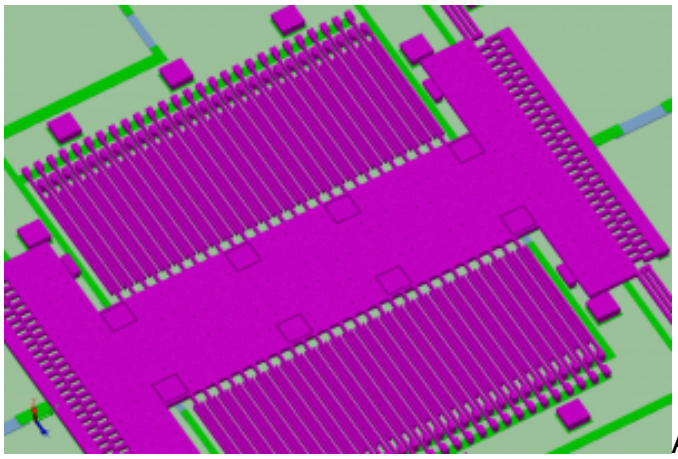
Software Increases 3D Simulation Capacity and Accuracy to Ease Verification of Complex MEMs Devices

 At the IEEE MEMS 2012 Conference, Coventor introduced the 2012 release of its best-in-class CoventorWare® solution for

MEMS design verification and optimization. CoventorWare 2012 capitalizes on increased computing power and software algorithm advancements to enable more complete and accurate verification of state-of-the-art MEMS designs.

CoventorWare 2012 continues to set the standard for MEMS simulation accuracy, capacity and speed with full 64-bit support and a new hex-dominant extrude meshing capability. In addition, CoventorWare 2012 includes a new Python scripting interface for its enhanced suite of MEMS field solvers and a new intuitive user interface, both aimed at automating the set-up, execution and post-processing of simulations. MEMS 2012 attendees can see live product demonstrations of the CoventorWare 2012 software in Booth #10 from January 30th through February 2nd at the Marriott Paris Rive Gauche Hotel in Paris, France.

“The complexity of MEMS devices being designed for the next wave of innovative consumer, automotive and industrial electronics systems requires new levels of performance from a verification perspective,” said Mike Jamiolkowski, CEO of Coventor. ”Our strategy is focused on dramatically shortening the typical lengthy MEMS product development cycle by offering designers a development environment that is easy to use, provides the complete range of modeling capabilities required for state-of-the-art MEMS, and has the throughput to handle the largest, most complex designs. CoventorWare has been the industry-standard for MEMS design for more than a decade and this latest releases raises the bar further still.”

Simulate Complex Designs More Accurately
CoventorWare is an integral part of Coventor’s MEMS design automation platform

for rapid evaluation of design concepts, optimization and MEMS+IC integration. It is used for verification and optimization of device designs starting from layout through analysis of MEMS-specific multi-physics, such as coupled electro-mechanics, gas damping, anchor losses, thermo-elastic damping (TED), and manufacturing-induced stress gradients. CoventorWare 2012 is focused on solving the big verification challenges faced by MEMS designers developing the next generation of MEMS devices.

“CoventorWare 2012 provides an entirely new level of simulation capacity and accuracy. It enables us to rapidly examine all aspects of our high-performance resonators in simulation and predict the Q factor due to thermo-elastic damping within five percent of measurement. As a result, we are able to further reduce the size of our quartz crystal and maintain the high Q necessary to interface with standard ICs, significantly extending our technology advantage in this highly competitive market,” commented Silvio Dalla Piazza, vice president of Research & Development at Micro Crystal AG, a subsidiary of The Swatch Group Inc. Switzerland.

With the increased memory capacity of 64-bit computing, CoventorWare users can now simulate more complex designs and obtain higher accuracy with finer meshes. Full 64-bit support has been implemented across the entire Coventor software suite, including the solid modeler, preprocessor and meshing, visualizer and all MEMS solvers. A single installation provides both 32- and 64-bit support that automatically runs in 64-bit mode on 64-bit operating systems.

The CoventorWare 2012 hex-dominant extrusion meshing option also increases simulation capacity and is ideal for typical MEMS structures, which are made up of high aspect ratio (fairly thin), stacked layers of materials perforated with release etch hole patterns. It automatically generates meshes that have uniform density and quality, unlike competing solutions that generate very inefficient tetrahedryl meshes or require extensive user involvement to produce an efficient hex-only mesh. This new capability reduces the number of mesh elements required for typical MEMS devices by as much as 20 to 40 percent, making it possible to simulate entire multi-axis inertial MEMS sensors with 100s of electrostatic comb fingers.

Automate Simulation Tasks

The all-new Python scripting interface for the CoventorWare 2012 field solvers enables users to automate repetitive tasks and perform more sophisticated types of analysis, such as multi-dimensional parametric studies. With CoventorWare 2012, users can set up simulations via the graphical user interface and then automatically generate Python scripts, eliminating the need to write scripts from scratch. Additionally, they can combine automatically generated scripts to automate series of simulations and post-processing tasks, while also benefiting from full access to the extensive numerical computation and plotting capabilities of the widely used Python language.

Python scripts can be executed from the new CoventorWare console, which is a unified graphical interface for accessing all CoventorWare functionality. The console

provides access to all simulation management functions in a single window while remaining compatible with the classic user interface, ensuring that both new and existing users can quickly become productive. The console also simplifies simulation setup for the enhanced versions of the MemElectro, MemMech, CoSolveEM, HamonicEM and DampingMM solvers provided with the CoventorWare 2012 software release.

For more information about CoventorWare solutions, visit: http://www.coventor.com/products/coventorware/ [1].

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