InventorCAM

Inventor + InventorCAM
The complete integrated Manufacturing Solution

Advanced 3D Mill and High Speed Machining Module - Integrated in Inventor

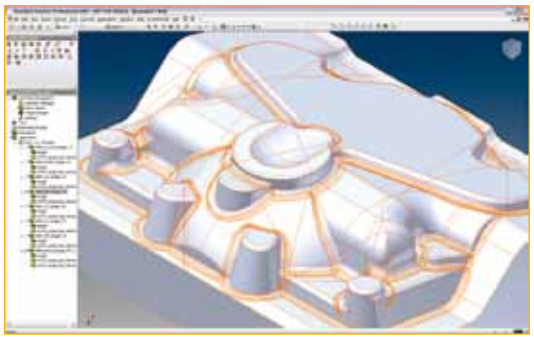
InventorCAM HSM is a very powerful and market-proven advanced 3D Mill and high-speed-machining module for 3D parts, aerospace parts and molds, tools and dies. The HSM module offers unique machining and linking strategies for generating advanced 3D Mill and high-speed toolpaths.

InventorCAM's HSM module smooths the paths of both cutting moves and retracts wherever possible to maintain a continuous machine tool motion – an essential requirement for maintaining higher feedrates and eliminating dwelling.

With InventorCAM HSM module retracts to high Z levels are kept to a minimum. Angled where possible, smoothed by arcs, retracts do not go any higher than necessary – thus minimizing aircutting and reducing machining time.

The result of the HSM module is an efficient, smooth, and optimal toolpath. This translates to increased surface quality, less wear on your cutters, and a longer life for your machine tools.

With demands for ever-shorter lead and production times, lower costs and improved quality, SolidCAM's HSM Module is a must in today's machine shops.



SolidCAM
The Leaders in Integrated CAM

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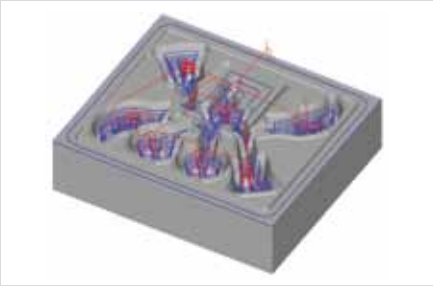
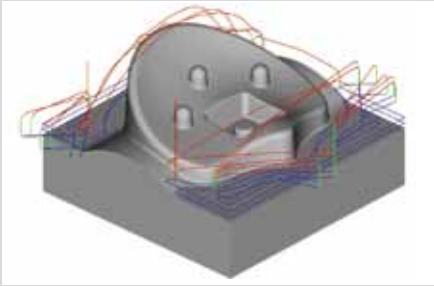
HSM Roughing Strategies



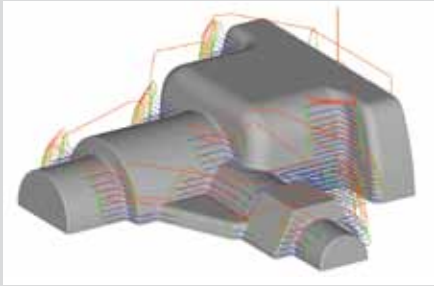
3D CONTOUR ROUGHING

Contour Roughing is the main strategy for clearing large volumes of material effectively. A series of offset passes are generated at specified Z-depths and are automatically calculated to remove the maximum amount of material without leaving upstands. The depth of cut automatically adapts, ensuring the machining of flat faces. Either helix or profile ramping entry is used. Smoothing arcs are created automatically, both in the passes and linking moves, eliminating dwelling, improving effective cutting feedrates and tool life.



HATCH ROUGHING

The Hatch Roughing strategy efficiently removes large material volumes by linear tool motions, including material removal at corners. Machining is performed at automatically defined Z levels that ensure removing maximum material efficiently. Machining depth is automatically calculated to ensure efficient milling at Horizontal areas between the calculated Down-steps. This option creates smooth tool motions thus speeding up milling and preserving tool life.

