



Prospector with PowerSource Technology

Version 6.0 Release Summary

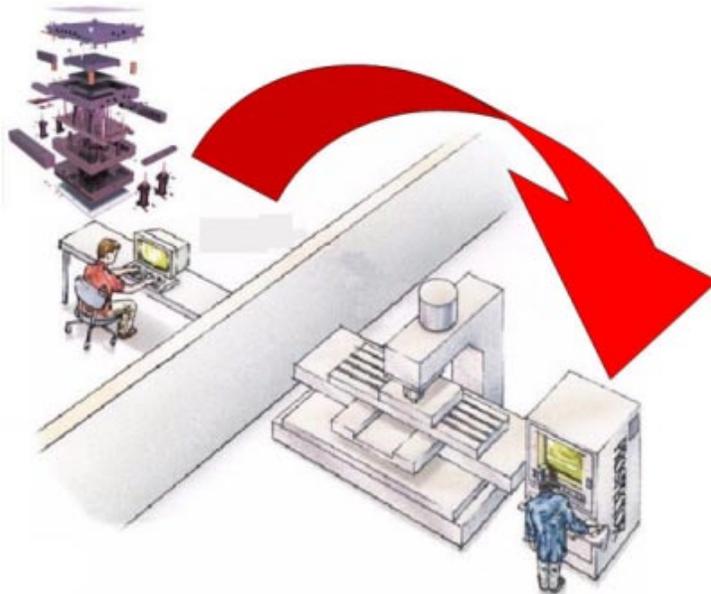
October 2002

Overview

Version 6.0 is a major milestone in the development of Prospector. This major release of Prospector includes the Parasolid® solid modeling technology. This allows Prospector to accept data directly from any Parasolid-based CAD system such as Unigraphics, SolidWorks and SolidEdge. This means that you can develop 3D and 2D cutter paths directly from solid models without having to translate to IGES or VDA before importing design data. Version 6.0 incorporates many new user interface concepts and techniques consistent with the most advanced Windows-based CAD systems. The new user interface is designed to make it much easier for new users of Prospector to learn and to dramatically improve the productivity of experienced users. This release summary will briefly review the new features and changes to Prospector. Choose What's New from the Help menu for a complete review of the changes. The on-line help provides full details on how to use all the features in Prospector. If you would like help getting up to speed with this new release, our Customer Service team has prepared a special update training program for Version 6.0. For more details, visit our web site at www.softtech.com or you can contact us at 800-280-0240 or e-mail at amt-support@softtech.com.

Prospector Powered by Parasolid

The Parasolid modeling kernel powers many popular solid modeling design systems including Unigraphics, SolidEdge and SolidWorks. By integrating the Parasolid technology, a direct data connection is established between popular Parasolid-based modelers and Prospector. With no need to translate data files to intermediate formats like IGES, design data from the CAD system can be imported quickly and efficiently with 100% accuracy. This means that you can eliminate an entire step - the data translation step - in your process of moving data from the CAD office to the shop floor for machining.



Parasolid-based Design Means 100% Accurate and Fast Data Transfers.

You can easily export each component of a an assembly model to create Prospector projects to be machined in Prospector:

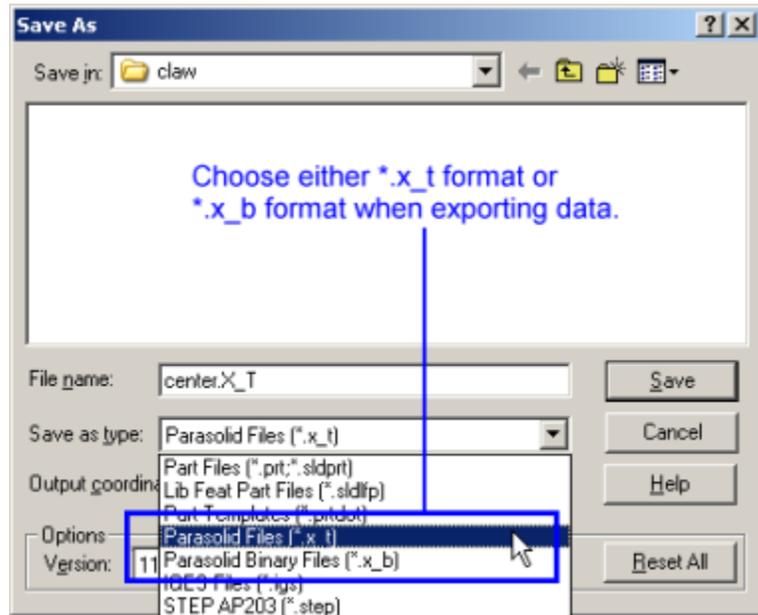
- Job 4958 - A-Pillar
- Top Clamping Plate
 - A Plate
 - B Plate
 - Core Insert
 - Electrode Grill
 -
 -

Exporting Data in Parasolid Format from CAD Applications

Parasolid-based CAD applications can write Parasolid ASCII (*.x_t) or Parasolid binary format (*.x_b).

