

# solidThinking Design

## 2017.3 Release Notes

The **solidThinking® Design** package includes *Inspire* and *Evolve* 2017.3. *Inspire* is available on Windows, while *Evolve* is available on Windows and Mac.

### solidThinking Inspire

#### Inspire 2017.3

##### *New Features*

- **Spot Welds:** Spot welds connect surface parts together by welding them at specific locations. You can apply spot welds at any location on a surface part or at any existing point.
- **Lattice Optimization:** Lattice optimization fills your design space with an optimized lattice structure. When you run an optimization, it creates a lattice inside the design space based on the target parameters. The lattice file can be imported into Materialise® 3-matic for further processing and printing.
- **PolyNURBS Fitting:** Use the Fit tool to automatically fit a PolyNURBS to an optimized shape.
- **Point Tracers for Motion:** Path traces for points on a part can now be drawn with a tracer and used for geometry creation and modification. Shapes (like cams) can be synthesized from part motion by choosing to draw the path on a moving reference frame. If you move the tracers with the Move tool, the traced paths will update automatically.
- **Table Profile for Motion:** You can now define actuator and motor profiles in terms of tabular data by using the Profile Editor. Files in .csv format may be opened by dragging and dropping them into the Profile Editor, and a plot lets you view the data when fit with a spline function. The Start Time parameter in the Property Editor allows you to delay the onset of the data, like the other built-in profile functions.
- **MotionSolve Plant Export for solidThinking Activate:** Export (to MDL) on the Run Motion Analysis Settings window now includes plant model information (MS Plant) for motors and actuators, making it easy to replace *Inspire Motion* built-in controller models with detailed **solidThinking Activate** block diagram (1-D) solutions.

##### *Enhancements*

- **UI Scaling:** You can now scale the user interface proportionally to the text size using an option in the Preferences. This is useful for high resolution screens and monitors.
- **User-Defined Units:** You can now define a set of custom display units in the Preferences.
- **PolyNURBS Sharpen:** The Sharpen tool controls sharpness along the edges of a PolyNURBS. You can now set the sharpening factor automatically by selecting the Auto Sharpen checkbox. Also improved the overall stability of PolyNURBS tools.

- **Motion Workflow Help:** The workflow help now persists when microdialogs are visible.

## ***Resolved Issues***

- Fixed an issue where Boolean operations were executed when rotating the model.
- Fixed an issue where subcases were not getting written for grounded fasteners.
- Corrected units conversion problem in motion plots for angular displacement.
- Sped up Motion Analyze Part run preparation for complex models. [IM-1200]
- Corrected vector component results shown in the Analysis Explorer when displaying motion loads.
- Fixed inconsistencies in the appearance of the cursor icon when using motion tools.
- Fixed units sensitivity while running motion models in reported cases.

## ***Known Issues***

- Section cuts are not supported for lattice results.
- Some surface contacts are not found due to geometry limitations. Workarounds are possible. [IN-14258, IN-14554]
- Numeric characters in assembly names cause errors in gauge optimization. Rename the assembly. [IN-15036]
- Joints connected directly to a design space may not be restored when returning from the motion Optimize Part workflow. The workaround is to utilize a non-design space partition when making connections (joints, motors, or actuators) to a design space, and to put the partitions with the design space into a single rigid group. [IM-1022, IM-1240]
- Spot welds are not supported for motion analysis. [IM-1299]
- Sign convention of joint force plots in Motion may differ due to part order. [IM-1139]
- Motion tracing is not displayed while in the Analysis Explorer or Shape Explorer. [IM-1326, IN-1322]
- When selecting a rigid group for Analyze Part, not all of the parts are highlighted. [IM-1264]
- Instanced (or mirrored) part position may jump on first frame of solution. [IM-881, IM-313]
- Temporary files generated by motion analysis have to be removed manually from the run history folder. [IM-1068]

## **Inspire 2017.2.1**

### ***Resolved Issues***

- Resolved an issue that caused a crash when switching between units with a fastener selected.
- Fixed an issue where units were not being exported correctly if the display units and the model units were different.
- Fixed an issue where modifying an angular velocity in the Property Editor was causing it to disappear.
- Fixed an issue with the motion rates option not being shown correctly in the Property Editor.