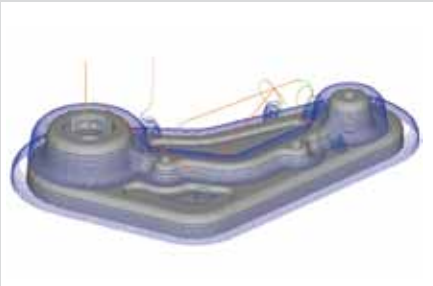


REST ROUGHING

Rest Roughing is achieved by following the work of a big tool with a smaller tool, in areas not cleared by the previous operation. The InventorCAM HSM module uses an updated stock model of the remaining material to avoid air-cutting. For big parts you can perform more than one rest roughing operation, with decreasing tool sizes. Rest Roughing can also be used when machining castings by trimming the passes to the cast surface model, with appropriate stock allowance.

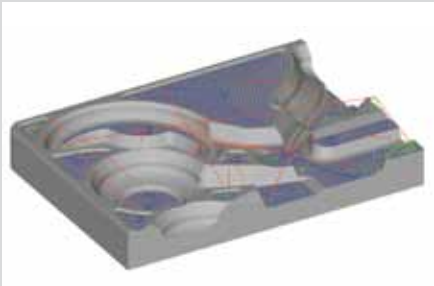
« InventorCAM HSM is a powerful solution for all users who need advanced 3D Mill and high speed machining capabilities... »

HSM Finishing Strategies



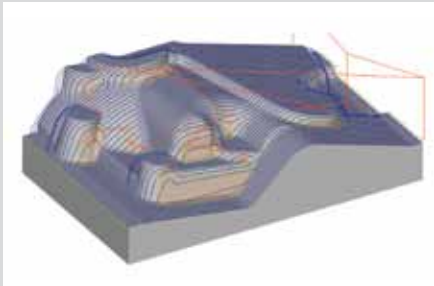
CONSTANT-Z MACHINING

Constant-Z machining passes are generated from a set of surface contours which describe the shape of surfaces at different z-heights - like horizontal slices through the geometry. This is the best strategy for semi-finishing and finishing of steep walls. By limiting the Constant-Z passes to contact angles between 30 to 90 degrees, the steeper areas are machined, leaving the shallower area for more appropriate strategies.



CONSTANT-Z MACHINING

Helical machining passes are generated from a set of surface contours which describe the shape of surfaces at different z-heights. The profiles are joined in a continuous descending ramp that follows the shape of the model. Helical passes are generated used for semi-finishing and finishing.Helical passes are best suited for surfaces whose angles are between 30 and 90 degrees.

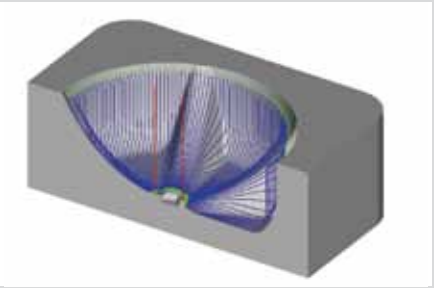


LINEAR MACHINING

Horizontal Machining strategy automatically detects all the flat areas of the part and clears them with an offsetting path at the z-level of each area, utilizing similar smoothing charcteristics as roughing. Linking is also similar to roughing with helix and profile ramping entries and smooth linking motions. If the user requires to machine these flat areas with more than one pass, any number of Z-axial offset passes can be added.

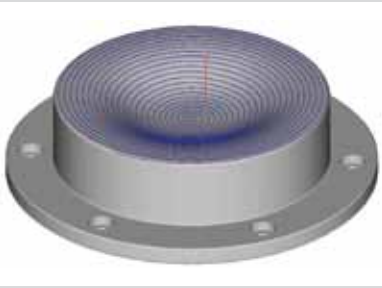
InventorCAM HSM Module

HSM



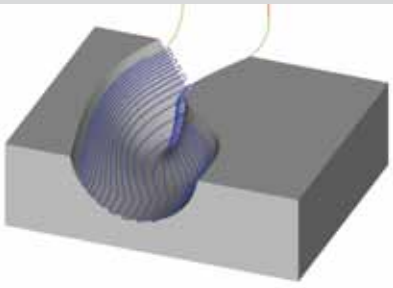
RADIAL MACHINING

Radial machining provides the user with the ability to machine radial parts. Machining converges to a central point with the ability to stop short of the center of the radial passes, where they become very dense. This strategy is ideally suited for use on areas that include shallow curved surfaces and circular areas, using contact angles between 0 – 40 degrees.