Typically you can choose these formats in the File Save As menu in virtually all Parasolid CAD applications.

The example to the right demonstrates how to save a Parasolid file from SolidWorks.

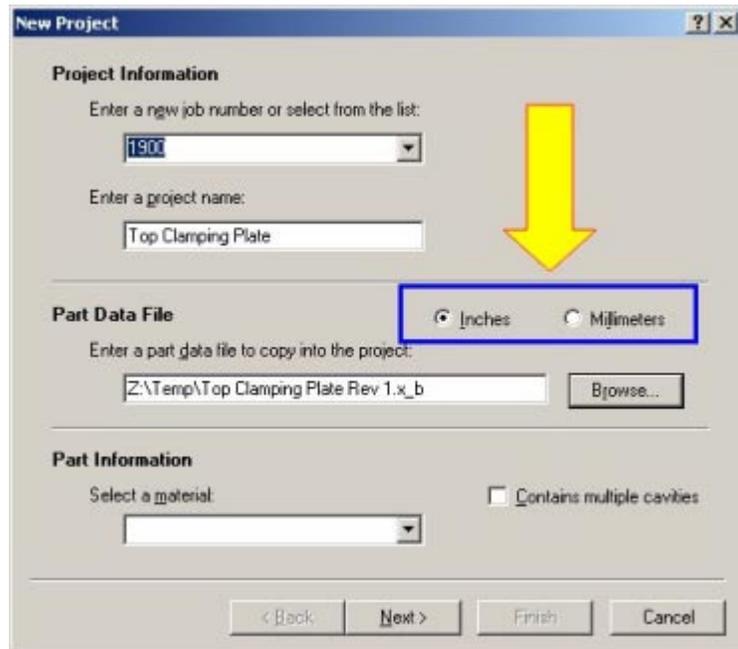


Importing Data in Prospector in Parasolid Format

Browse for the Parasolid file exported from the CAD system.

The file filters for the standard file extensions *.x_b, *.x_t make it easy to locate these file types.

Parasolid transmit files do not indicate the system of units to use. When the file is specified, don't forget to indicate the system of units to use for the project!



Free Plug-In to SolidWorks

If you are currently using SolidWorks as your CAD system, you can download a free plug-in to SolidWorks that lets you create Prospector projects directly from the SolidWorks user interface.



From Prospector menu in SolidWorks, choose Create Prospector Project to create a new project from the design you are currently working on.

If you are working with an assembly model, you can choose discrete components of the assembly or the entire assembly to send to the shop floor for machining.

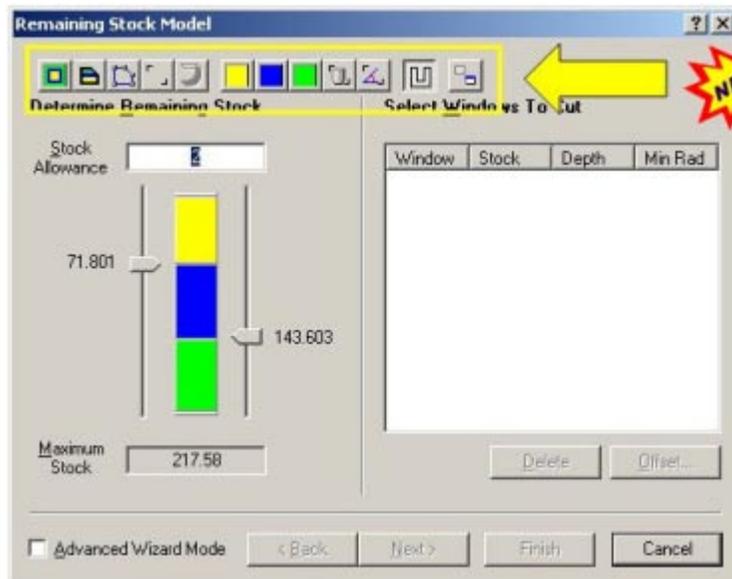
Choose Update Prospector Project if you need to export an engineering change to an existing project or add more data to a project.

