## Contents



# Efield® 5.2 released

Efield® announces that its new product release Efield® 5.2 is now shipping. This Efield release includes many improvements of existing features but also some new important capabilities.

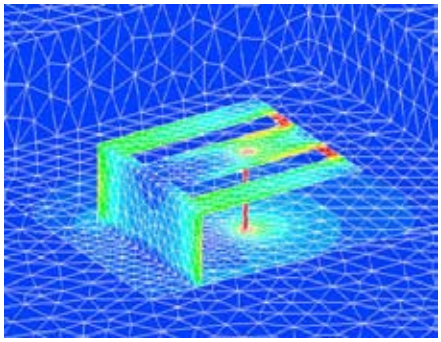
Major improvements of this release include:

- Hybrid EFIE-CFIE integral formulation for installed antenna problems modelled as strips/thin wires that speeds up convergence in MLFMM
- New flexible way of combining results, useful for example in array antenna computations
- Possibility to mix waveguide mode excitations with other sources including voltage sources on edges and nodes
- Improved handling of FDTD geometry with respect to memory consumption and simulation time. Improved treatment for multiple dielectric materials with heavily reduced memory requirements
- Parallelized direct solver for FEM-FDTD problems

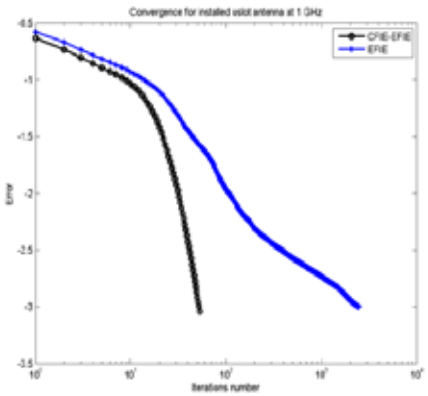
# Efield® hybrid EFIE-CFIE method

"In Efield 5.2 a hybrid EFIE-CFIE integral equation formulation is introduced that drastically reduces the number of iterations for large antenna installation problems when using Efield MLFMM solver"

## The Efield hybrid EFIE-CFIE method is a new tool for large antenna installation problems.

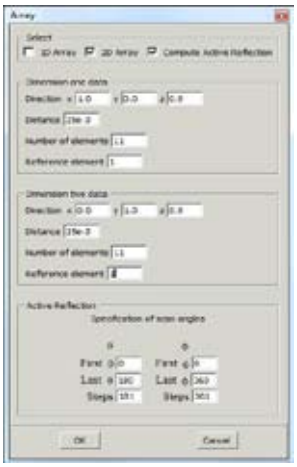


A hybrid EFIE-CFIE integral equation formulation is introduced in Efield 5.2 that drastically reduces the number of iterations for large antenna installation problems when using the Efield MLFMM solver. Often the antenna can not be modeled as a closed body and as a consequence CFIE can not be used, resulting in poor convergence in MLFMM. With the EFIE-CFIE formulation in Efield 5.2 the antenna is modeled using EFIE and the large platform using CFIE resulting in an efficient method ensuring good accuracy and fast convergence. Another advantage with the EFIE-CFIE formulation compared to pure CFIE formulation is that some excitation types such as voltage sources on surface edges and wire nodes are only available in the EFIE formulation. Using the EFIE-CFIE formulation those excitations are available for antenna simulations. Read More ››



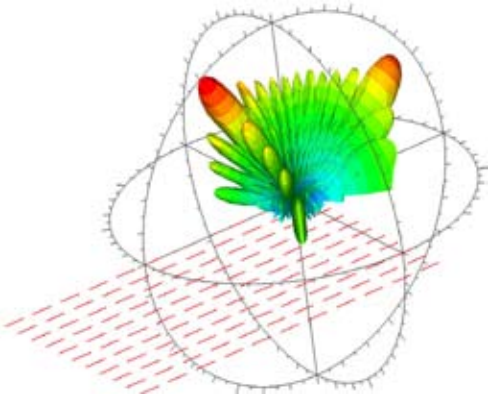
# Array antenna modelling in Efield® frequency domain

## Modelling of large antenna arrays with Efield MoM makes it possible to compute the coupling between all elements in the array in one single run.



