

CAMWorks Multiaxis Machining allows a wide variety of shops and manufacturing facilities to take advantage of 4/5-axis machines that provide greater productivity, equipment flexibility and quality.

Machine Complex Shapes

CAMWorks 4/5-axis simultaneous machining allows the user to create toolpaths across complex shapes that could not be machined on 3-axis machines. This includes automotive port finishing, impellers, turbine blades, cutting tools, trimming/deflashing, and undercut machining in mould and die making.

CAMWorks 4-axis simultaneous machining is designed for complex rotary applications such as camshafts, extrusion screws, cutting tools and blade machining.

Multiaxis Machining also supports 3-axis machining for complex parts, including 3 axis undercut machining.

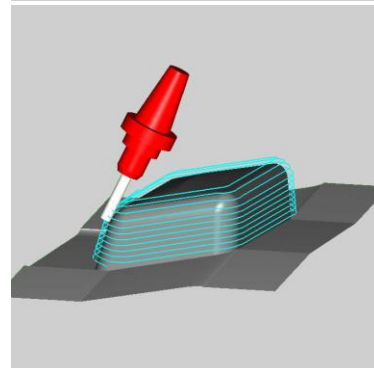
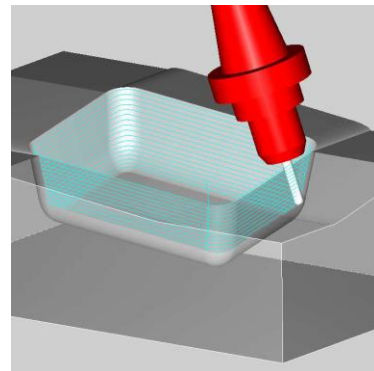
Reduce Cycle Time . . . Improve Surface Finish . . . Extend Tool Life

- Shorter cutting tools can be used since the tool can be tilted to adjust the angle between the cutter and the part. The increased rigidity of shorter tools allows you to take advantage of the high-speed options in CAMWorks to machine at higher speeds with no loss in accuracy. The result is better surface quality and reduced finishing time.
- Generating 5-axis swarf toolpaths instead of traditional 3-axis toolpaths can result in fewer cut passes and improved surface finish.
- By optimizing the angle between the tool and the surface, it is possible to achieve a constant chip load and a high feedrate at the contact point. The result is improved surface finish and extended tool life.
- Parts that previously required multiple setups can be machined in a single setup with simultaneous control of the rotary axis. In addition to saving time, this also cuts down on mistakes that might be made during multiple setups.

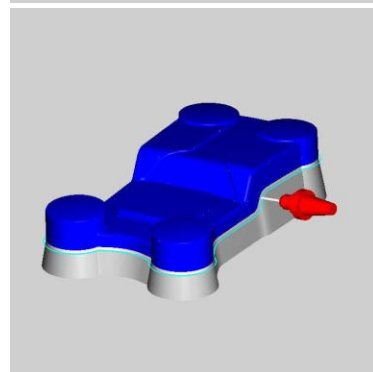
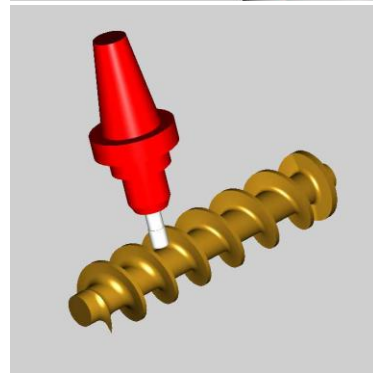
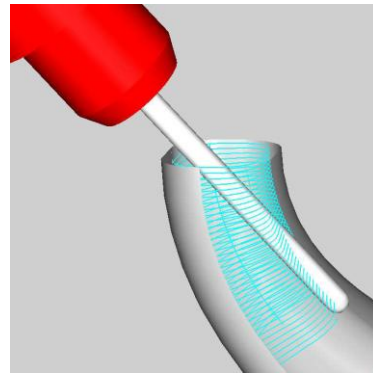
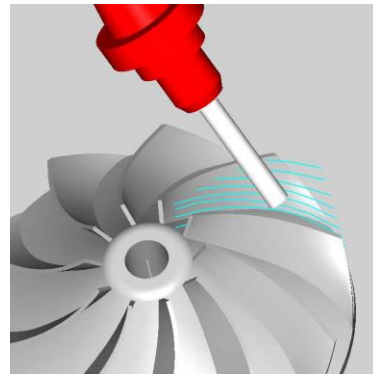
Product Highlights

