

Industrial Workshop

Organiser: Christos Liontas

Company/Organization: BETA CAE Systems SA

Title: Advanced Simulation Toolchain for Electromagnetic and Radiofrequency Compatibility Applications in Realistic Automotive and Aerospace Application Scenarios

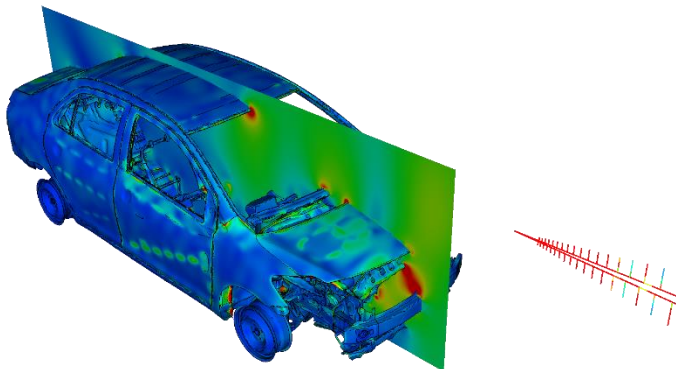
Abstract: The advancing electrification of vehicular platforms and the increasing need for interconnected computing, sensor and communications electronics in the automotive and aerospace industry has made the use of electromagnetic simulations indispensable for prototyping, optimization and virtual testing. Consequently, the need for pre-processing and simulating complicated geometries has also intensified. We present the application of a simulation toolchain that couples BETA CAE's advanced pre-/post-processing tools and IMACS' high-performance EM solver in realistic automotive and aerospace scenarios for EM and RF compatibility respectively. Two aspects of tackling the complexity bottleneck will be emphasized: advanced geometrical pre-processing and antenna substitution by Huygens sources.

Outline:

Two simulation scenarios will be presented to showcase the proposed simulation toolchain:

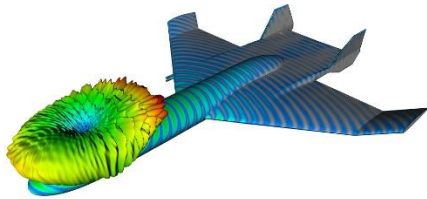
Electromagnetic compatibility for automotive applications (C. Liontas, BETA CAE):

We present geometrical/modelling challenges and solutions for simulating EMC immunity and cross-talk scenarios in complete vehicles. Special attention is paid to model conversion between different disciplines (structural to EM).



Radiofrequency compatibility for aerospace applications (B. Chaigne, IMACS):

We address the issue of RF interoperability in aeronautics, where multiple RF systems coexist. The use of Huygens sources to replace the respective antennas can be used to protect the intellectual property of antenna manufacturers, simplify geometrical modelling and accelerate solver performance.



Speakers:



CV: Dr. Christos Lontas received his Diploma in Electrical and Computer Engineering from the Aristotle University of Thessaloniki in 2003 and his PhD from the same Department in 2011. From 2012 to 2020 he was a researcher at the Fraunhofer Institute of High Frequency Physics and Radar Techniques, where he worked on numerical electromagnetics, Radar, microwave heating and EM field optimization. In 2020 he joined BETA CAE Systems, leading the team for Electronics and Electromagnetics. His current activities include FE modelling of electronics, pre-processing / meshing for EM solvers, and EMC/RF simulations in the automotive and aerospace industry.



CV: Dr. Benoît Chaigne

- 2005: Master of Science from the Université de Technologie de Compiègne (France) in computer science and from the Chalmers University of Technology (Gothenburg, Sweden) in applied mathematics

- 2006-2009: PhD in Applied Mathematics at the INRIA research institute in Sophia Antipolis (Nice, France); works on shape optimization with applications to reflector antennas in partnership with Orange Labs (French telecommunication company)

- 2010-2012: researcher at the Technische Universität München (Germany); works on electrostatics simulation and shape optimization of high voltage devices to reduce the creation of electrical arcs; in partnership with ABB

- From 2012: research engineer at IMACS; participates in the development of a 3D Maxwell Boundary Element Method solver and various simulation tools and methodologies; conducts several industrial studies; application to design and certification (Electrical Structural Network, Lightning Indirect Effects, RFC, etc.)