You can download this free plug-in from our web site at: www.softtech.com

If you want to customize this plug-in to further automate the process, the VisualBasic source code is also available for download on our web site.

New Window Tools

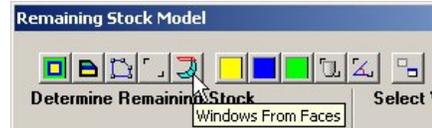
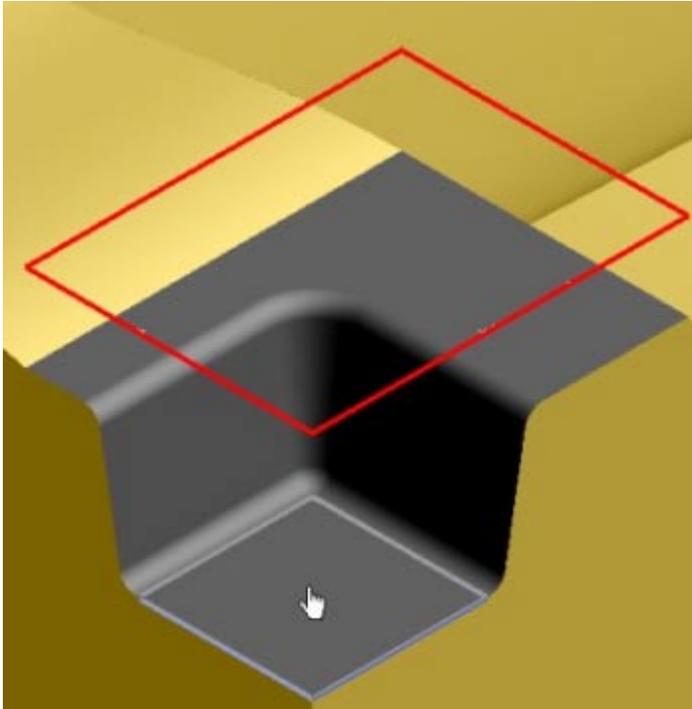
Tools for creating Windows have moved! Instead of a separate tool bar, the window tools are placed at the top of the first page of the New 3D Program wizard:



At the top of the first page of the New 3D Program wizard are all the tools for creating windows.

In previous releases, window tools would be presented in their own tool bar.

The Window from Faces tool constructs a window that surrounds the face you indicate. A face can be a surface of the face of a solid model:

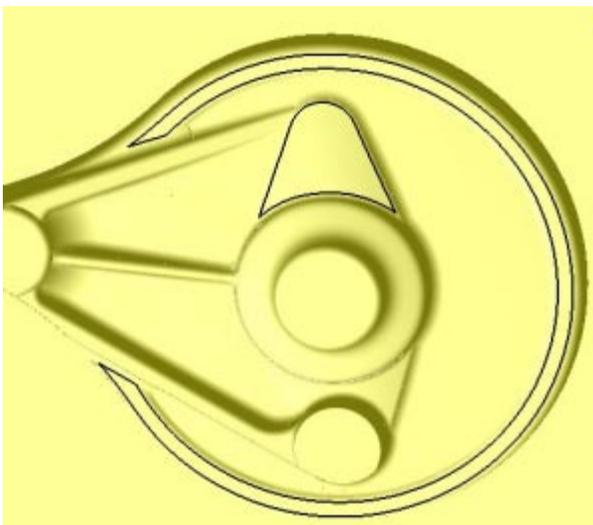
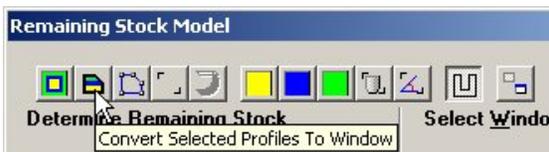


When you click on the face, the edge curve is extracted and a dynamic preview of the shape of the window is shown.

If you wish to accept this as your window, click the Window From Faces tool once more to exit this mode.

Holding down the Ctrl key while you select faces or surfaces will combine the curves extracted to form a single window around the entire area. In the example to the left, all the surfaces forming the lock area were selected in this manner to form the window shown.

Windows from selected profiles tool creates windows from all the geometry you currently have selected.



Develop the profiles to form the window(s) you wish to machine.