CAMWorks Multiaxis Machining provides a powerful set of features and cutting strategies to meet the machining requirements of diverse applications.

- Support for multiple tool types including flat, ball, hog nose, tapered and undercut tools such as lollipop and keyway.
- Cutting strategies for swarf cutting, profile contouring, engraving, grooving and machining deep corners and cavities.
- The tool orientation while in contact with surfaces is completely user-controlled. Options include the ability to define tool orientation relative to the surface normal. To get a good finish with a 5-axis machine, the tool should have a specific angle to the surface. This tilt angle can be fixed, a variable angle based on the current normal vector of the surface or user-defined from points, lines or curves.
- Collision detection looks at each toolpath and the surfaces to decide if the tool tip, tool shaft or holder is colliding. The check is done at each calculated tool position. Groups of surfaces can be defined, each with its own avoidance strategy.
- Roughing options include multiple cuts normal to the surface, multiple cut depths along the tool axis and full 5-axis plunge roughing.
- Toolpaths can be copied and rotated to create full rotation symmetric operations (for example, impeller machining).
- Toolpaths can be contained within a user specified area.
- User-defined limits for the machining area and tool angles on several planes for increased flexibility.

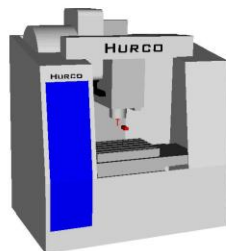
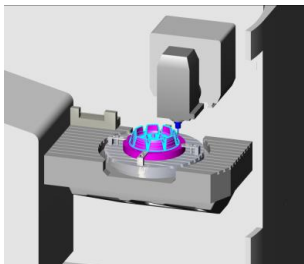


- When toolpath topology becomes very complex due to slicing (for example, parallel to curve and surface patches are very large) an option provides more accurate analysis of complex surface topology to generate toolpaths.
- A lag angle can be set between the end of a flat or hog nose tool and the surface, which results in a face milling condition that reduces the number of cuts in shallow areas.
- Undercut areas can be machined using 3-, 4- or 5-axis strategies.
- Rest machining options determine if CAMWorks generates toolpaths to remove remaining material based on an STL file or a calculated Work-in-Process (WIP). Optionally allow toolpath to follow stock shape when linking cuts.
- Options to take advantage of an existing stock geometry to minimize air cuts during roughing operations.
- User-defined options determine how CAMWorks handles gaps: gaps in surfaces can be ignored and machined without retracting the tool, the tool can be moved back to the rapid plane and skip the gap or the tool can follow other surfaces.
- Numerous options provide simple and easy trimming of vacuum-formed or fiber reinforced plastic parts.
- Multiaxis laser toolpaths can be created to trim sheet material in difficult to reach areas, for pre production runs where stampings require trimming or when single set up trimming is required for production speed.
- Numerous options provide more control for machining impeller blades.




Machine Simulation

CAMWorks provides a realistic simulation of the complete machine tool, enabling collision checking between the tool and the machine components. Simulation shows the path of the tool on the actual 3D model. The complete machine tool can be created including axis configurations up to 5-axis, machine limits, etc. The image can be manipulated during simulation to provide closer representations and views from different angles.



CAMWorks Modules:

CAMWorks modules are available in a variety of bundles or combinations:

- 2 ½ Axis, 3 Axis, 3 Axis with undercut
- 4 Axis and 5 Axis Simultaneous milling
- 2 and 4 Axis Turning
- Rotary Milling
- 2 and 4 Axis Wire EDM
- ElectrodeWorks™
- Volumill™ 

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