## **Inspire 2017.2**

### ***New Features***

- **Improved Contacts:** Search distances for contacts are now shown in terms of the minimum gap—the exact minimum distance between parts. The Auto Search Distance on the guide bar is now a global search threshold, while the search distance in the Contact table shows the minimum gap for each contact.
- **Multi-Feature Loads and Supports:** You can now double-click or hold the Ctrl key to apply a single load to multiple points, edges, or faces. This new feature can be used when applying loads, pressures, torques, supports, and enforced displacements.
- **Move Faces Tool:** The new Move Faces tool allows you to translate or rotate holes, pockets, and surface features.
- **Move Tool Alignment:** The Move tool now allows you to align the tool to points, edges, and faces. You can also align a part or objects that are being moved.
- **Improvements to PolyNURBS:** This release includes several additions and enhancements to PolyNURBS.
  - The PolyNURBS tools now show self-intersections.
  - The Wrap tool now creates flat PolyNURBS faces when wrapping to a planar geometry. This makes creation of fillets easier.
  - The Boolean tools are now accessible from the PolyNURBS secondary ribbon, and perform Boolean operations on the PolyNURBS cages.
  - The Sharpen tool now shows edge sharpness using a color legend.
- **Transient Load Extraction for Motion:** Motion analysis results for a part can now be extracted for use in structural (FE) analysis and optimization. Peak loads from transient analysis will be automatically extracted from the motion simulation and used in analysis and optimization runs.
- **Motion Animation with FE Results:** The Analysis Explorer now supports the motion animation playback toolbar, allowing you to visualize part structural (FE) analysis results simultaneously with movement of the motion model. Additionally, the motion load cases have now been consolidated into a single Combined Motion Load Case.
- **Time-Dependent Forces and Torques for Motion:** You can now define time-dependent forces for actuators or torques for motors using the available built-in profile functions.

## Enhancements

- The Partition tool can now split solid faces into surfaces, and surfaces into new parts.
- You can now define gravity in terms of its *x*, *y*, *z* components.
- Added support for split draw directions for topography optimization.
- Progress meters and stop buttons have been added to the find button on the guide bars for the Fasteners, Joints, and Contacts tools.
- Displacement results in the Analysis Explorer can now be shown in terms of magnitude or X, Y, Z direction.
- The Design Violations table and Compare Results table have been updated to include gauge optimization.
- Added support for binary STL import and export.
- Deactivated parts are now ignored when saving a file.
- There are now two types of units: *Model units* (the unit system used for calculations) and *Display units* (the unit system used in the user interface). Both can be changed in the Preferences.
- Several new unit systems have been added, including the (N, kg, mm, s) system for multi-body analysis.

# solidThinking®

- A progress meter and stop button have been added to the Analyze Motion tool. The progress circle is also useful for when running motion analysis without simultaneous animation as it gives you an idea of how far along you are in the analysis.
- You now have an option to perform motion analysis without animating simultaneously by selecting Animate: When Finished from the Run Motion Analysis window. This is useful when you have a high output rate, or long end time because it allows the solver to run as fast as possible.
- Additional plots for motors (Angle, Speed, Angular Acceleration) and actuators (Travel, Velocity, Acceleration) are now available to provide more consistency when comparing results between differing types.
- The global X, Y, Z locations of all connections on a part can now be exported to a CSV file.
- Unit labels are now written in the .csv file as a separate row (beneath the column header) when using the Export Plot option.
- The Export (to MDL) button in the Run Motion Analysis settings now writes out the motion model as a MotionView System entity and bushing rates are conveniently stored in a dataset.

## ***Resolved Issues***

- Resolved an issue where the Mirror operation was not creating expected copies of rigid groups.
- Disabled the Connect All button for joints until find operation has finished.
- The Connected Parts option for actuators is now disabled if no connections exist.
- Resolved an issue where a torsion spring's implicit joint could not be set to Revolute.
- Eliminated spikes in statics solution.
- Corrected various problems in Analyze Part and Optimize Part dialogs for load extraction workflow.
- Fixed a problem where the playback toolbar was including extra frames when computing range.
- Motion entities are now honored during section cut.

