BETA
SIMULATION SOLUTIONS

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Aerospace engineering

Reach higher performance altitudes

Take the next step in your simulations by employ the standard in multi disciplinary simulation

The broad range of functionality complemented by special tools, along with the high level of process automation, will ensure high performance and efficiency for all your required tasks. The ANSA and META pre- and post- processing suite will streamline your working ways and offer you all the tools you need for effective multi-purpose simulations.

Core Functionality

- Integrated CAD tools for geometry creation, modification, cleanup and defeaturing.
- Middle Surface extraction for complex parts.
- Batch Meshing that respects user-specified quality criteria and mesh parameters. ANSA offers automatic feature recognition, defeaturing and special treatment for fillets, flanges, tubes, and holes, tailored meshing sessions for different areas of the model, local refinement and coarsening.
- Part and Sub-Assembly based model build-up offering: Part, Version and Representation Control & Exchange.
- Flexible, updatable definition of Connections, Fasteners, Adhesives and Weldments within ANSA.
- DataBase Comparison: identification of regions, capturing of specific characteristics, and reuse of validated work.
- Task Manager to organize a step-wise sequence procedure.
- User-friendly Python object-oriented scripting language to automate ANSA procedures.
- Interoperable pre-processing decks for numerous solvers for FEA and CFD analyses.
- Output of ready to run solver input files for all industry used solvers.

CFD Oriented Features

- Powerful surface wrapping tool, capturing all sharp edges of the model, with curvature and proximity refinement. Rapid creation of fully watertight models regardless of the geometry complexity. Leak detection tool.
- Automatic curvature-dependent surface meshing with user controlled growth rate, min & max element size and mesh feature angle.
- Fast and robust volume meshing for tetra, prism, pyramid and hexa elements.
- Generation of smooth boundary layers, advanced control for squeezing, collapsing or excluding to overcome quality and proximity issues.
- A variety of options for boundary conditions definition.
- Easy creation of Smoothed-Particle Hydrodynamics (SPH) inside a volume of any shape.

Composites

- Creation, modification and visualization of thickness and fiber orientation of composite structures.
- Integration of VISTAGY's FiberSIM and SIMULAYT's Layup for seamless exchange of composite material data.

Morphing & Optimization

- Parametric shaping of both FE model & geometry.
- Model validation through animation of model shaping.
- Generative morphing modes to create new features from scratch.
- Capture and reuse of meshed details.
- Task Manager organization and control of optimization through:
  - Enhanced Design of Experiments.
  - Full Factorial algorithm.
  - Uniform Latin Hypercube algorithm.
  - Direct coupling of ANSA & META with all industry-standard parametric optimizers.
  - Integrated TOSCA interface.

Special Tools

- Creation, manipulation & calculation of cross sections.
- Automatic creation of beam elements.
- Replacement of meshed parts with beams of equivalent Cross Section.
- Distribution of non-structural mass for proper total weight equivalence.
- Automatic “Rigidize” for the replacement of a model part by rigid bodies.
- Sub-structuring function to define an area of interest on the full body, while preserving load-case attributes of the original loadcase setup.
- Mapping of pressure & temperature results from a CFD simulation to an FEA model.
- Calculation of liquids level inside a tank of any shape.
- Trapped Fluids volume identification.
- Creation, transformation & efficient handling of fastener & connection entities.

Features

- Process automation
- Geometry clean up
- Shell and Volume meshing
- Boundary layer meshing
- Interoperable decks
- Solver-like entity cards
- Model assembly
- Model checks & fixes
- Welds & Fastener modeling
- Mass trimming
- Substructuring
- Results mapping
- Parametric morphing
- Coupling with optimizers
- Automated 3D & 2D post-processing
- Results calculation
- Automated reporting