Some major improvements for finite array antenna modelling are included in Efield 5.2. As in earlier versions of Efield the coupling between all elements can be computed in one single run.

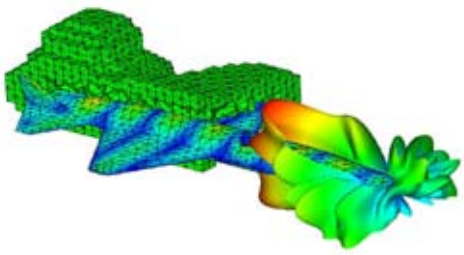
Computation of active reflection coefficients for a user defined scan angle sequence is also included in Efield 5.2. A new tool to combine excitations makes it possible to combine excitations in any way that the user wants. Results supporting the combined excitations includes surface currents, input power, power through surfaces, far field power, near and far fields. For antennas, active input impedance, active reflection factor etc, may be computed. The new functionality is easily accessible through a new GUI tool.



# Efield® time domain highlights

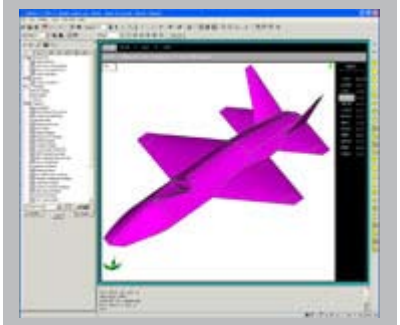
## Efield® is the first commercial software vendor offering a combined FDTD-FEM solver allowing unstructured grids for modeling complex geometries and small details, together with a structured grid for the rest of the domain.

Efield 5.2 incorporates a parallelized direct solver for the FEM part of the time domain FDTD-FEM solver. The benefits compared to the iterative solver are significantly reduced simulation times and the ability to better handle large aspect ratios between FDTD and FEM mesh sizes. Major improvements in the material module and mesh handling makes the Efield 5.2 FDTD solver almost twice as fast for dielectric problems when compared to Efield 5.1 and at half the memory cost. New examples highlights the use of the FEM-FDTD solver for RCS calculations which is a competitive approach for bistatic computations over wide frequency ranges. Read More ››

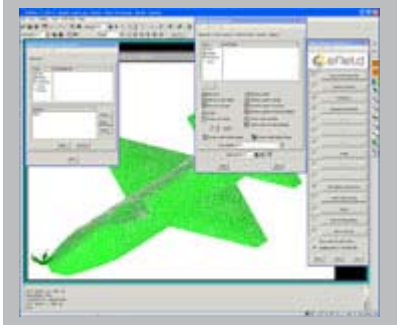


"Efield 5.2 incorporates a parallelized direct solver for the FEM part of the time domain FDTD-FEM solver. The benefits compared to the iterative solver are significantly reduced simulation times and the ability to better handle large aspect ratios between FDTD and FEM mesh sizes"

Geometry modeling and repair

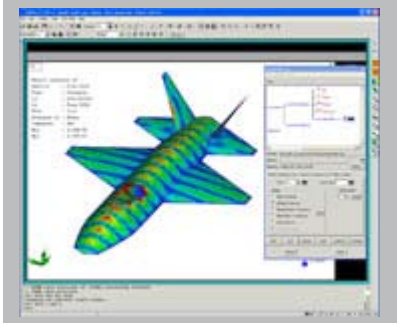


Mesh generation and solver GUI



Run manager

Result visualization



# Efield® 5.2 release notes

Efield® announces that its new product release Efield® 5.2 is now shipping.