## **Inspire 2017.1**

### ***New Features and Enhancements***

- **Gauge Optimization:** The new gauge optimization feature allows you to optimize the thickness of surface parts. Gauge optimization can be run by itself, or at the same time as topography optimization.
- **Static Load Extraction from Motion Analysis:** Motion analysis results for a part can now be extracted for use in structural (FE) analysis and optimization. Peak loads will be automatically extracted from the motion simulation and used in analysis and optimization runs.
- **Component Forces:** You can now define forces, torques, and g-Loads in terms of their x, y, z components.
- **Fastener Optimization:** When optimizing fasteners, you can now constrain the axial and shear forces using the optimization properties in the Property Editor.
- **Inertia Relief:** The new inertia relief feature is used to analyze unsupported systems that are not fully grounded, such as airplanes and satellites.

# solidThinking®

- **2.5D Section Creation:** The new 2.5D section creation feature allows you to extract sketch curves from optimized results.
- **PolyNURBS Split:** The new PolyNURBS Split tool allows you to trim individual cage faces.
- **Structural Entity Enhancements:** Structures such as forces, supports, masses, etc. now animate alongside your analysis results. They are also maintained when their hierarchy is changed in the model browser.
- **Minimum Gap:** The new Min Gap property allows you to define the minimum distance between structural members for topology optimization in the Property Editor.
- **Resizable Plots:** The default plot size is now larger and can be resized using <Ctrl>+, <Ctrl>- and <Ctrl>0 to increase, decrease, and reset the plot size.
- **Casting Add-On:** The new casting add-on includes tools that are used to run a casting feasibility analysis based on product geometry.
- **Workflow Help:** Most tools on the ribbon now include text prompts beneath the tool or guide bar that explain what to do next. Click the workflow help once to expand the text, which provides additional hints and keyboard shortcuts.

## ***Known Issues***

- Pressure loads are not supported during motion analysis. [IM-598]
- Load extraction for transient motion simulations is not supported, but you are not prevented or warned when doing so.
- Incomplete motion support for midsurfaced parts. [IM-594, IM-983]
- Mirrored instances are not supported in Inspire Motion due to left-handed coordinate system. [IM-700, IM-881, IM-839]
- Instanced (or mirrored) part position may 'jump' on first frame of solution. [IM-881, IM-313]
- The Casting add-on cannot be used with imported STL parts.

## **Inspire 2017**

### ***Motion***

- **Motion ribbon:** The tools on the new Motion ribbon can be used to easily mechanize your model and perform a motion analysis.
- **Ground Parts:** The new Ground tool allows you to designate one or more parts that are considered to be ground and therefore immovable during motion analysis.
- **Rigid Groups:** The new Rigid Groups tool allows you to group a collection of parts together so they are treated as one rigid body for the purposes of motion analysis. This allows for efficiencies when building up motion models.
- **Joints:** The enhanced Joints tool allows you to connect parts together based on neighboring parts and designate whether they should be locked, active, or free. It also includes a greater variety of joint types that can be created (hinge, cylindrical, translational, ball and socket, planar) and finds more locations where joints can be placed (spherical, cylindrical, planar, and multi-planar pairs).

# solidThinking®

- **Motors:** The new Motors tool allows you to drive parts in a rotational manner and define angle, speed, or acceleration with built-in profile functions. The Use Controller option helps you to better diagnose situations where mechanical lock-up or motor stalling may occur.
- **Actuators:** The new Actuators tool allows you to drive parts in a translational manner and define displacement, speed, or acceleration with built-in profile functions. The Connected Parts option automatically finds connected part pairs that can be actuated.
- **Springs:** The new Springs tools allow you to create coil springs and torsion springs between parts. Movement of the spring-dampers can be visualized during analysis and review of the motion results.
- **Gravity:** The new Gravity tool allows you to visualize the direction of gravity in your model and reorient it using the Move tool.
- **Run Motion Analysis:** You can run a motion analysis using the Quick Run button on the Analyze icon to view instant feedback on how your model moves during motion analysis. Use the Run Settings to define whether to run a static or transient analysis and to define other run parameters.
- **Review Motion Results:** Motion analysis results can be played back for review. Results like forces, displacement, velocities, etc., can be plotted in a chart by clicking on an entity or selecting it from the Model Browser. A context menu on the chart allows you to export to .csv format.

