CADFEM®

Simulation is more than Software®

Provide Security for Antennas through HF-Simulations

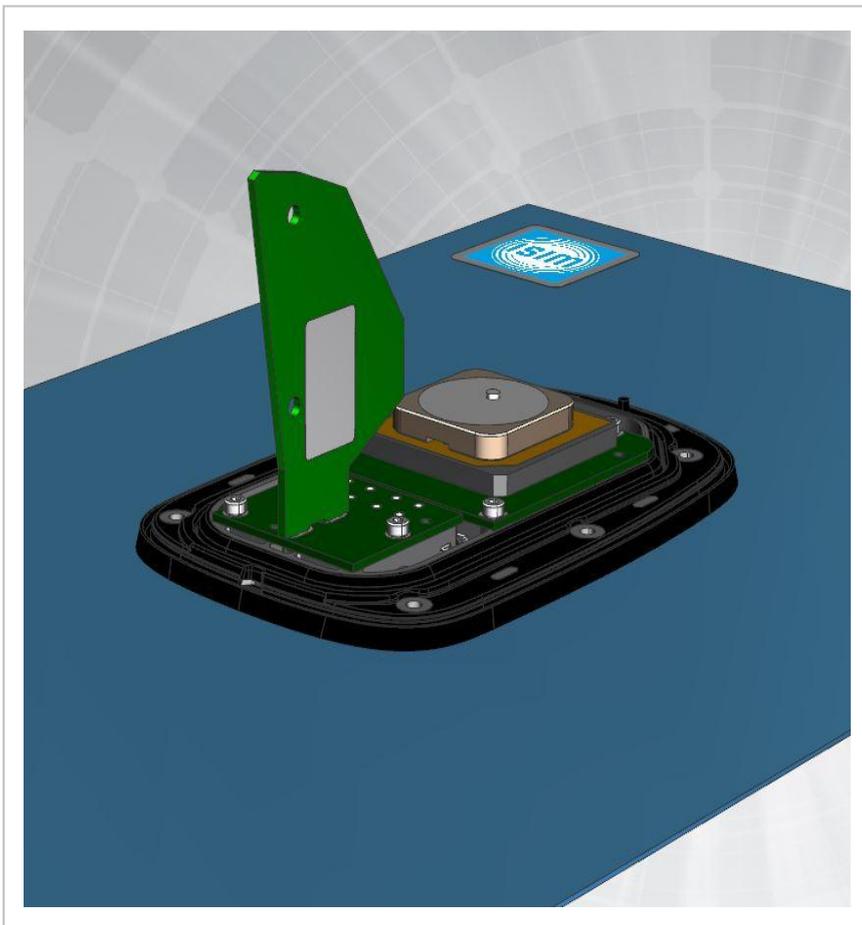## Electromagnetic High Frequency Simulation for Validation of Radiation Characteristics of Automotive Antennas

Fig. 1: WISI roof antenna.

Task

WISI Automotive has been a highly regarded partner for many years for the development and production of antennas and RF modules for automotive, commercial vehicles and industrial applications. At its locations in Germany and Tunisia, WISI Automotive stands for know-how in construction, development and production of antennas, telematics systems and HF-accessories.

Nowadays there are up to 30 antennas in a modern premium vehicle. They are used for comfort, safety and telematics applications. The requirements on those antenna systems are continuously increasing: larger bandwidths, low headroom, higher packing densities, integrated assembly spaces below the ceiling, good MIMO functionality, Co-existence with other radio services.

Often prototypes of vehicles are not yet available for real measurements. For this reason, an accurate simulation of the installed antenna performance is needed.

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Solution

With the help of ANSYS HFSS it is possible to make reliable predictions about the performance of antennas. It is important for WISI to understand the antenna design and matching as well as the installed antenna performance.

ANSYS HFSS combines finite element with integral equation methods to efficiently and accurately predict the behavior of small components on large structures, e.g. antennas on a car. The automated, adaptive meshing ensures reliable results with respect to the radiation characteristic in a user-friendly manner.

The scripting capabilities of the ANSYS Electronics Desktop can be used to evaluate industry specific results. E.g. the average antenna gain in a given sector of the radiation sphere. Easy-to-use graphical menus ensure a simple and intuitive setup.
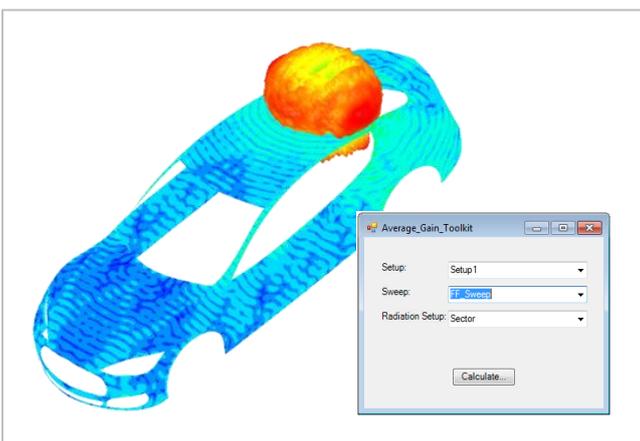
Customer Benefit

With the help of high frequency simulation WISI is able to make reliable predictions about the technical performance of newly developed antennas on a given platform already in the quotation phase. Those digital prototypes are of significant help in the sales process. Customer requirements can be assured based on this simulation driven product development.

The digital visualization of the technical characteristics of the antenna systems under development allow for well-founded decisions in the early development process. Those decisions can be taken without having to wait for real measurements on physical prototypes. This reduces the number of development loops and thus leads to shorter development times and cost reduction.
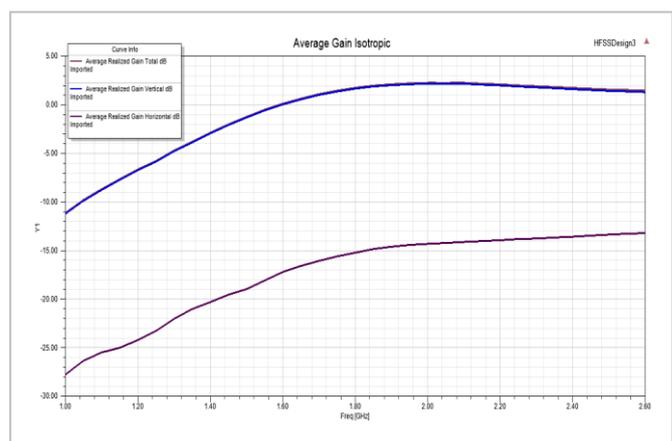

Fig. 2: Field distribution and radiation characteristic of a WISI roof antenna.

Fig. 3: Results of the Average Gain Toolkit for a roof antenna

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About CADFEM

Since 1985, CADFEM delivers CAE competence and works closely with ANSYS Inc. Today we are an ANSYS Elite Channel Partner and we provide our customers with everything required to bring success in simulation: Software and IT-solutions. Consulting, Support, Engineering. Know-how-Transfer.