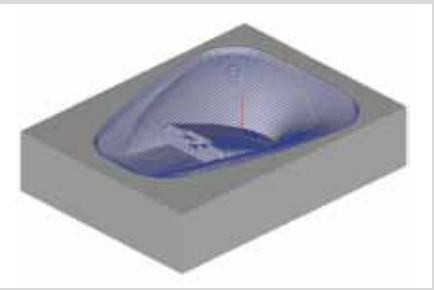
SPIRAL MACHINING

Spiral machining creates a spiral toolpath from a given focal point, while keeping constant contact between the cutter and workpiece as it machines within a given boundary. A stepover defines the spacing between each coil of the pass. The focal point of the detail to be machined with spiral or radial passes is located automatically, or can be determined by the user.



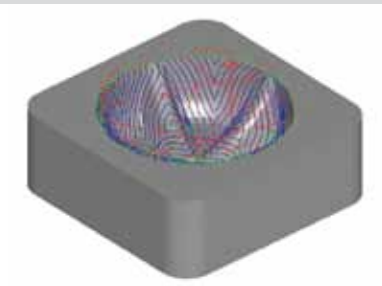
MORPHED MACHINING

Morphed machining controls the toolpath using flow boundaries and direction profiles. Morphed passes flow across the surface in a close-to-parallel formation with the shape and direction of the passes dictated by the boundaries around them. Each path echoes the shape of the one before and takes on some characteristics of the one after, thus gradually changing shape.



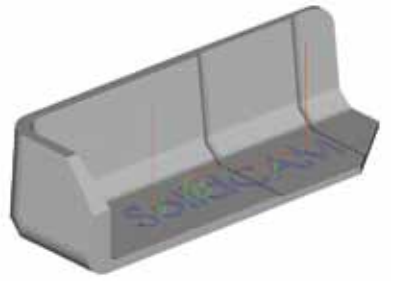
3D CONSTANT STEPOVER

3D Constant-stepover finishing strategy maintains a constant, equidistant stepover from one toolpath pass to the next, irrespective of the slope angle of the part. It creates 3D passes that are at a constant distance from each other along the surface of the part, by offsetting inwards along the surface. This strategy can be applied within any boundary or to the whole part.



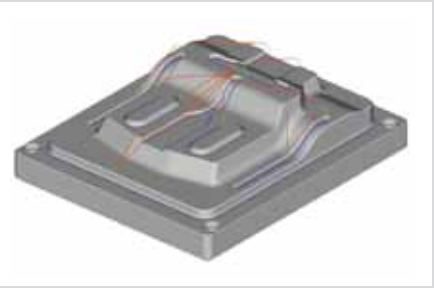
BOUNDARY MACHINING

A Boundary pass is created by dropping the cutter onto the surface and running it along a single boundary or a set of boundaries to produce the effect of engraving. It can be applied for engraving text, chamfering along a profile or of mold tool runner detail. Negative machining thickness can be used to machine at a constant depth below the surface being machined.



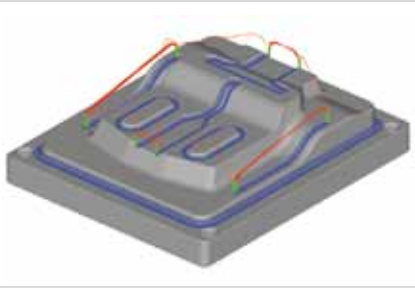
OFFSET CUTTING

Offset Cutting calculates the toolpath based on a defined boundary, defined distance to either one or both sides of the boundary and at a constant step over. The toolpath can be parallel to the boundary in a to/from manner, or perpendicular to the boundary. Offset Cutting is used for machining up to the boundary of a wall or open cavity.



