

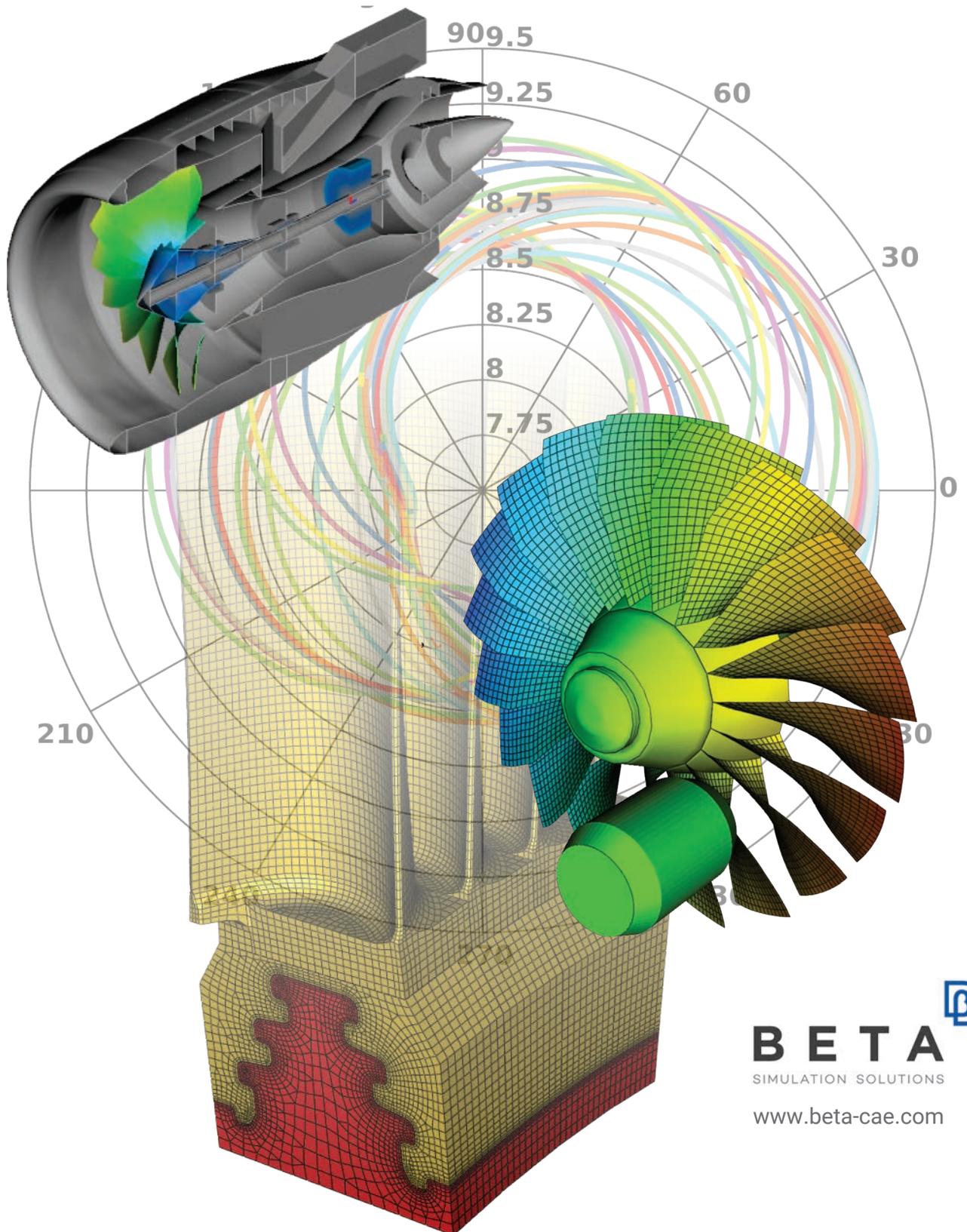
**ANSA**  
PRE PROCESSOR



**META**  
POST PROCESSOR



high performance  
pre- & post-processing tools  
for aerospace engineering

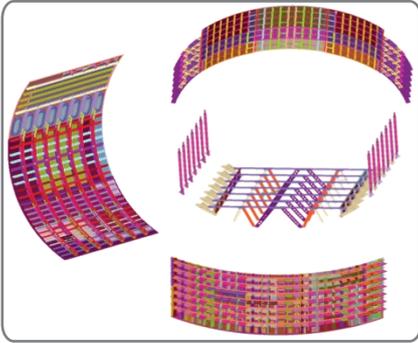


**BETA**  
SIMULATION SOLUTIONS  
[www.beta-cae.com](http://www.beta-cae.com)



ANSA is an advanced multidisciplinary CAE pre-processing tool that provides all necessary functionality for full-model build up: from CAD data to ready-to-run solver input files, in a single integrated environment. A broad range of functionality complemented by special tools, along with high level of process automation, ensures high performance and efficiency for all required tasks: for load-path identification, static stress, durability, crash, Noise, Vibration, CFD, and optimization studies.

META is a highly sophisticated and user friendly multi-purpose post-processor that meets the needs of various CAE disciplines. Through undisputably high performance, top quality 3D graphics and 2D plots, automation and reporting capabilities, post-processing becomes more comprehensive and faster than ever before.



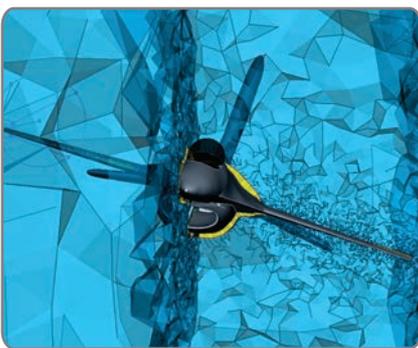
### Core Functionality

- Integrated CAD tools for geometry creation, modification, cleanup and Defeaturing.
- Middle Surface extraction for complex parts with fully automatic functionality, producing high quality mesh and assigning nodal thickness.
