

## New InCa3D v2.2 - Conductor Impedance & Near Field Simulation.

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InCa3D, the CEDRAT simulation tool dedicated to electrical connection modelling in both electromagnetic compatibility and power electronics phenomena, is being enriched with many new features for improving its ease of use and expanding its domains of application.

### De-featuring of MCAD files

The most important feature of this version will certainly be the ability to import geometries described in the most common MCAD (Mechanical Computer-Aided Design) formats like STEP, IGES and SAT files or native files from CATIA (v4 and v5) and Pro/E. This new functionality is based on the 3D modeller ACIS kernel, provided by Spatial Corporation. The simulation of complex structures (e.g., a power module, a system of distribution bars or a switchboard) will thus be very simple and fast, thanks to a dedicated environment where users can also automatically clean up or heal the imported models.

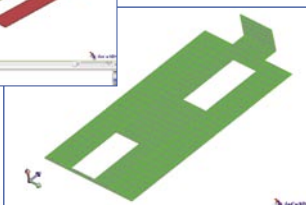
An example of this facility is shown in the figures here below: all the little holes have been deleted and the blends transformed into right angles. These mechanical details have minimal influence on the electromagnetic simulation results but they are very consuming from a meshing and a computational points of view. The user will also be able to cut, by means of virtual planes, the objects of the imported geometry, in order to have a final geometry which is simpler to model and mesh in InCa3D. The construction of the bi-directional conductors modelling, for example the external case of a power module, will be particularly efficient. All these de-featuring operations can be made easily due to the provided procedures.

Another capability related to the MCAD import is represented by the algorithm which allows a user to create



A busbar imported from an IGES file.

The de-featured and meshed busbar for InCa3D simulations.



unidirectional conductors from one or more imported volumes, which may not only have planar surfaces. For example, it will be very useful to model cables or PCB bond-wires: the user will simply have to define the input and output faces and InCa3D will automatically generate the meshed conductors approximating the volume of the bond-wire. New predefined conductor profiles are also available (circular full, circular hollow and rectangular hollow sections), and their construction has been automated.

### Images-based conductor creation

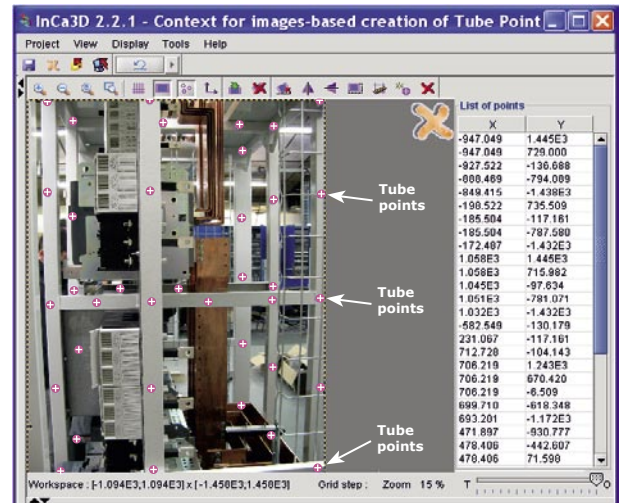
The InCa3D users will also have the possibility to capture an image (accepted formats: BMP, GIF, JPG, PNG and TIF) with the goal of easily drawing at the real size one part or the totality of the structure to simulate. In a specific context for images-based creation, the picture will become the InCa3D wallpaper where users can draw by simple mouse clicks all the fundamental points necessary for creating the geometry. After exiting this context, the user will only have to define the corresponding unidirectional conductors by referring to the plotted points. An example of this new function is shown in the opposite figures.

### Parametric solving

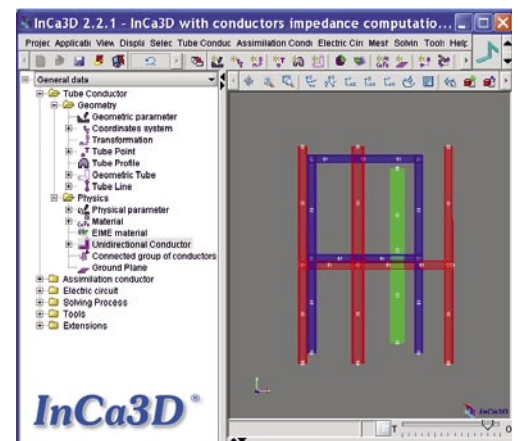
Version 2.2 of InCa3D will also allow the user to perform multiple parametric solving, by means of an extended scenario definition. This functionality will help engineers to find the optimized values for some parameters or key-properties of the considered system, like for instance the position of some conductors, the shape of their cross-section or the amplitude of the power supply sources. It will also be possible to plot 2D curves showing the evolution of the output quantities in function of the parameter to optimise.

### Impedance export

It is now easier to export towards external circuit simulators an equivalent macro-component of the structure. The user is supported by a functionality which is able to automatically create and connect the minimal number of impedance probes necessary to measure all the impedances desired. To make this possible, the user will



Tube points plotted in a picture (Courtesy of ACCO3 - Montluçon - France).



Creation of geometric tubes based on the tube points plotted on the image.

have just to define the terminals of the structure that should become the pins of the macro-component.

In the long list of achieved developments, a last (but not the least) feature worth highlighting is the synthesising of the extracted equivalent circuit into the VHDL-AMS format by the "Conductors Impedances" application. Thanks to this IEEE standard language, the inclusion of InCa3D models into system-level simulators, like Portunus, will be more robust and efficient. The user can also continue to export the results into SPICE, Modelica or SABER formats.

Discover new InCa3D web pages at: <http://www.cedrat.com/en/software-solutions/inca3d.html>.

For a web demonstration do not hesitate to contact us at: [software@cedrat.com](mailto:software@cedrat.com) !