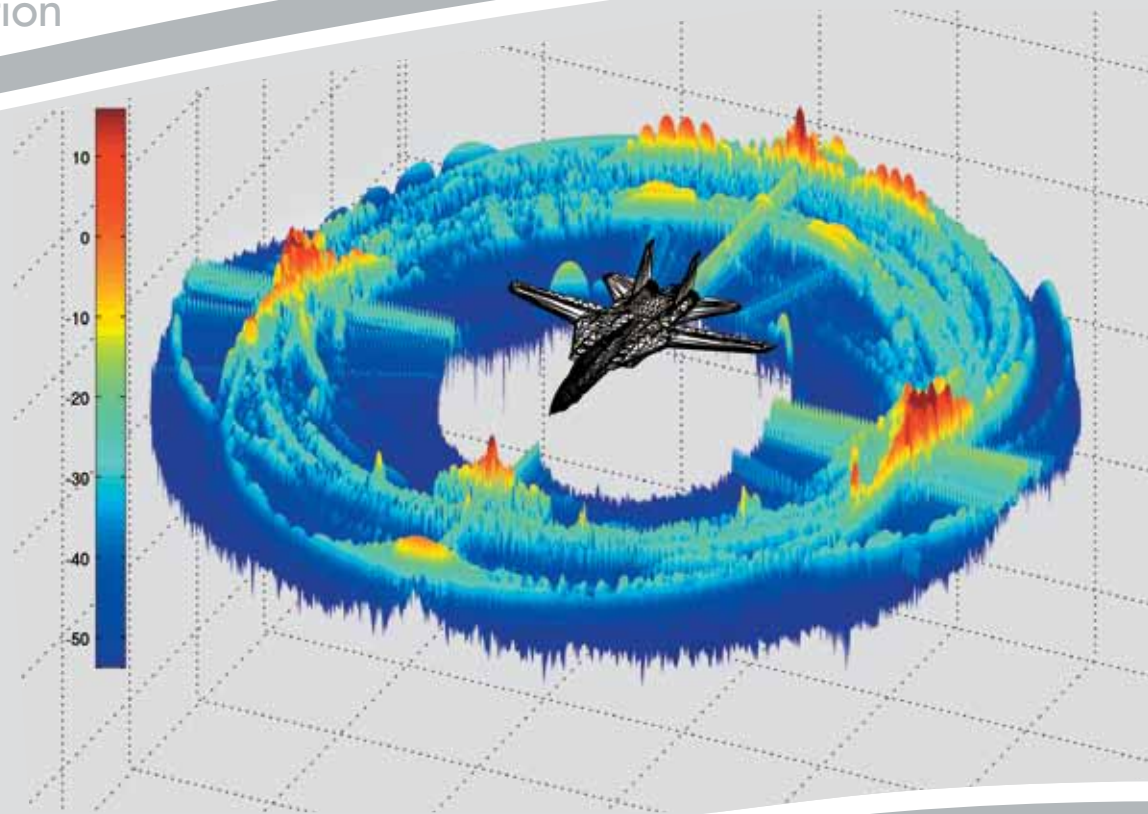
Focus on CSIR

SigmaHat –

RCS and EM

Scattering Simulation

SigmaHat is a software tool used for the calculation and analysis of the Radar Cross Section (RCS) and other Electromagnetic (EM) scattering features of large complex objects such as aircraft, land vehicles and ships.



SigmaHat is based on asymptotic (high frequency) EM calculation techniques and can be used to calculate the RCS of electrically large complex 3D objects such as aircraft, land vehicles and ships.

Applications

SigmaHat can be used for many applications in the field of radar and EW engineering, including:

