Altair | HyperWorks®

FEKO for Defense and Aerospace

Antenna Design and Placement, EMC and RCS for Defense Platforms

FEKO is Altair's comprehensive electromagnetic simulation software suite, used extensively to design communication and radar antennas for aircrafts, ships, vehicles, satellites, missiles and other platforms. Optimum radiation performance and reduced interference can be achieved by investigating the antenna placement on the platform. FEKO's broad solver technology offering is well suited to the efficient and accurate simulation of defense platforms, even at high frequencies where the structures are electrically very large. FEKO also offers dedicated features for the investigation of cable modelling, while permitting electromagnetic compatibility (EMC) analysis, like lightning and high intensity radiated fields (HIRF).

Solution Highlights

- Efficient analysis of antennas, including complex and electrically large antennas, with multilevel fast multipole method (MLFMM) and hybridized solvers
- Investigation of optimum antenna placement scenarios on electrically large platforms, including planes and ships, thanks to asymptotic and hybridized solvers
- Dedicated toolset for array design. Perfect boundary condition (PBC) for periodic and domain Green's function method (DGFM) for large finite arrays
- Radar cross section (RCS) simulation and advanced RCS visualization for target detection and recognition
- Lightning, electromagnetic pulses (EMP) and EMC analysis of platforms including cables
- Specialized cable modelling tool

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Defense Capabilities

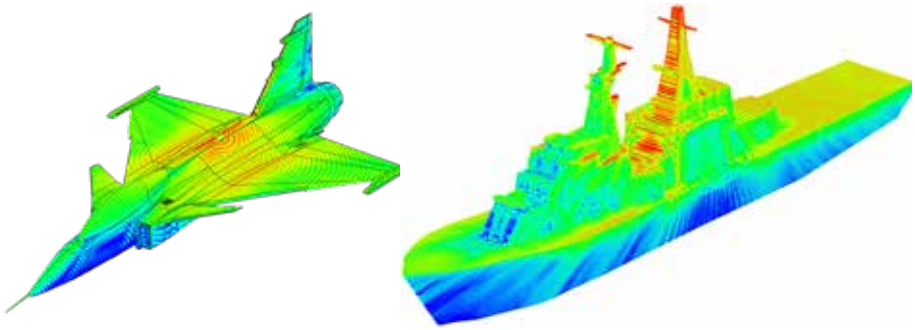
- MLFMM for the efficient simulation of electrically large platforms and asymptotic solvers for electrically very large platforms
- Advanced material modelling including metals, thin dielectric sheets, coatings, composites and anisotropic layers, for example carbon fiber
- Advanced RCS, shielding, RADHAZ, HIRF, EMP, and lightning analysis
- Model decomposition - Replace complex sources and receivers by equivalent sources to efficiently solve large and complex platforms, and NGF method for the analysis of dynamic elements and antenna placement investigations
- Co-site interference analysis electric and magnetic shielding
- Advanced cable coupling modelling and simulation
- CMA solver gives insight into the resonant behavior of the structure, offering a smart (non-brute-force) design approach for antenna design and placement

Interfaces

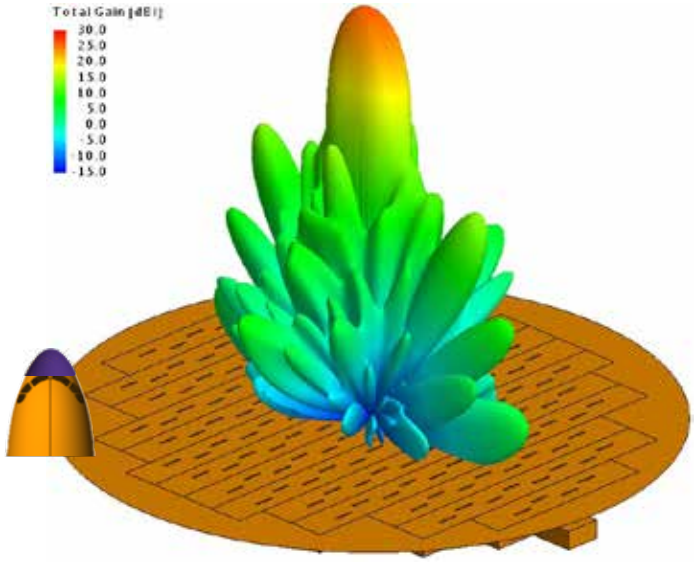
- Most industry standard CAD software and ODB++, 3Di and Gerber layouts
- Mesh importing
- Interface with HyperMesh
- Near field and far field import including general, Orbit/Satimo and Sigirity
- Cable path (.kbl) import
- Optenni Lab for antenna matching circuit design
- Touchstone, SPICE circuits and non-radiating networks

General Capabilities

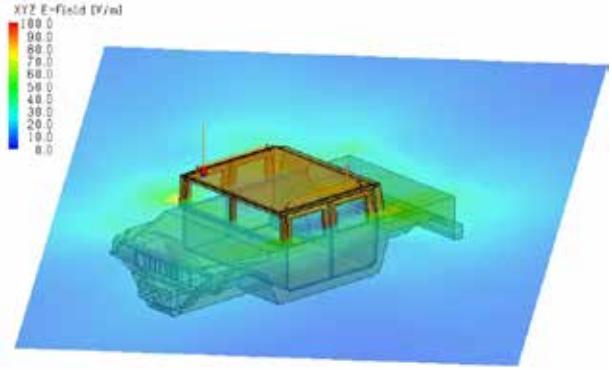
- Comprehensive suite of accurate, powerful, reliable and parallelized solvers with true hybrization, including MoM, MLFMM, FEM, FDTD, PO, LE-PO, RL-GO and UTD
- Complete HPC and GPU features
- 3D parametric environment modeling
- Extensive post-processing capabilities
- Integrated Lua scripting environment for data manipulation and task automation



Antenna placement on defense platforms (the induced surface currents are shown): FEKOs leading solvers with true hybridization enable efficient solutions electrically huge platforms. Calculate the actual antenna performance, optimum placement and coupling with other communication systems



Slotted waveguide array for weather radar with radome. 3D far field pattern at 9.4 GHz



Military vehicle communication system optimization, including radiation hazard study for personnel

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