## *Geometry*

- **Partitions:** The new Partition tool can be used to divide a part into design and non–design regions by selecting a hole, pocket, or face to offset.

## *Structure*

- **Bead Patterns:** Bead patterns have been moved out of the Property Editor and are now a tool on the Structure ribbon. The visualization has been changed to make it clearer where the bead boundaries are.
- **Grounded Fasteners and Joints:** When defining connections, you can now create grounded bolts, grounded screws, grounded pins and grounded sliding pins that act as supports in load cases.
- **Fastener Optimization:** When optimizing using grounded fasteners or cylindrical supports, you can now constrain the axial and shear forces using the optimization properties in the Property Editor.
- **Connection Stiffness:** You can now enable connection stiffness in the Property Editor, which allows for better approximation of axial and shear stiffness in grounded fasteners, grounded joints, and cylindrical supports.
- **Joints:** The enhanced Joints tool includes a greater variety of joint types that can be created (hinge, cylindrical, translational, ball and socket, planar) and finds more locations where joints can be placed (spherical, cylindrical, planar, and multi-planar pairs).
- **Part-to-Part Contacts:** Contacts can now be defined between surfaces or manually created between parts.

## *Resolved Issues*

- Fixed a crash found while removing holes in geometry.
- Corrected an issue where contacts were not detected after midsurfacing parts.
- Fixed optimization error that caused models to fail.

# solidThinking®

- Resolved a safety factor bug some users faced while minimizing mass.
- Resolved an issue with stored views creating blank images.
- Fixed an issue on Mac where selecting the default run options wasn't restoring properly.
- Push/Pull line now follows the mouse direction.
- Improved the contact finding algorithms.
- Bolt pretension can now be used without adding external loads.
- Fixed an issue in temperatures.
- Enhanced the scaling of mesh models for PolyNURBS wrapping.
- Fixed an issue with sorting by mass in the model browser.

## ***Known Issues***

- Switching model units during motion analysis is unsupported. [IM-382]
- Mirrored instances are not supported in Inspire Motion due to left-handed coordinate system. [IM-700, IM-881]

### Evolve 2017.3

#### *Resolved Issues*

- Fixed an issue causing long calculation times and freezing when using the Intersect Curve tool.

### Evolve 2017.2.1

#### *Resolved Issues*

- Fixed an issue where the Sweep tool was failing and causing a crash when objects were being edited.
- Fixed an issue causing a crash when creating a bridge using the Edit PolyNURBS tool.
- Fixed an issue causing a crash when importing DXF and DWG files.
- Fixed an issue causing a crash when using Interactive Rendering.
- Fixed an issue where rendering was taking a long time to start and crashing when stopped.
- Fixed an issue where transparent glass was turning black.
- Fixed an issue where CUDA 8 was not working on NVIDIA Pascal video cards.
- Fixed an issue causing incorrect interactive rendering thread priority on NVIDIA cards.

### Evolve 2017.2

#### *New Features and Enhancements*

- **Rendering:** Added support for graphics cards using CUDA 8.
- **NURBS to Poly:** Added an Advanced Tessellation option to enable/disable edge smoothing.

#### *Resolved Issues*

- Fixed an issue causing long delays when disabling grid in 3D view.
- Fixed an issue with exporting files to DXF and DWG where "exact" circles were not being converted properly.
- Fixed an issue where using Save Selected was not working properly with DXF and DWG.
- Fixed an issue to automatically disable the Coating option when a material type is changed to Emitter.
- Fixed an issue causing a crash when editing a PolySphere using the Replicate tool.
- Fixed an issue where the 3D mouse was not working on Mac.
- Fixed an issue causing missing information when importing DXF and DWG files.



# solidThinking®

- Fixed an issue causing Save Selected command to not work properly for SVG and PDF files.
- Fixed an issue when rendering an animation where textures were being lost after the first frame.
- Fixed an issue causing crashes and errors when opening and saving IGES and X\_T files with Mac in Japanese.
- Fixed an issue on Mac where saving a new material was creating two images.
- Fixed an issue causing different results when opening the same DXF or DWG file.
- Fixed an issue preventing DXF and DWG files from being imported.
- Fixed an issue causing a crash when using the Undo command.
- Fixed an issue where the Create Bridge tool was generating replicated faces.
- Fixed an issue causing incorrect results using the Radial Symmetry tool on PolyNURBS.