Improvements in Efield frequency-domain solvers:

- Hybrid EFIE-CFIE integral formulation for strips/thin wires that speed up convergence in MLFMM
- New flexible way of combining results, useful for array antenna computations and for multi source configurations
- Possibility to mix waveguide mode excitations with other sources including voltage sources on edges and nodes. Waveguide ports can act as excitation of waveguide modes but also as a perfectly matched truncation of waveguides
- Extended outgoing power computation at waveguide ports
- Computation of normalized admittance- and impedance-matrix for waveguide mode excitations
- Modularization of solvers in solution and result part making the simulation process more flexible

Improvements in Efield time-domain solvers:

- Scaling of frequency-domain results with input power or voltage
- Improved handling of FDTD geometry with respect to memory consumption and simulation time
- Improved treatment of multiple dielectric materials with heavily reduced memory requirements
- Multiple frequency ranges for far field sections
- Parallelized direct solver for FEM-FDTD problems
- NetCDF storage for waveguide modes
- Color-coded solver GUI
- Improved standard output messages including memory estimates
- New examples including RCS and FEM-FDTD problems

Improvements in Efield pre- and post-processing:

- GUI for setting up combination of results
- Array antenna GUI
- New button showing list of right hand sides and types of excitation

## About Efield®

Efield® provides a unified electromagnetic simulation environment making both time and frequency domain methods available through the same user interface. Efield® makes the powerful concept of hybrid methods easy to use in both in time and frequency domain. Hybrid methods makes it possible to use an accurate numerical method in only the part of the simulation domain where it is really needed, and a less costly method in the rest of the domain. Efield® offers an environment for High Performance Computing with carefully parallelized solvers for distributed and shared memory multi-processor architectures. Powerful CAD interfaces streamline the design process, making reuse of existing CAD models easy. In this way we enable electromagnetic simulations for applications you have only dreamt of before.

Take a look at our web site www.efieldsolutions.com. There you can find more information and download a white paper describing our products in detail. Also, please forward this message to those of your colleagues who are interested!

## Efield® - a complete simulation environment for 3D electromagnetics applications

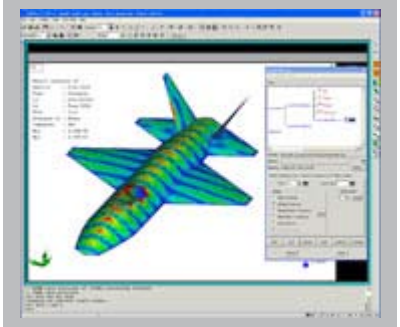
Efield® offers software for 3D analysis of a wide range of electromagnetic applications such as:

- Antenna design: All kind of antennas including horn, reflector, wire and microstrip antennas as well as broadband antennas and antenna arrays.
- Antenna integration: Radiation pattern and coupling of installed antennas on large platforms such as aircraft or ships.
- Microwave design: Typical applications includes design of filters, connectors and couplers.
- EMI/EMC interaction: Analysis of a wide range of EMC/EMI problems including shielding and coupling.
- Scattering & radar cross-section: RCS analysis of structures such as aircraft, ships, air-intakes and antennas.

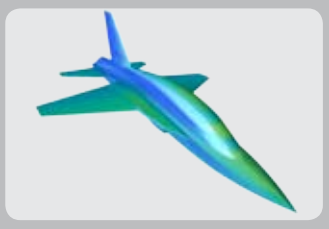
Efield® has the solution to every stage of the analysis including:

- Integrated environment including user friendly GUI
- CAD import of all major formats
- Fixing and repair of complex CAD models
- Model building
- Efficient and high quality meshing
- Unique solver technology in both time- and frequency-domain including full wave, approximative and hybrid techniques
- Unparalleled execution performance on single PC's or parallel processing on multiprocessor computers
- Flexible and high quality post-processing including graphing of results as well as visualization of surface currents, near fields and far fields.

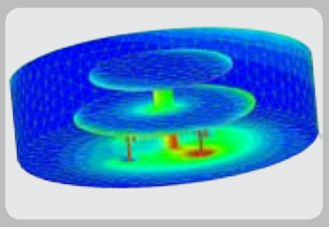
Efield Electromagnetic Solver Suite



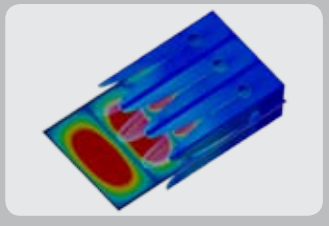
RCS and Scattering



Antenna Design



Microwave Design



EMC and EMI