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This is the final issue of the FEKO Quarterly for 2009. The year is ending with many FEKO-related activities, reported on in this issue. These include the FEKO Student Competition and various FEKO User Meetings and roadshows all over the world. Looking ahead, we announce the ACES 2010 conference and international FEKO User Meeting. Best wishes for 2010 to all our readers!

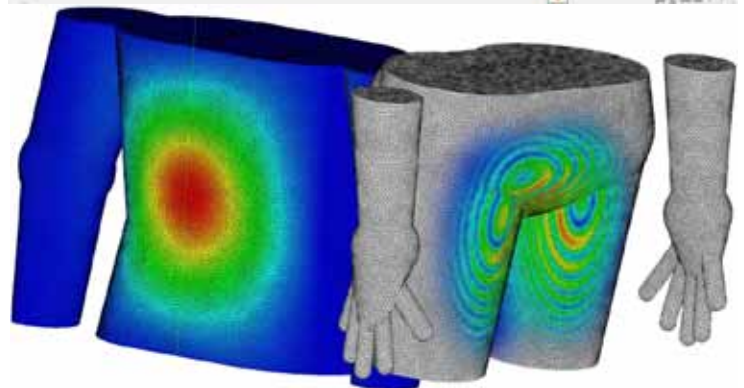
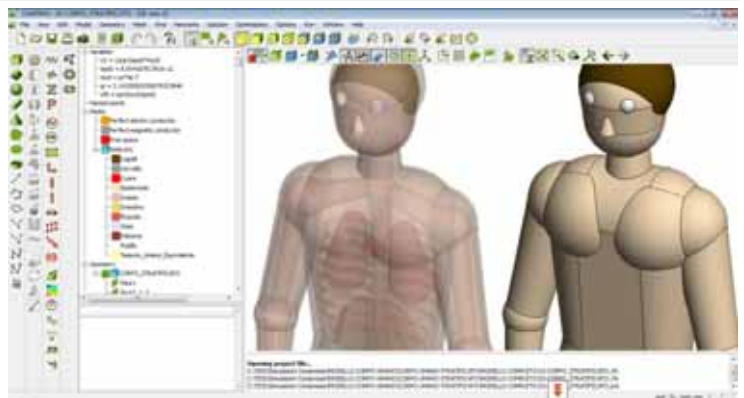
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Student Competition results

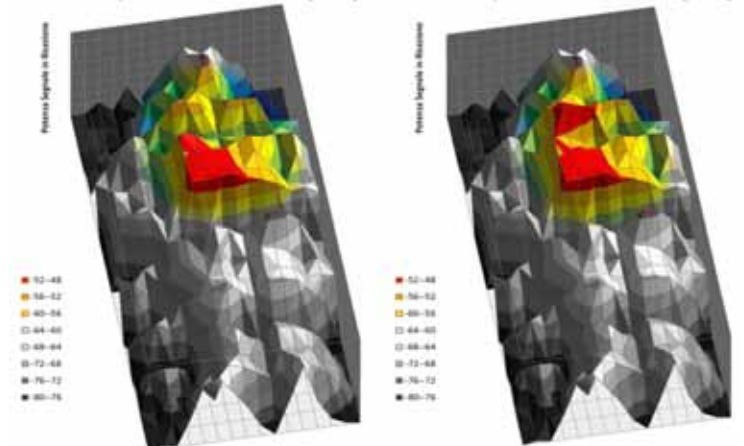
This year we again received many high quality entries. The winner has been judged on the extent to which the wide range of FEKO features were appropriately applied for maximum benefit, as well as on insight shown into the EM problem at hand. The judging panel decided to also make honourable mention of a number of other entries, in recognition of hard work and high standards.

Winner

This year's winner is Simone Ledda, with an entry entitled "Microwave Sensor with Polarization Diversity for Detection of Dielectric Objects", from the Electronic and Telecommunications Department, Faculty of Engineering, University of Florence, Italy. A sensor system, operating between 18 and 24 GHz was designed and analysed. The purpose of the system is to detect dielectric objects in close proximity to the human body. The CAD creation and manipulation features of FEKO were extensively used to create a realistic human body model from scratch. Various solver features were subsequently employed, including the method of moments (MoM), multi-level fast multipole method (MLFMM), layered media MoM, radiation pattern point sources and ideal receiving antennas.