- Powerful Batch Meshing that respects user specified quality criteria and mesh parameters. ANSA offers automatic feature recognition, de-featuring 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 same, similar, or incompatible regions, leading to capture of specific characteristics and reuse of validated work.
- Task Manager to organize a step-wise sequence procedure and all steps and actions necessary for model build up.
- User-friendly Python object-oriented scripting language to automate ANSA procedures. An easy way to perform repeated actions, manipulate all entities and drive most of the core functionality.
- Interoperable pre-processing decks for numerous solvers for FEA and CFD analyses.
- Output of ready to run solver input files.



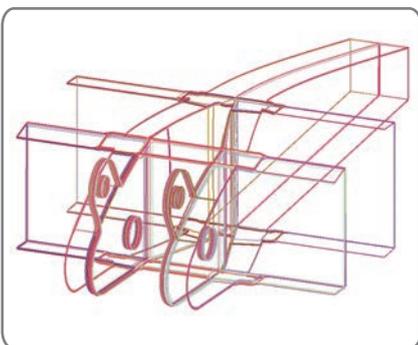
### CFD Oriented Features

- Powerful surface wrapping tool, capturing all sharp edges of the model, with curvature and proximity refinement facilitating the rapid creation of fully watertight models regardless of the geometry complexity. A Leak detection tool is also available.
- Fully 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.
- Commercial, Research & Industrial solvers supported.



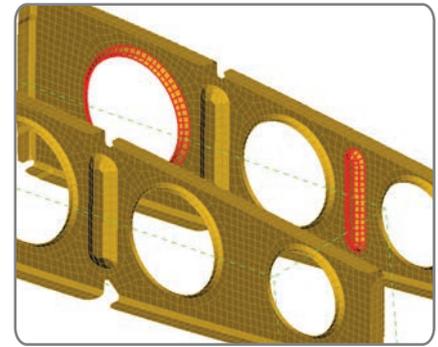
### Composites

- Dedicated Laminate tool allows easy 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.



