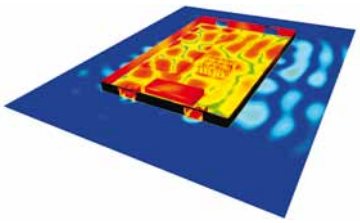
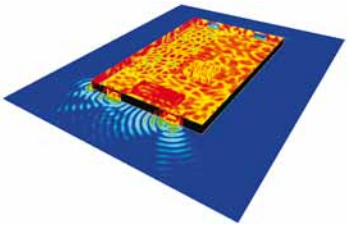
CST MICROSTRIPES™ EMC EDITION

EMC/EMI/E3 ANALYSIS

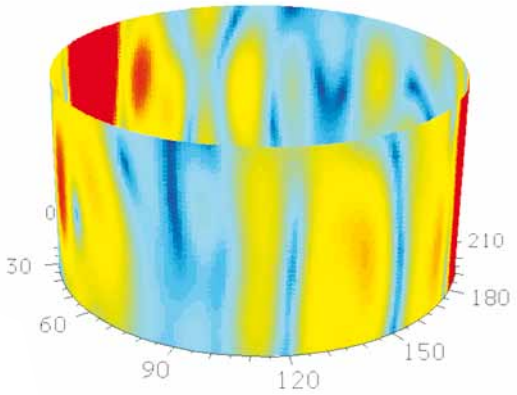
CST MICROSTRIPES™ EMC Edition (CST MS/EMC) is a 3D electromagnetic simulation tool based on the time-domain Transmission-Line Matrix (TLM) method and is ideal for direct transient or broadband applications typically found in EMC/EMI/E3 and antenna applications. With CST's proprietary "compact modeling" techniques for efficiently representing coupling through apertures/panels and interactions with cabling, CST MS/EMC delivers unprecedented performance for real-world applications. CST MS/EMC is fully 64-bit coded, allowing impressive scalability of models and fast solve times through its parallel computing solver. A powerful Octree-based meshing algorithm enables accurate representation of model details, but reduces overall cell count by combining cells in less critical regions. This typically results in cell count reductions of over 90 % compared with basic graded-mesh techniques.



1U server emissions at 3GHz
(seam leakage)



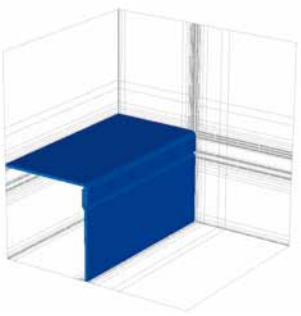
1U server emissions at 10 GHz
(air vent leakage)



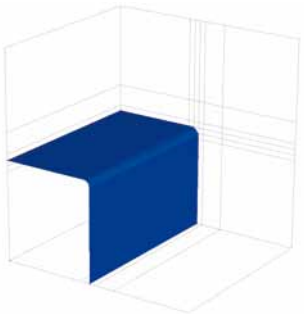
3m radius cylinder-scan at 3 GHz (peak E field)

APPLICATIONS

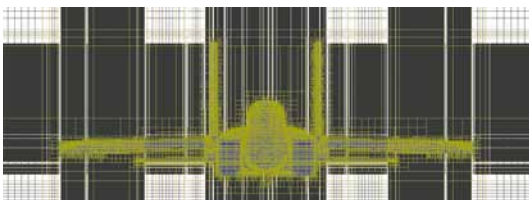
- Radiated emissions and immunity
- Conducted emissions and immunity
- EMI, EMP, lightning and HPM
- Electrostatic discharge (ESD)
- High speed interference
- Shielding analysis
- Antenna and radome design
- Installed performance and co-site analysis



Detailed model of seam requires
a fine mesh



Compact model uses
a significantly coarser mesh



Octree meshing reduces cell count for F-15 model from 220 Mcells to 11 Mcells.
The yellow grid indicates where different levels of cell-lumping are applied.
The grey lines are the underlying fine mesh.