Ricezione cross-polare - Scansione a matrice [20x16] Ricezione cross-polare - Scansione a matrice [20x16]



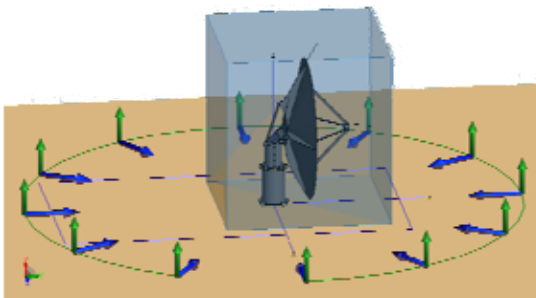
Results by Simone Ledda (winner): a detailed human body CAD model created in CADFEKO (top); current distribution under sensor antenna illumination (middle); cross-polarised backscattering without and with a dielectric object present (bottom).

"The CAD creation and manipulation features of FEKO were extensively used to create a realistic human body model from scratch."

Student Competition results ... (continued)

Honourable mention

We are pleased to make honourable mention of the following entries:



Plane wave excitation from different directions, modelling indirect lightning strikes, by Gideon Wiid.

- Markus Lehner, “Modelling and Numeric Simulation of the HIRF EMC-Testplant in Manching”, Duale Hochschule Baden-Württemberg Ravensburg and EADS Military Air Systems (training company), Germany.

- Bennie Jacobs, “Modelling Manufacturing Tolerances in 1-18 GHz Double-Ridged Horn Antennas”, University of Pretoria, South Africa.

- Gideon Wiid, “Radio Frequency Interference and Lightning Protection of the SA Square Kilometre Array Demonstrator, MeerKAT”, University of Stellenbosch, South Africa.

“FEKO engineers constantly pursue fluent, effortless integration and use of our software on the latest and most advanced computing platforms.”

Windows certifications

FEKO engineers constantly pursue fluent, effortless integration and use of our software on the latest and most advanced computing platforms. This means that FEKO is regularly tested by third parties, including independent test houses, Intel and Microsoft. These authorities are then entitled to grant FEKO certification for use on a variety of platforms. Recent tests that FEKO were submitted to delivered the following results:

- The windows installation of FEKO was certified by Veritest (a Microsoft partner) for both client (e.g. Microsoft Windows XP) and server (e.g. Microsoft Windows Server 2008 HPC) operating environments.
- FEKO Suite 5.5 obtained both the “Compatible with Windows 7” and “Works with Windows Server 2008 R2” status from Microsoft.
- FEKO Suite 5.5 was certified by Intel as being “Intel Cluster Ready”.



Certifications of FEKO

These certifications are important to FEKO users, as they testify to the fact that FEKO is a cutting edge technology tool that works well with modern computing platforms and operating systems.

Using Antenna Magus with FEKO

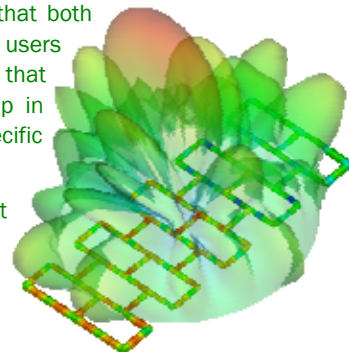


www.feko.info/antennamagus

it can take care of detailed antenna modelling and problem setup in FEKO. This allows them to focus their efforts on solving their specific problems quicker and more easily.

Antenna Magus is continuously being improved and extended to best serve the antenna design and placement community. Recently Version 1.4.0 has been released. Examples of antennas that have been added to the collection of antennas since their first release include among others a wire grid array, a 2 x 2 rectangular microstrip patch array and slotted waveguide antennas.

