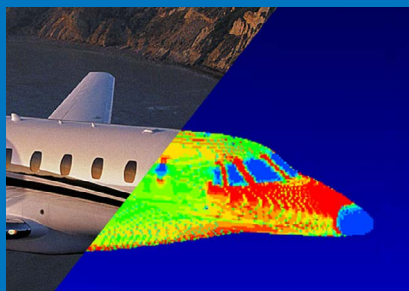


CASE STUDY: EMA Enhances Aerospace Certification with CADfix Integration for Efficient Electromagnetic Simulation

CADfix geometry processing for electromagnetic analysis

- Rapid import of any CAD format
- Automatic repair of poor quality geometry
- Automatic defeaturing of models, saving analysts time
- Efficient preparation of analysis models
- Generates multiple meshes for different solvers



“Practically 80% of engineering time is spent fussing with geometry and dealing with the CAD to CAE process. We’ve used CADfix for many years to automate processes and work more efficiently. This directly adds to the bottom line and it helps the company be more efficient and competitive.”

*- Tim McDonald, PhD
Chief Scientist, EMA*

Overview

Aerospace companies seek the most thorough, most efficient, and most accurate methods to achieve certification. In aircraft development, for example, significant resources are spent to ensure safety during a lightning strike. Physical testing is costly and does not allow engineers to measure the breadth of potential scenarios. Thus, there is increased use of electromagnetic simulation as a method of compliance, which is made possible by advances in simulation capability and validation accuracy. This requires justified and verified models.

Denver based Electromagnetic Applications Inc (EMA) has been a partner with ITI’s CADfix for over twenty years. By leveraging expertise of each company, an innovative CADfix and JEMA3D integration proves to be beneficial for EMA and for aerospace customers. This integration provides aerospace customers a suite of validated tools designed to enhance testing and to help them design safer and lower cost systems with a high degree of confidence – quickly and more accurately.

Challenges

The industry dictates that CAD master model data drives electromagnetic analysis. While CAD provides the geometry for the master models, it takes time to prepare and verify the geometry. Companies are always seeking ways to reduce this pre-processing time and automate processes. For EMA, CADfix is the ideal tool.

Solution

EMA developed a set of customized GUI tools using CADfix specifically for the EMA solver suite. These tools use the CADfix API and user interface development toolkit. EMA also developed interfaces to their analysis solvers using the CADfix API to extract necessary data. Thus, CADfix acts as a customized pre- and post processor for EMA3D.

Through integrations such as this, EMA has implemented new system-modeling approaches to simulate the interaction of systems and their electronics with electromagnetic environments. This helps aircraft companies prepare their designs for certification in a shorter time, with more accuracy, and at a lower cost.

According to Tim McDonald, PhD, Chief Scientist for EMA, “Every step of the process for us involves CADfix.” CADfix provides model import and repair, geometry de-featuring and preparation for EM analysis, property and boundary condition definition, and meshing using several complex approaches.

“CADfix is valuable to us because it is the central working hub that interfaces with all of our solvers. We use it for our electromagnetic models, space plasma solvers, and thermal solvers. CADfix allows us to solve multi-disciplinary problems, using several solvers, based on the same initial CAD geometry,” stated Cody Weber, Senior Scientist at EMA.

Result

Right now, a few environment simulations can be used for FAA certification. As more FAA certification processes happen through simulation, manufacturers will need to verify their design cost effectively through simulation. Thus, the need for solutions from companies like EMA will increase. EMA and ITI, together, look forward to developing smarter, more innovative solutions for automated geometry manipulation, freeing analysts to work multiple environment scenarios in the same time frame.