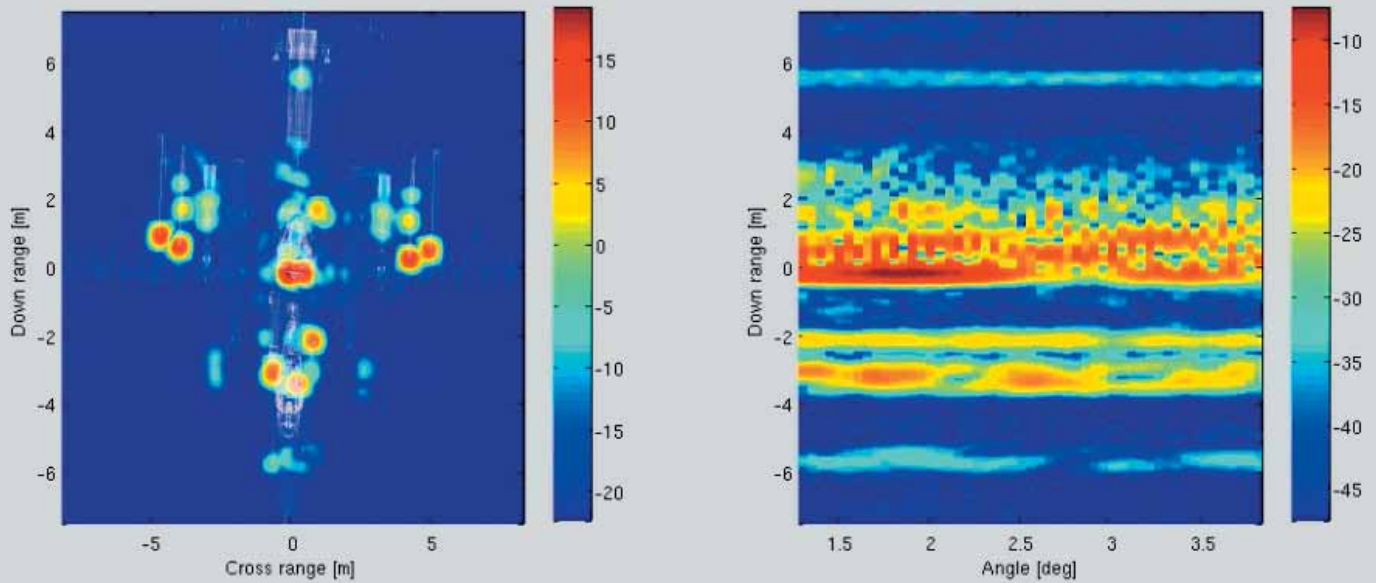
- Calculating the RCS of large complex objects such as aircraft, land vehicles and ships;
- Calculating and analysing the EM

scattering features of target objects that can be used in the development and evaluation of radar systems and techniques;

- Generating additional RCS data, to compliment measurements with limited coverage in aspect angles and frequency;
- Simulating High Range Resolution (HRR) profiles, Inverse Synthetic Aperture Radar (ISAR) images or micro-Doppler signatures (e.g. JEM) of target objects for

use in the development of Non-Cooperative Target Recognition (NCTR) algorithms and systems;

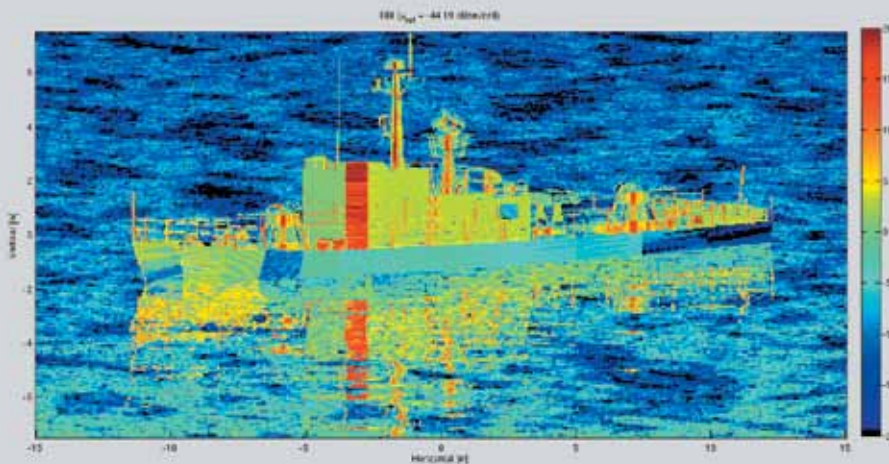
- Training of engineers on target scattering mechanisms and RCS features;
- Generate high fidelity RCS models of targets for engagement analysis in the 'SEWES' – many-on-many Electronic Warfare simulation.



SigmaHat has the following main features:

- Easy-to-use Graphical User Interface (GUI).
- Interface to FEKO for importing and exporting CAD models and results.
- Batch processing modes for turntable type RCS measurement, ISAR, etc.
- Innovative calculation algorithms which can be optimised for accuracy or improved run-times.
- Support for parallel and distributed computing, including GPU processing.
- Generation of various outputs, such as:
 - RCS data per frequency and aspect angle,
 - Amplitude and phase of scattered field,
 - Real Beam Image (RBI) for visualisation of scattering contributions,
 - High Range Resolution (HRR) profiles,
 - Inverse Synthetic Aperture Radar (ISAR) images.
- User extendable framework and functions for specialised RCS analyses.

SigmaHat can generate RCS data quickly, cost effectively and with a high degree of control. It is the ideal tool for radar and EW engineers to bridge the gap between full-wave EM solvers and field measurements by allowing them to address large-scale RCS questions.



Contact details:

Pieter Goosen – Business Development
 CSIR – Defence, Peace, Safety and Security
 Tel: +27 12 841 2060
 Fax: +27 12 841 2455
 Cell: +27 83 272 6662
 e-mail: pgoosen@csir.co.za
www.csir.co.za