The comprehensive interface between Antenna Magus and FEKO, which allows models to be exported from Antenna Magus directly into FEKO, streamlines the workflow of FEKO users. Antenna designers, system integrators and other EM specialists appreciate the fact that Antenna Magus helps them obtain first order designs and qualified FEKO simulation models in very little time. Feedback that we have received indicate that both novice and experienced FEKO users find Antenna Magus beneficial in that

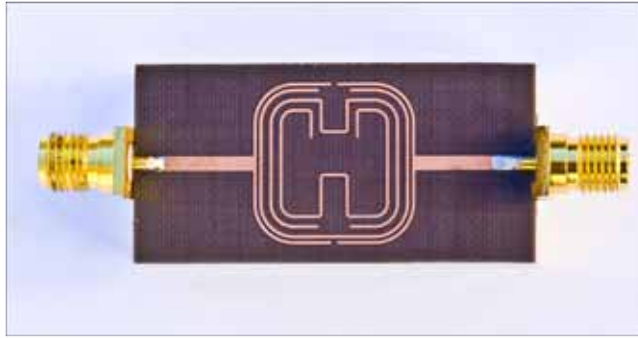


10 GHz wire grid array gain pattern

“...both novice and experienced FEKO users find Antenna Magus beneficial ...”

SRR microstrip filters with planar Green functions

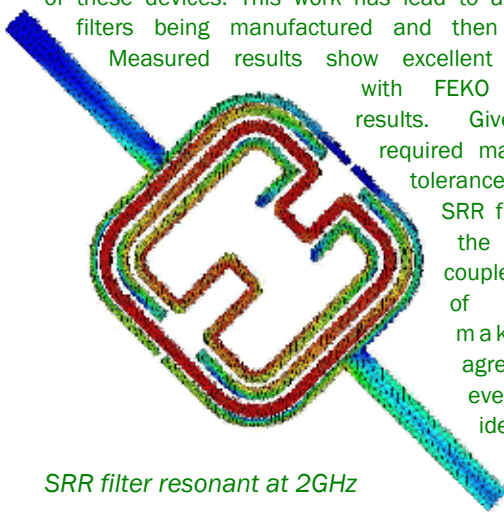
Planar Green functions are an ideal solution method for the analysis of microstrip networks. The Method of Moments (MoM) formulation that underpins the planar Green function method is based on the solution of Maxwell's equations in integral form. This method results in a solution that is highly phase stable, enabling the analysis of proximity coupled microstrip structures that are closely spaced, such as the rings of a split ring resonator (SRR) microstrip filter.



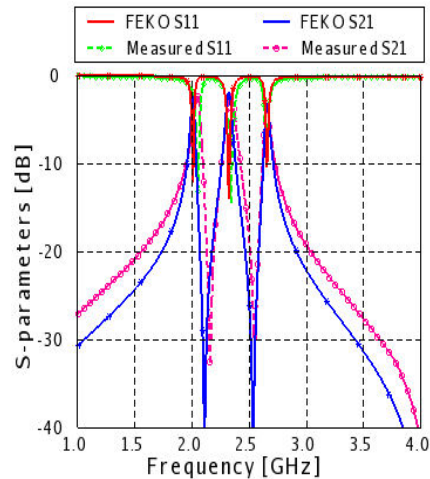
SRR filter prototype (above); measurement vs FEKO simulation (below)

Dr. Riana Geschke of the University of Stellenbosch (SU) in South Africa, Dr Branka Jokanovic from IMTEL, Serbia and Prof Petrie Meyer (SU) have been working on the design of SRR filters [1]. They use FEKO extensively for the simulation of these devices. This work has led to a number of filters being manufactured and then measured.

Measured results show excellent agreement with FEKO simulation results. Given that the required manufacturing tolerances for these SRR filters are in the order of a couple of tenths of micron, it makes the agreement obtained between FEKO and measured results even more impressive. This work shows that FEKO is ideally suited to the simulation of complex microstrip filters, towards advancing the state of the art in microstrip filter design.



SRR filter resonant at 2GHz



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[1] R.H. Geschke, B. Jokanovic, P. Meyer, "Compact Triple-Band Resonators Using Multiple Split-Ring Resonators," Proceedings of the European Microwave Week 2009, held in Rome, Italy, 28 September to 2 October 2009.

ACES 2010 and international FEKO User Meeting

The Applied Computational Electromagnetics Society (ACES) is hosting their annual conference in Tampere, Finland, from April 25 to 29, 2010. This international symposium serves as a forum for developers, analysts and users of computational electromagnetics (CEM) methods over all frequency ranges and relating to diverse applications. Please visit aces.ee.olemiss.edu/conference.php for more information.

A special session on EM modelling with FEKO will take place at ACES 2010. We expect many FEKO users again to attend ACES this year.

