Altair Inspire™
Generative Design Taken to the Next Level

Altair Inspire enables design engineers, product designers, and architects to create and investigate structurally efficient concepts quickly and easily. Inspire uses the industry leading Altair OptiStruct™ technology to generate and analyze design concepts. The software is easy to learn and works with existing CAD tools to help design structural parts right the first time, reducing costs, development time, material consumption, and product weight.

Product Highlights

- Structurally efficient concept generation and analysis
- Support for optimization and analysis of parts and assemblies
- Quickly and easily clean up and de-feature problem areas in the geometry
- Investigate linear static and normal modes analysis
- User friendly interface with extremely short learning curve
- Generate dynamic motion of complex mechanisms to identify and apply forces

Learn more:
altair.com/inspire

Benefits

Design Faster
Generate concepts which meet structural performance requirements at the beginning of the design cycle. This results in significant time savings over the traditional approach of design, validate, redesign to meet structural requirements.

Design Smarter
Inspire makes it easy to perform "what-if" scenarios where package space, connections, load conditions, and shape controls can be modified. Reviewing the resulting concepts often reveals valuable insights.

Design Lighter
Inspire makes efficient use of material, only placing it where required to satisfy structural performance requirements. Reduced design weight leads to material cost savings, performance improvements, and reduced shipping costs.

Capabilities

Geometry Creation and Simplification
Create, modify, and de-feature solid models using Inspire's modeling tools. Geometric constraints such as mirroring, scaling, revolving, push/pull, tangency and perpendicularity can also be applied.

- Sketch Tools – Build or modify parts by sketching lines, rectangles, circles, and arcs
- Trim/Break – Cut and remove sketch curves at the point of intersection
- Boolean Operations – Add, subtract, or intersect solid parts to create more complex geometry
- De-feature - Remove imprints, rounds, fillets, holes, and pockets, or plug holes and pockets, or create patches and bridges
- Mid-surfacing – Mid-surfacing tools allow users to find and extract 2D sheets from single thickness thin solid geometry

Optimization Options
Inspire offers users a number of optimization options:
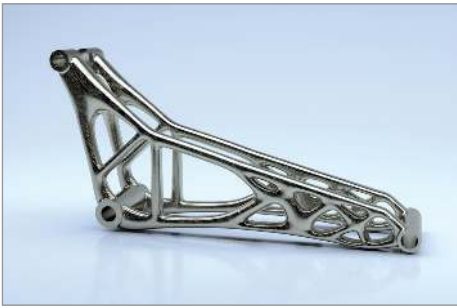
Optimal concept for a 3D printed bike rocker arm

Optimized and 3D printed metal aerospace bracket

Analysis of an optimized robot gripper arm

- Optimization Objectives - When running an optimization, designers can choose to either maximize stiffness or minimize mass
- Stress Constraints - A global stress constraint can be applied to limit the maximum stress in the model during optimization
- Displacement Constraints – Displacement constraints can be applied to a model to limit deflections in desired locations and directions
- Acceleration loads – Angular velocity and acceleration tools allow users to define the speed of rotation of the entire model and the axis about which it rotates
- g-Loads – g-Loads tool allow users to simulate a model undergoing acceleration, which imparts a force on all parts of the model
- Displacement Constraints – Displacement constraints can be applied to a model to limit deflections in desired locations and directions.
- Temperature Loads – Temperature tool allows users to simulate the effects of temperature changes in a model
- Export to OptiStruct – designers can export OptiStruct input files for advanced simulations

Contacts and Assemblies
Optimize and analyze full parts and assemblies inside of Inspire.
- The Contacts tool allows users to find neighboring parts and designate whether they should be bonded, contacting, or have no contact
- Users can connect multiple parts in a model using the Fastener and Joints tools to add bolts, screws, pins, or sliding pins

Manufacturing and Shape Controls
Generate design concepts that are not only structurally efficient but also manufacturable using Inspire's shape controls:
- Symmetry Planes – Force asymmetric design spaces to generate symmetric optimized shapes
- Cyclic Repetition – Create cyclically repeating shapes like propellers or wheels

- Draw Directions – Generate shapes that can be easily molded or stamped by applying single or split draw directions
- Extrusion Shape Control - Generates constant cross-section topologies in a specified direction
- Design for additive manufacturing with overhang shape controls to reduce overhangs to create self-supporting structures

Analysis
Investigate linear static and normal modes analysis on a model and visualize displacement, factor of safety, percent of yield, tension and compression, von Mises stress, and major principal stress.

Customizable Materials Database
Inspire is packaged with a material library including various aluminum, steel, magnesium, and titanium alloys. Custom materials can also be added.

PDM
Inspire allows users to open models from Teamcenter or Windchill PDM systems. It is also possible to save Altair Inspire models back to the PDM system.

Part Instances
Parent-Child Instances – Individual parts can be copied and pasted as an instance. Whenever one is updated, the other is automatically updated as well. Instancing information can also be imported from CAD files.

Pattern Repetition
When a design space is repeated multiple times in a model using part instances, Altair Inspire will automatically apply pattern repetition to the design spaces so they generate identical shapes.

Interactive Results Visualization
Explore optimized shapes using a simple slider to add or remove material. Users can decide which features are important and then pick the concept design best suited to their needs.

Assembly Configuration
Multiple assembly configurations can be created. These configurations can then be used to evaluate various design scenarios and the resulting concepts.

Final Model Creation
Create PolyNURBS – The create and edit PolyNURBS tools allows users to quickly create free-form solid geometry that is smooth, continuous, and ready for manufacturing.

Multiple Language Formats
Chinese, English, French, German, Italian, Japanese, Korean, Portuguese, Spanish

Shape Controls & Design Constraints
- Min/Max Size
- Draw Direction
- Symmetry
- Pattern Repetition
- Cyclic Repetition
- Stress Constraints
- Frequency Constraints
- Displacement Constraints
- Overhang angle

Geometry Import
- ACIS
- Catia (V4 & V5)
- Creo
- IGES
- Inventor
- JT
- Parasolid
- Pro/E
- SolidWorks
- STEP
- STL
- UG NX (Unigraphics)

Geometry Export
- IGES
- Parasolid
- STEP
- STL

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