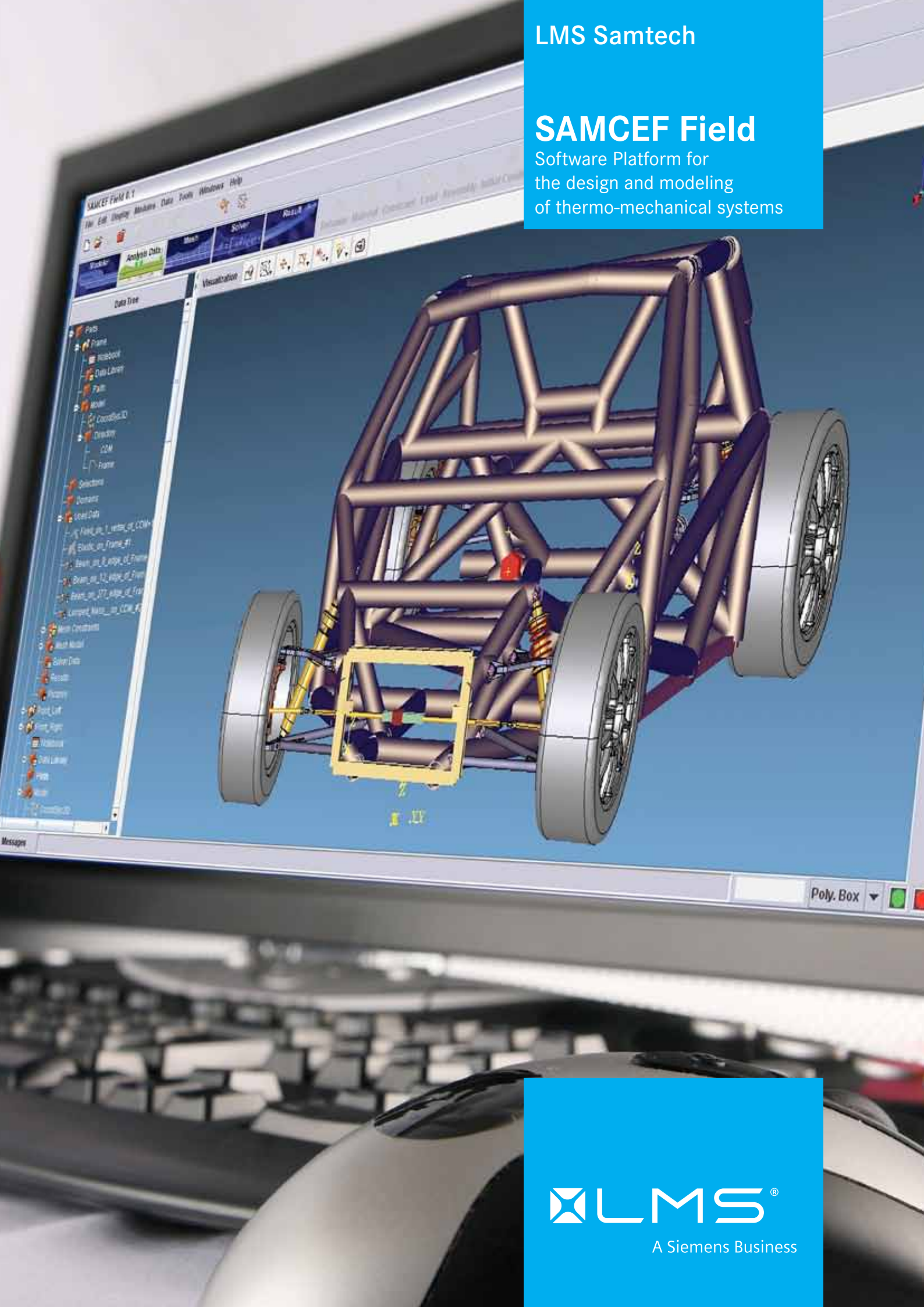
LMS Samtech

SAMCEF Field

Software Platform for
the design and modeling
of thermo-mechanical systems



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SAMCEF Field allows you to design your systems with a simple click, using pop-up menus, icon bars, shortcuts or keyboard commands. Design, modeling, analysis and results post-processing operations are driven in a fully contextual and single environment.

General characteristics

The geometry is either created in the SAMCEF Field modeler or can be directly imported from most commercial CAD software. SAMCEF Field supports a wide range of applications, from simple linear numerical simulations to most advanced dynamic analyses of complex mechatronics systems, based on FEA concept.
SAMCEF Field integrated reports generation system allows you to make up very comprehensive analysis files in HTML format (modeling and analysis tasks summary, data and properties, photos, list of pre-selected values in Excel format...).
The SAMCEF Field documentation is directly accessible from the graphical interface. The help function offers two research levels depending on the requested information details: tutorial and user manual.

Creation of CAD geometries

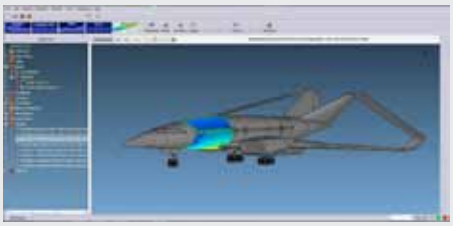
SAMCEF Field integrates simulation in the design process. It includes 2D and 3D design tools making it easy to create simple parts or complex mechanical systems in a very intuitive way, but also to repair or rework imported geometries. SAMCEF Field also includes a sketcher for the creation of basic geometries (lineic, surfacic, volumic). Lastly, a set of specific tools is available for the assembling of existing geometries.
The complete history of your analysis is directly accessible via the navigational system. Easy-to-use and user-friendly, this feature make it possible to re-use either all or parts of your geometries components or assemblies, or to introduce modifications, immediately passed on to your geometry.