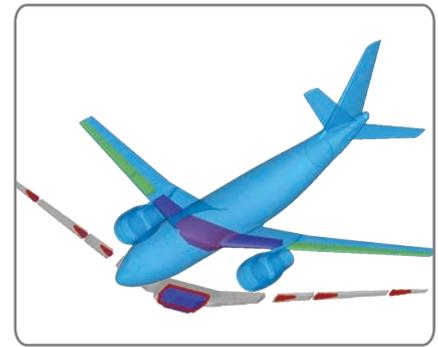
## Morphing & Optimization

- Parametric shaping of both FE model & geometry through the use of the Morphing Tool.
- Model validation through animation of model shaping, using the Simulate tool.
- 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, including.
    - Full Factorial algorithm.
    - Uniform Latin Hypercube algorithm.
  - Direct coupling of ANSA & META with all industry - standard parametric optimizers.
- Integrated TOSCA interface.



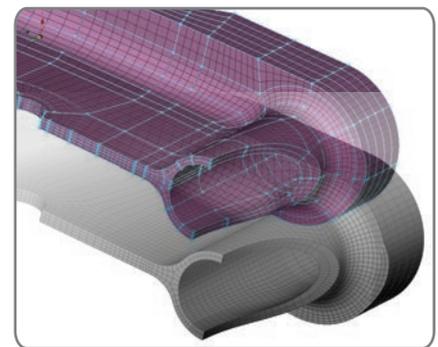
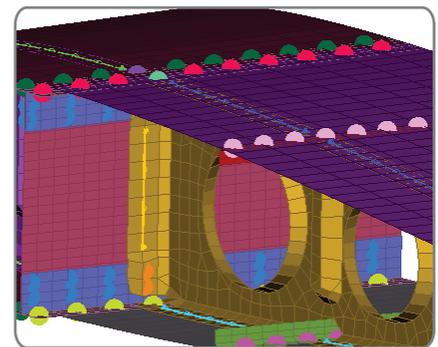
## Special Tools

- Creation, manipulation & calculation of cross sections using the Cross Section tool.
- Automatic creation of beam elements with cross sections selected from a user generated database.
- 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 featuring the mass and inertia of the substituted regions.
- Sub-structuring function to define an area of interest on the full body, while preserving load-case attributes of the original load-case setup.
- Mapping of pressure & temperature results from a CFD simulation to an FEA model.
- Calculation of liquids level inside a tank of any shape, using the Tank tool.
- Trapped Fluids volume identification.
- Creation, transformation & efficient handling of fastener & connection entities in their thousands.



## Epilysis: the Finite Element Solver

- Epilysis is a high quality General Purpose Structural Finite Element solver integrated in ANSA, featuring:
  - Linear Statics, including AMLS & block – Lanczos EigenValue 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.

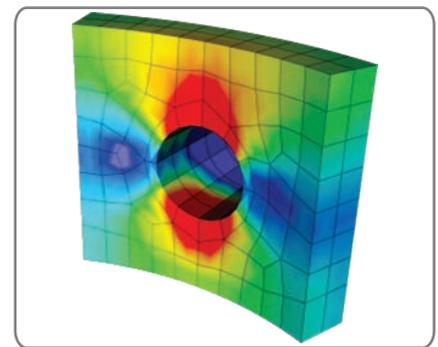


### Features

- 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
- FE and geometry
- 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



## 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. New datasets can be created by applying any mathematical operation on existing data.
- Calculation of forces and moments on any user defined section and output in solver format to be used 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 achieved through an integrated toolbar.
- Image matching and video synchronization for results validation.
- Reports creation in html, Postscript, pptx or pdf format using the Report Composer.
- Dragging and dropping images and copy to clipboard functionality for transferring data.
- Customized toolbars creation through the toolbar designer.
- Toolbars for CFD, Composites (failure criteria) and Bearing Distortion.

