Altair HyperMesh™
High-Fidelity Finite Element Modeling

Benefits
Open-Architecture Design
Combining the broadest set of direct CAD and CAE interfaces with user-defined integrations, HyperMesh fits seamlessly within any simulation environment.

High-Speed, High-Quality Meshing
Streamlines the modeling process and provides a suite of tools to model even the most complex geometries.

Model Build and Assembly
HyperMesh Part Browser is dedicated to part level Model Build and Assembly, Representation management and Configuration management. A bi-directional link to PDM enables the seamless import and export of the model hierarchy. The Part Library is used to manage, control, and update Library Part revisions and serves as a centralized library of HyperMesh parts, which in turn facilitates the collaboration between simulation teams both locally and abroad.

Increases End-User Modeling Efficiency
Using sophisticated batch meshing technology, HyperMesh eliminates the need to perform manual geometry clean-up and meshing, thus accelerating the model development process.

Advanced 3D Model Visualization
3D visualization of all element types (1D, 2D and 3D elements) within an FEA model eases model checking and visual verification.

Model Setup
A variety of sophisticated tools help with efficient model setup. The ID Manager ensures that all entities of a model even across or per include files adhere to a specified numbering scheme of a workgroup or a company to ensure modularity. HyperMesh provides connector technology, a highly automated way for assembly of hundreds of parts with spot- and seam welds, adhesives or bolts. Automated contact management tools are a huge time saver when defining contacts between individual parts.

Composites Modeling
Ply and laminate entities facilitate composites modeling in terms of individual

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layer shapes and their stacking sequence. CATIA CPD and Fibersim readers extract composite data and map it onto FE meshes automatically. Piles and ply angles can be visualized in 3D for easier model verification.

Meshing Capabilities
HyperMesh presents an advanced suite of easy-to-use tools to build and edit CAE models. For 2D and 3D model creation, users have access to a variety of mesh generation capabilities, as well as Altair HyperMesh's powerful automeshing module.

High Fidelity Meshing
- Surface meshing
- Solid map hexa meshing
- Tetra meshing
- CFD meshing
- Acoustic cavity meshing
- Shrink wrap meshing
- SPH meshing

Surface Meshing
The surface meshing module in HyperMesh contains a robust engine for mesh generation that provides unparalleled flexibility and functionality. This includes the ability to interactively adjust a variety of mesh parameters, optimize a mesh based on a set of user-defined quality criteria, and create a mesh using a wide range of advanced techniques.

Solid Meshing
Using solid geometry, HyperMesh can utilize both standard and advanced procedures to connect, separate, or split solid models for tetra-meshing or hexa-meshing. Partitioning these models is fast and easy when combined with HyperMesh's powerful visualization features for solids. This allows less time spent preparing geometries for solid meshing. The solid meshing module quickly generates high quality meshes for multiple volumes.

Mesh Controls
Mesh controls promote meshing automation for surface, batch meshing, adaptive and volume mesh generation. Detailed local and global control of mesh parameters for either the entire model or for individual features and regions of the geometry are possible. Mesh controls can be saved in the database or exported and reused in other models, promoting standardized mesh quality and repeatability.

Batch Meshing
The Altair BatchMesher™ in HyperMesh is the fastest way to automatically generate high-quality finite element meshes for large assemblies. It is available as a standalone application or directly within Altair HyperMesh.

By minimizing manual meshing tasks, this automeshing technology provides more time for value-added engineering simulation activities. BatchMesher provides user-specified control over meshing criteria and geometry clean-up parameters as well as the ability to output to customized model file formats.

Industry Specific Meshing
HyperMesh provides a variety of meshing algorithms for different industries and verticals, such as acoustic cavity meshing and mesh coarsening for NVH applications, and shrink wrap meshing or SPH meshing. HyperMesh also offers a highly-competitive suite of tools for CFD meshing.

CAE Solver Interfacing
HyperMesh provides direct readers to popular native CAD file formats. Moreover, HyperMesh has robust tools to clean-up imported CAD geometry that contain surfaces with gaps, overlaps and misalignments which hinder high-quality mesh generation.

By eliminating misalignments and holes, and suppressing the boundaries between adjacent surfaces, users can mesh across larger, more logical regions of the model. This significantly increases meshing speed and quality. Boundary conditions can also be applied to these surfaces for future mapping to underlying element data.

Customize HyperMesh to Fit Your Environment
Customize your modeling experience through an easy-to-use interface containing drag-and-drop toolbars, configurable pull-down menus and keyboard-controlled shortcuts.

Custom Utilities: Create custom applications that are fully integrated within the HyperMesh interface.

Solver Input Translators: Users can extend HyperMesh's interface support by adding input translators to read different analysis data decks.

Solver Export Templates: Export templates allow the HyperMesh database to be exported to user-defined formats for proprietary and specialized solvers.

CAE Solver Interfacing
HyperMesh provides direct import and export support to the industry's most popular solvers. Additionally, HyperMesh provides a completely tailored environment for each supported solver.