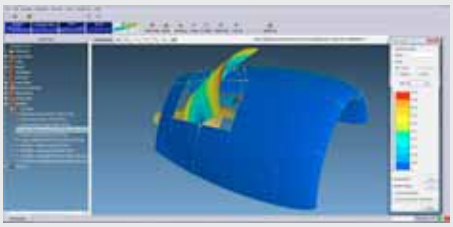
Data management

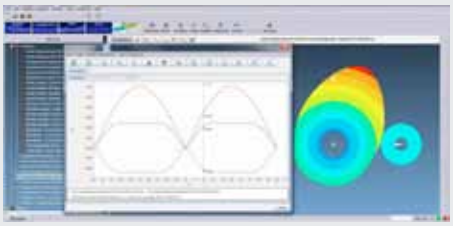
This analysis process step lets you introduce and define all material and physical data of your mechanical system (material behavior, shell thicknesses, beam or rod properties...), as well as boundary conditions, loads and constraints between parts of the system (i.e. local stiffness, springs, gaps).
Data definition uses the mechanical engineer vocabulary. You can thus really focus on your problem, particularly since access is only given to data relevant to the selected application and analysis type. When changes are made to the geometry, all related items are easily updated. You can also assign data directly on the FE mesh.
SAMCEF Field provides you with intuitive tools for data definition and pre-visualization, as well as import and use of existing data libraries.

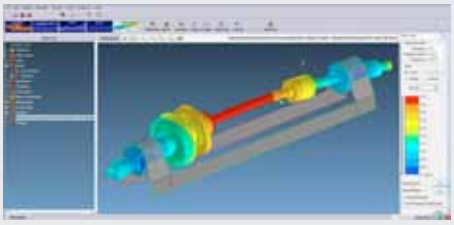
Solvers

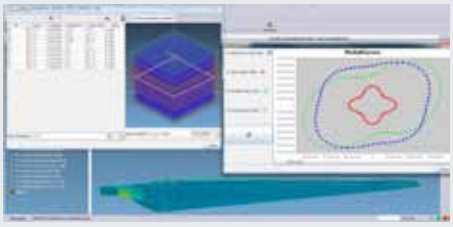
Before launching the solver, and in order to avoid any waste of time, a data coherence checking is performed. This functionality verifies that the analysis is relevant and that elementary data are not missing. If data are missing, you are immediately informed. You can select the results to store for the post-processing. By default, you can access standard SAMCEF analysis result. The monitoring interactive window allows to follow up the evolution of the calculation steps and interrupt if a problem is detected.











Meshers

Within SAMCEF Field, it is only when launching the solver that data are really assigned to the geometry. This characteristic is essential since it allows in particular to easily re-mesh the model, while preserving a coherent data definition. It is also possible to directly import a mesh either in SAMCEF, NASTRAN, IDEAS or ANSYS formats.
Meshing functionalities in SAMCEF Field are organized in four principal steps :

- Definition of mesh constraint (number of elements on a line, element size...)
- Choice of element order (linear, quadratic...) and meshing type (projection, extrusion, ruled mesh, free mesh...)
- Mesh generation
- Mesh verification according to integrated quality criteria and possible mesh modification

Results Analysis

After analysis completion, the results are easily accessible from a simple click in the navigator. Standard graphical tools can be used to visualize 2D or 3D analysis results on the initial or deformed geometry (using iso-contour, color maps, symbols, principal tensors...). Result post-processing can be performed on the global model or on selected critical areas. Results can also be exported into EXCEL sheets.
Lastly, specific functionalities allow to scan any results distribution in 2D or 3D structures and save visualizations as images or video films.

Documentation

For direct access to information, the Users Guide and Help manual are available via your favorite navigator (HTML).

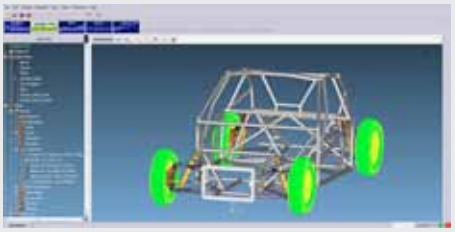
Platforms

SAMCEF Field is available on Windows 2000 & XP Pro platforms.

Coupling SAMCEF Field with other products of SAMCEF family

SAMCEF Field environment ensures a total compatibility between different solvers of the SAMCEF family and makes it possible to chain different types of analyses with great flexibility; for example, you can easily switch from linear to non-linear analysis on the same model.
It is also possible to perform a modal analysis or a linear buckling analysis starting from a converged non-linear solution (SAMCEF Mecano):

- SAMCEF Linear (Asef, Dynam, Stabi): linear static, modal and buckling analyses;
- SAMCEF Mecano: unique integrated solver for non-linear structural analysis and multibody systems simulation based on FE methods. SAMCEF Mecano is declined in following modules:
  - MECANO Structure: non-linear structural analysis module, including advanced 2D and 3D friction contact algorithms;
  - MECANO Motion: static, dynamic and kinematical analyses of flexible mechanisms.
- SAMCEF Thermal: stationary thermal analyses;
- SAMCEF Rotors: critical speed, stability, transient and harmonic responses of rotating systems.



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