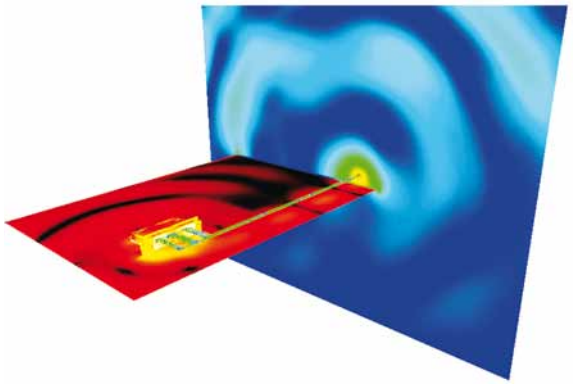
CST

CHANGING THE STANDARDS

EMC/EMI/E3 ANALYSIS

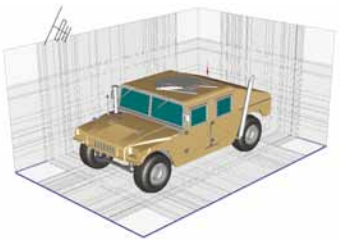
3D TLM SOLVER TECHNOLOGY

- Direct time-domain analysis
- Compact slots, seams and gaskets
- Compact air-vents (square, round and honeycomb holes)
- Compact multi-conductor wires
- Compact shielded cables
- Compact frequency-dependent thin panels
- Compact conductive coatings and absorbers
- Lumped circuits for filters, terminations etc.
- Broadband compact antenna radiation sources based on the Equivalence Principle
- Broadband compact PCB sources for EMC analysis, with imports from CST PCB STUDIO™ and Sigrity™ tools
- Interface with CST CABLE STUDIO™

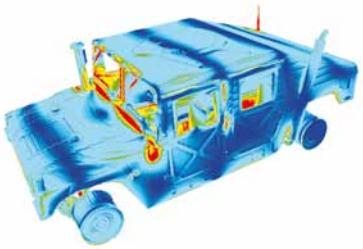


Radiation from automotive control module harness

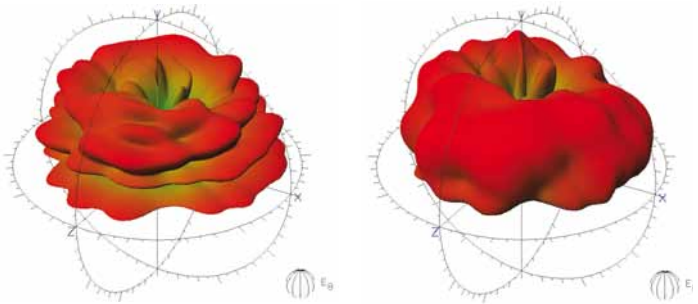
HUMVEE E3 APPLICATION EXAMPLE



Imported CAD model for immunity analysis



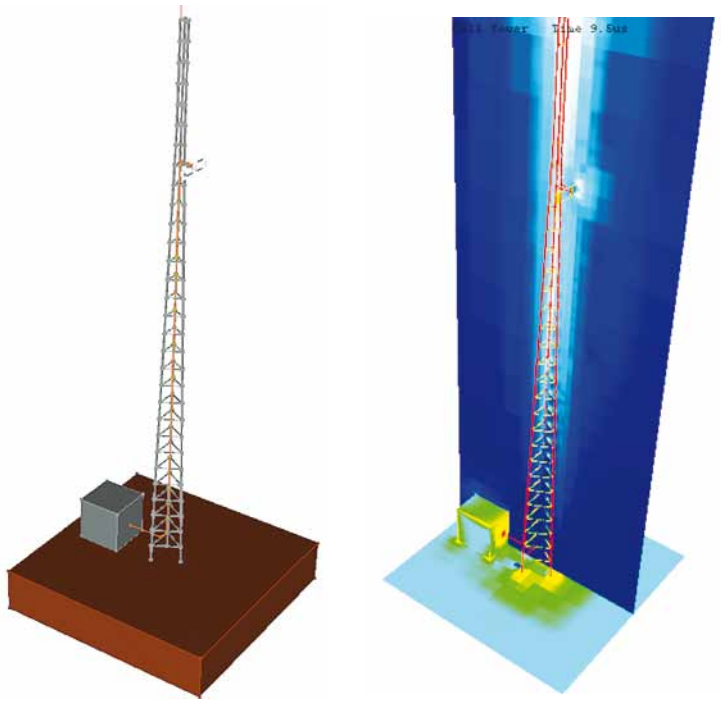
Time-domain surface current due to EM pulse



Installed antenna pattern over PEC and earth ground

KEY FEATURES

- Model sharing with CST MICROWAVE STUDIO®
- CAD import with automatic repair [SAT, STEP, IGES, NASTRAN, STL, DXF]
- Powerful 64-bit compatible geometry modeler with parameterization
- Automated Octree-based meshing
- Extensive materials modeling
- Transient plane waves and wire voltage sources, with user-definable waveforms
- Direct time-domain output for E/H fields and peak voltages/currents
- Coupling into shielded cables for transient protection analysis
- Broadband output from single 3D TLM solve
- Cylinder scan for emissions analysis yielding peak radiated fields vs. frequency
- External ground plane can be defined outside of the solution domain
- Real earth modeling for realistic antenna radiation pattern analysis



Time-domain analysis of lightning strike to cell tower