Benefits

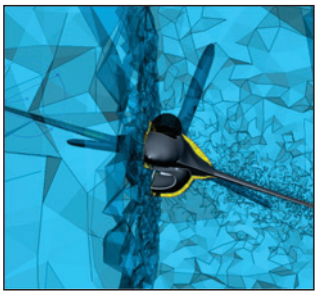
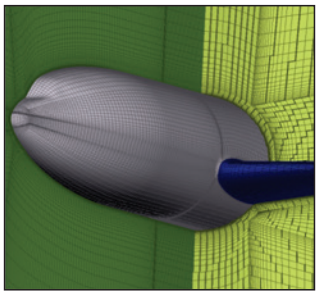
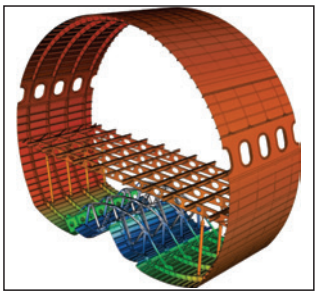
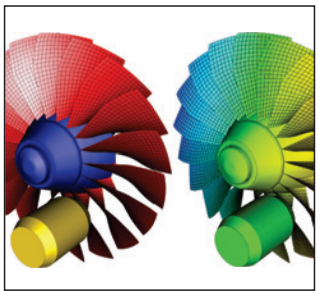
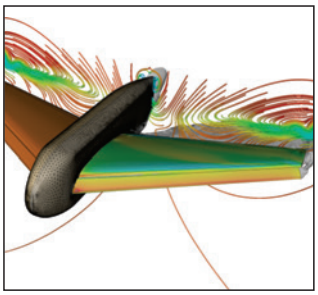
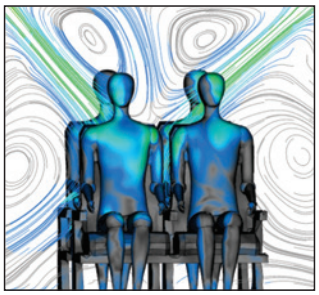
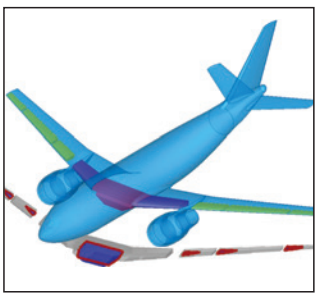
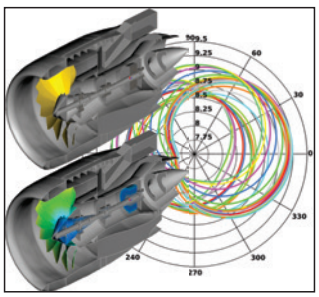
- Multidisciplinary processing in a single environment
- Cost and time-to-market minimization
- Decrease of human error potential
- Fast design modifications for re analysis
- Easy handling of large and complex models
- Coupling with any optimizer
- Fast generation of comprehensive and ready-to-show reports
- Effortless execution and repetition of frequent tasks

EPILYSIS: The Finite Element Solver

- Linear Statics, including AMLS & block–Lanczos Eigen-Value analysis.
- Dynamics: Direct, Modal & Transient.
- Small-strain Non-Linear / Contact.
- Substructuring/Static Condensation/Component Mode Synthesis.
- Shared Memory Parallel Architecture, in & out-of-core, for large problems.

Post-processing

- Support of CFD results format of ANSYS FLUENT, StarCCM+ and OpenFOAM.
- Visualization of Streamlines as lines, ribbons or cylinders, colored by any variable available.
- Hot spots identification through filtering capabilities incorporated in many tools of META.
- Overview of results achieved through statistics tables with spreadsheet functionality.
- Integrated calculator for linear combination of results deriving from other loadcases.
- Calculation of forces and moments on any user defined section and output in solver format to for sub-modeling.
- Integrated powerful graph tool for direct plotting of data deriving from the 3D model or from imported solver time history files.
- NVH post processing with a whole variety of 2D plots (Polar, Magnitude-Phase, DNA and more) and integrated tools like modal model building, modal response calculator and FRF assembly.
- Post-processing for durability and fatigue analysis is greatly assisted by parameterized sessions and scripts.
- Coupling of META with external optimizers.
- Image matching and video synchronization for results validation.
- Reports creation in html, Postscript, pptx or pdf format using the Report Composer.
- Customized toolbars creation through the toolbar designer.
- Dedicated Toolbars for CFD, Composites (failure criteria) and Bearing Distortion.

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