## Evolve 2017.1

### *New Features and Enhancements*

- **UI Font:** Added option in Preferences to change the font size in the user interface.

### *Resolved Issues*

- Fixed an issue with all multi-output tools (Trim, Face Extract, etc.) where translating the final object was not updating the source objects in history.
- Fixed issue with the Z depth image size not matching the rendered image size when using GPU and Full (Progressive) rendering engines.
- Fixed an issue preventing different images from being used for the Global Environment and the Illumination.
- Fixed an issue with the Edit PolyNURBS tool not working after the Symmetry tool was applied.
- Fixed an issue with the Trim tool where the normal calculation of curves was incorrect.
- Fixed an issue with the Trim tool causing a crash.
- Fixed an issue with .dwg files causing a crash when changing the model Units.
- Fixed an issue with artifacts being created when using the Radial Symmetry tool on a PolyNURBS object.
- Fixed an issue with the Extend Curve tool causing a crash.
- Fixed an issue with Surface Offset where applying the Invert Direction was causing a crash.
- Fixed an issue with Trim tool failing.
- Fixed an issue with Background Image not being able to be edited interactively in Top view.
- Fixed an issue causing a crash when opening models with self-intersecting surfaces.

## Evolve 2017

### *New Features and Enhancements*

- **Symmetry:** New Planar Symmetry and Radial Symmetry tools have been added to replace the Mirror and Polar Copy tools.
- **Loft and Sweep feedback:** The Loft and Sweep tools now provide additional feedback in cases of failure.
- **Length Parameter:** A length parameter has been added to the Line and Rounded Polyline tools.
- **Curve Offset:** When using the Curve Offset tool, you can now select surface edges directly.
- **Depth of Field:** All images which are rendered inside Evolve include a Depth Channel (tiff). This Z-depth channel can now be saved in the Image Browser and used in post-processing tools such as Adobe Photoshop to simulate the natural blurring of foreground and background scene elements when viewed through a camera lens.
- **File Import/Export:** The user interface for importing and exporting IGES and STEP files has been unified and now includes the option to select either the Parasolid or the Core Technologies library. This eliminates the need for two IGES and STEP options when opening or saving files.
- **SVG Format:** Evolve now supports import and export to SVG format.
- **PDF 2D Format:** Evolve now supports export to PDF 2D format.
- **DWG and DXF Update:** Support for the AutoCAD Drawing (.dwg) and AutoCAD Drawing Exchange (.dxf) formats has been upgraded.
- **Quick Help Link:** You can now access help for the current tool by clicking the ? icon on the Control Panel.
- **Background Image:** Added an option to hide the background image.
- **KeyShot Live Link:** Updated the KeyShot plug-in to support Live Linking with KeyShot version 6.

## ***Resolved Issues***

- Fixed an issue with the orientation of the Trim tool when using the custom direction parameter.
- Fixed an issue with the Extrude tool when extruding surfaces in a non-planar case.
- Fixed an issue with the division point when using the Divide Curve tool.
- Fixed an issue with the Curve Offset tool generating incorrect caps.
- Fixed an issue with offset point movement not working correctly in the Curve Offset tool when the Closed parameter is enabled.
- Fixed an issue with Curve Offset and Surface Offset giving different results from the same source curve.
- Fixed an issue with the Surface Offset tool causing a crash.
- Fixed an issue with the Make Manifold tool not showing a broken status when the resulting object was not a solid body, and added a feedback message in the World Browser.
- Fixed an issue with the Autosave saving files to the incorrect folder with an incorrect file extension.
- Fixed an issue with an internal routine in font selection that could cause a crash.
- Fixed an issue with the Shelling tool showing handles in an incorrect position.
- Fixed an issue with the spacebar not working correctly to accept selections (Japanese keyboard only).
- Fixed an issue with the Draft Analysis tool displaying incorrect color.
- Fixed an issue with the Draft Analysis tool failing in certain cases.
- Fixed an issue with selection of overlapping surfaces on Mac.