



solidThinking 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 cleanup and defeature problem areas in the geometry
- Investigate linear static and normal modes analysis
- User friendly interface with extremely short learning curve

### 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:

- Sketch Tools – Build or modify parts by sketching lines, rectangles, circles, and arcs.

Geometric constraints such as, mirroring, scaling, revolving, push/pull, tangency and perpendicularity can also be applied.

- 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.
- Defeature - Remove imprints, rounds, fillets, holes, and pockets, or plug holes and pockets, or create patches and bridges.
- Midsurfacing – Midsurfacing tools allow users to find and extract 2D sheets from single thickness thin solid geometry



Optimal concept for a 3D printed bike rocker arm



Optimized and 3D printed metal aerospace bracket



Analysis of an optimized robot gripper arm

### Optimization Options

Inspire offers users a number of topology options:

- 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 allows 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.

### 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 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, 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

### 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