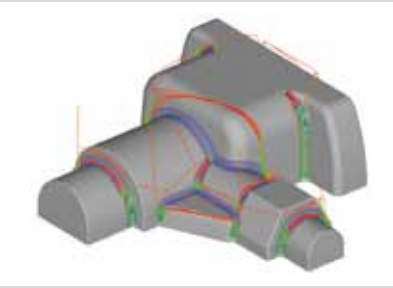
PENCIL MILLING

The Pencil milling strategy creates tool paths along internal corners and fillets with small radii, removing material that no other strategy can reach. The pencil milling routine is used to finish corners which might otherwise have cusp marks left from previous machining operations. This is ideal for machining into corners where the surface radius is the same as the cutter.



PARALLEL PENCIL MILLING

Parallel pencil milling is an extension to pencil milling where the user can determine the number and step-over of multiple-passes, either side of the pencil tool-path. This is particularly useful when the previous cutting tool has not been able to machine all the internal corner radii to size. These multiple passes will machine from the outside in to the corner, creating a good surface finish.



REST MACHINING

While pencil milling of vertical corners can cause both the flute of the cutter and the radius to be in full contact with the material, creating adverse cutting conditions, Rest Machining strategy picks the corners out from the top down resulting in better machining technique. Steep and shallow areas are both machined in a single toolpath with different rest machining strategies.

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HSM

InventorCAM HIGH SPEED MACHINING

InventorCAM HSM

The InventorCAM HSM module features several enhancements to CAM technology that make high-speed operations possible, including: avoiding sharp angles in the tool path, ensuring that the tool stays in contact with the part as much as possible, optimizing non-machining moves to reduce air-cutting and generating smooth and tangential in/out leads.

Any HSM 3D machining strategy can be controlled by specifying the surface slope-angle to be machined or by specifying the machining boundary. InventorCAM HSM module provides a comprehensive set of boundary creation tools, including Silhouette boundaries, Cutter Contact Area boundaries, Shallow boundaries, Theoretical Rest Area boundaries, Rest Area boundaries and User-defined boundaries.

InventorCAM HSM module is a powerful solution for all users who need advanced 3D Mill and high speed machining capabilities. It can also be used to improve the productivity of older CNC's with reduced air-cutting and smoothing arcs that maintain continuous machine tool motion.

Inventor + InventorCAM

Full Integration and Associativity

Autodesk Inventor 2011 Certified

Autodesk

With the single-window integration of InventorCAM in Inventor, all machining operations can be defined, calculated and verified without leaving the Inventor assembly environment. All 2D and 3D geometries used for machining are fully associative to the Inventor design model. In a single CAM-Part, several Inventor Assembly configurations can be used. Each configuration can represent an independent state or production step of a workpiece.

When the geometry used to define a machining operation is changed in the Inventor design, InventorCAM enables the user to automatically synchronize all machining operations with the updated geometry. The full associativity to the Inventor design model reduces errors when the model changes and facilitates the process where updates are received for models already machined.

With InventorCAM's seamless single-window integration in Inventor - any size organization can reap the benefits of a completely integrated CAD/CAM solution.

About Us

Founded in 1984, SolidCAM provides manufacturing customers with a full suite of integrated CAM software modules in Inventor for 2.5D Milling, 3D Milling, High Speed Machining, Multi-sided Indexial 4/5 axes Milling, Simultaneous 5-axes Milling, Turning, Mill-Turn up to 5-axes and Wire EDM.

InventorCAM has the Certified product status from Autodesk and provides seamless, single-window integration and full associativity to the Inventor design model. The hallmarks of InventorCAM are its ease of use, combined with its powerful functionality and customized post processors that generate efficient G-Code.

InventorCAM is used in the mechanical manufacturing, electronics, medical, consumer products, machine design, automotive and aerospace industries, mold, tool and die and rapid prototyping shops.

SolidCAM has today more than 13,500 seats installed in industry and education. CIMdata, the leading worldwide strategic consultancy company, has named SolidCAM, in the "Cimdata NC Software Market Assessment Report", as the consistent growth leader in CAM over the last five years, with annual growth rates in the +30% range.