As in the past, an international FEKO User Meeting is being organised at the same location as ACES. FEKO users are invited to attend both the ACES symposium and the FEKO User Meeting.

At the FEKO User Meeting, presentations will be made to highlight some of the latest FEKO features (Suite 5.5, released July 2009) and FEKO users will present their work, facilitating the exchange of ideas and knowledge in the FEKO community. Users will have the opportunity to interact with the FEKO product manager, to discuss their use of FEKO and to request future extensions. Please visit www.feko.info for more information.



Tampere, Finland
(Original image: www.gaba-project.eu)

"Measured results show excellent agreement with FEKO simulation results."

"...an international FEKO User Meeting is being organised at the same location as ACES."

Exhibitions: FEKO will be exhibited at many conferences this quarter, including those listed below.

9 - 11 Mar '10	EMV 2010, Düsseldorf, Germany
12 - 16 Apr '10	EuCAP 2010, Barcelona, Spain
25 - 29 Apr '10	ACES 2010, Tampere,

International exposure and feedback

To maintain constructive interaction between FEKO developers and customers, members of the FEKO team regularly visit customers and attend technical conferences all around the globe. These visits and exhibits provide developers with a greater understanding of what customers require and help to communicate new product features and developments to new and experienced customers alike. The second half of 2009 has been a particularly busy time for such activities.

NI2 Designs arranged a two week roadshow in India during August. During this roadshow a diverse range users were visited. Included in the program was a technical lecture at an IEEE AP/MTTS chapter meeting in Bangalore.

EMSS S.A. visited various cities in Australia, presenting new features to many different interested parties. This trip was combined with a FEKO exhibit and workshop at the 2009 Australian EMC Symposium in Adelaide, which took place from September 16 to 18.

PERA Global organised a Chinese FEKO User Meeting in October. Representatives from the FEKO development centre made presentations on the latest features of FEKO and how it can be used together with Antenna Magus. These presentations were translated into Chinese, with the whole meeting being conducted in Chinese. Interesting user contributions were presented.



Attendees at the Chinese FEKO User Meeting in October, which was organized by PERA Global — the distributor of FEKO in China.

EMSS USA conducted a FEKO roadshow in three US cities in October. The FEKO product manager shared details and insights about the latest release of FEKO and obtained feedback from users. Users had the opportunity to interact face-to-face with the EMSS USA FEKO support team.

11th Annual German FEKO User Meeting in Stuttgart. This year the annual German FEKO User Meeting was again held in Stuttgart, Germany on the 20th of October. In the morning, various customers from diverse industry sectors gave interesting presentations about their applications and their work with FEKO. Contributions included antenna integration on aircrafts, numerical simulation of emissions from a high-voltage system into an antenna of a hybrid car, simulation of EMC problems in automotive electronics as well as development of a citizens band radio antenna for commercial trucks. The agenda included presentations on Antenna Magus and the new features of the latest release of FEKO (Suite 5.5, July 2009).

Comprehensive Electromagnetic Solutions

APPLICATIONS

- Antenna Design
- Antenna Placement
- EMC Analysis
- Scattering Analysis
- Biomedical

SOLUTION TECHNIQUES

- Method of Moments (MoM)
- Multi-level Fast Multipole Method (MLFMM)
- Finite Element Method (FEM)
- Physical Optics (PO)
- Ray-Launching Geometrical Optics (GO)
- Uniform Theory of Diffraction (UTD)

- Planar and Periodic Green Functions
- True Hybridisation of MoM/FEM, MoM/PO, MoM/GO and MoM/UTD
- MoM for Multiple, Complex Dielectric Bodies

FAST SOLUTIONS

- Parallel Processing (Multi-Core CPUs, Clusters)
- Fast Frequency Sweep
- Out-of-Core Solving

MODEL FORMATS

- Solid Models (Parasolid, DXF, ACIS, CATIA, Pro-E, IGES, STEP, Unigraphics)
- Meshes (CADFEKO, FEMAP, NASTRAN, Auto-CAD DXF, STL, PATRAN, ANSYS CDB, ABAQUS, ASCII data format, GID)

SERVICES

- Extended Service Contract
- On-site Training (Short Course)

- CAD Preparation
- Runtime Solutions
- Engineering Consulting Services



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