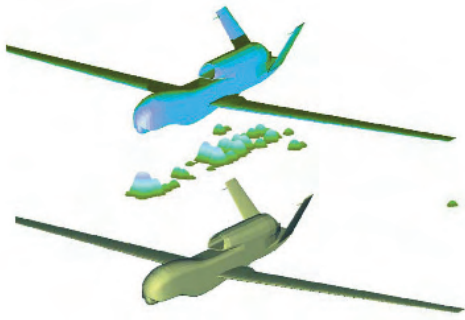


Epsilon™ - Radar Cross Section (RCS) Prediction Software

The most rigorous, accurate and easy to use RCS solver in its class





Epsilon™ is a software package that predicts the Radar Cross Section (RCS) of electrically large targets direct from a computer model.

Radar signature management

Radar signature management is required by clients who design platforms (eg, aircraft, ships or land vehicles) or radar systems. Designers of military platforms need to minimise RCS to reduce the probability of detection by radar based sensors. Conversely, radar and radar simulator operators require sensitivity analysis of radar systems against predetermined targets.

In all cases, the predicted RCS data can be critical to a design or analysis so the choice of RCS prediction software is paramount.

Epsilon™ is a highly versatile tool which accurately models real life scenarios, enabling clients to rapidly evaluate a target's radar signature and investigate how that signature varies according to the shape and orientation of their design. This allows various design options to be assessed in order to achieve the most cost effective solution.

Applications

Typical applications for **Epsilon™** include:

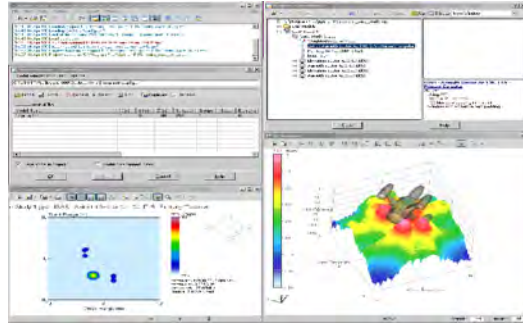
- Conventional radar cross section predictions
- Optimisation of new platform concepts for stealth
- Improvement and retro-design of existing platforms
- Generation of models for physical level simulation
- Imaging of radar targets.

Epsilon™ has been used on a variety of radar targets. Wind farms, for example, have been analysed to determine their effect on radar performance.

Other examples include:

- Major platforms: aircraft, ships, tanks, spacecraft
- Secondary field equipment: trucks, generators, stores
- Weapons and weapon release systems
- Antennas
- Buildings and structures.

Epsilon™ can also be embedded within simulation tools to provide highly accurate radar representations of targets, for engagement analysis.



Features and benefits

Epsilon™ is more than a theoretical tool. It offers considerable scope to tailor a target's response to the environment and to a given waveform to ensure realistic RCS data is obtained.

Epsilon™ uses highly accurate model geometry, handles a variety of material surfaces, and includes automatic multiple scattering. Compared with other tools, which require multiple scattering to be completed manually, **Epsilon™** saves our clients significant work and removes the possibility of human error in identifying surface interactions.

Accuracy	<ul style="list-style-type: none"> • Accurate model geometry used – far superior than a faceted approach • Automated multiple scattering determines which surfaces interact • Material modelling options ensure real-world results • Near field predictions possible by entering a radar-to-target range
Speed	<ul style="list-style-type: none"> • Shading algorithm reduces computation time by removing obscured surface areas
Usability	<ul style="list-style-type: none"> • User friendly Windows® project based interface • Data output in text files ready for importing into spreadsheet software • Screenshots of project windows can be saved for inclusion into reports
Analysis	<ul style="list-style-type: none"> • Bistatic/multi-static analysis for investigations into non-conventional radar (e.g. passive radar) • Scattering statistics • Diagnostics which identify target regions requiring attention

Support

Epsilon™ is developed and supported by Roke Manor Research Limited, a Siemens company. We have an intimate knowledge of how to use the software and offer a range of support packages to suit our client's needs – depending upon their requirements and familiarity with the radar signature domain.

- On-site installation
- Supply of hardware
- 2 day/5 day training courses
- Radar signature management consultancy
- Porting to other platforms
- Annual support and upgrades.

Licensing and availability

Epsilon™ is available under licence, subject to export control, or for use during stealth consultancy, counter stealth studies and any aspect of radar cross section technology or radar imaging.

Outline technical specification

Interfaces	Windows® Application Programming Interface (API) – to link to third party simulation software Script files – for batch run processing	
CAD	Compatible with industry standard CAD interfaces – Patran FEM, AutoCAD DXF, 3D Studio, and IGES. Integrated model preparation tool	
Model geometry	Parametric cubic No maximum geometry size	
Materials	Each surface patch of the CAD model is assigned a material property Material options include Perfect Electrical Conductor (PEC); lookup table of reflection coefficients	
Methods	<ul style="list-style-type: none"> • Geometrical Optics (GO) • Physical Optics (PO) • Physical Theory of Diffraction (PTD) • Geometrical Theory of Diffraction (GTD) 	<ul style="list-style-type: none"> • Multiple scattering (automated) • Shooting bouncing ray bundles • Diffusing ray optics • Shading
Analysis	<ul style="list-style-type: none"> • Radar imaging – a full phasor-vector result is calculated. There is considerable scope for imaging the target using any component, or linear combination of components, of the scattering matrix • Super resolution processing – embedded super resolution processing algorithms for: 1D (HRR); 2D (ISAR); 2.5D (ISAR); and 3D (ISAR) • Reverse translator – scattered field contributions painted back onto the CAD model • Ray history plots – visualisation of the calculated multiple scattering plots • Bistatic and multi-static modelling • Bulk signature prediction – for signature metric evaluation • High-Range Resolution Range Profile (HRRP) – for target recognition and high bandwidth analyses 	
Outputs	Data: ASCII Graphics: Encapsulated postscript	
Hardware	Standard Windows® desktop PC (porting to other platforms is available) Parallel processing possible across any standard computer network	

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