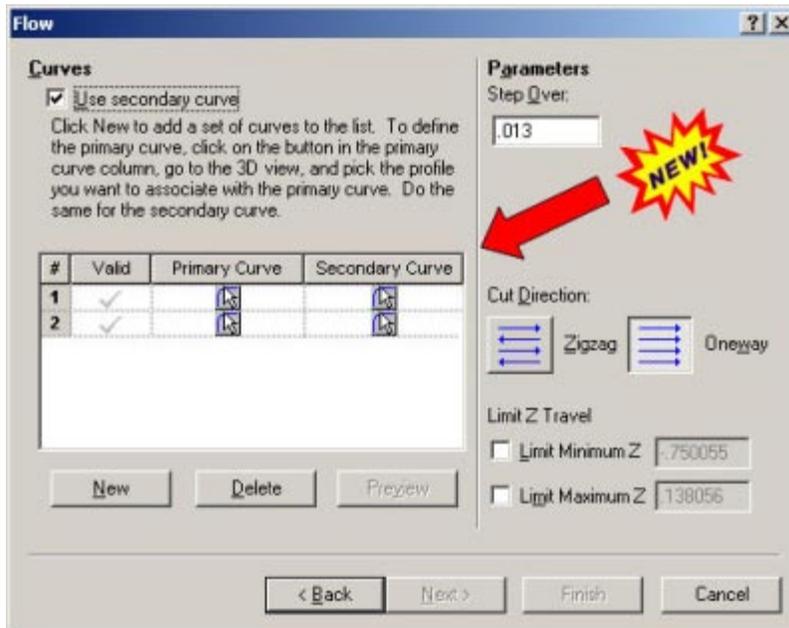
Select the profiles to use for your window then click the Convert Selected Profiles To Window tool.

Notes about building windows from profiles:

- If you have one or more profiles selected that are not closed boundaries, Prospector will automatically close the boundary before creating a window from it.
- The curve(s) you selected become windows so the original curve is gone once the window is created. If you wish to retain the curve after the window is built, make a copy of it first.
- If your selection includes a closed curve inside another closed curve, a complex window will be created.

Flow and Radial Machining of Multiple Curves

Flow and radial machining has been enhanced to allow you to cut any number of curves in a single program.



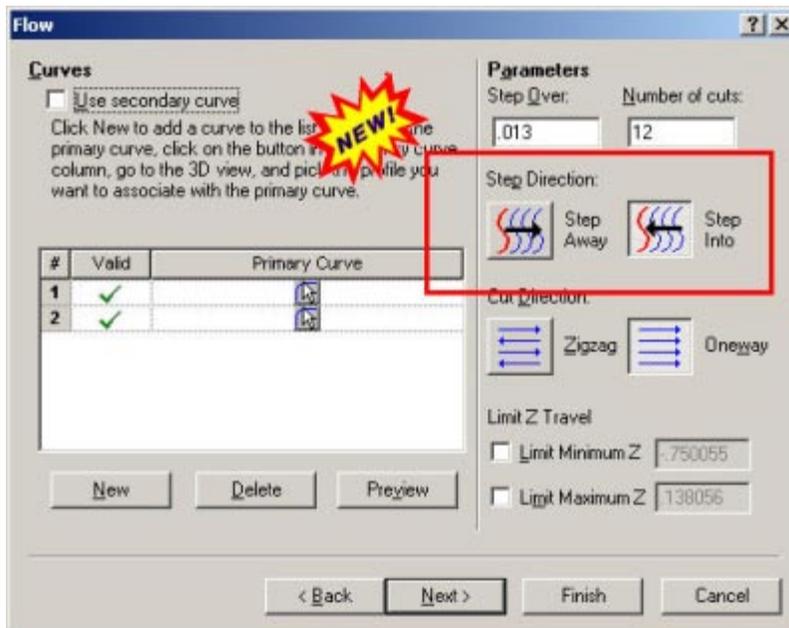
The new grid control for both the Flow and Radial parameters have lets you choose how many cuts to create by clicking on the New button.

The selection icons for each cut let you pick primary and secondary curves for each cut.

The Preview button provides a quick graphic preview of the cutter path that will result given the current set of parameters.

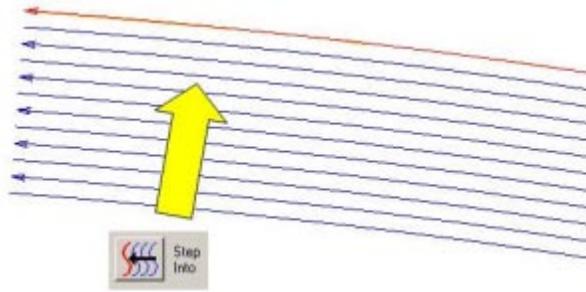
Controlling Step Direction for Flow Machining

A new option is available for flow machining to let you choose the direction of the cut relative to the flow curve to machine:

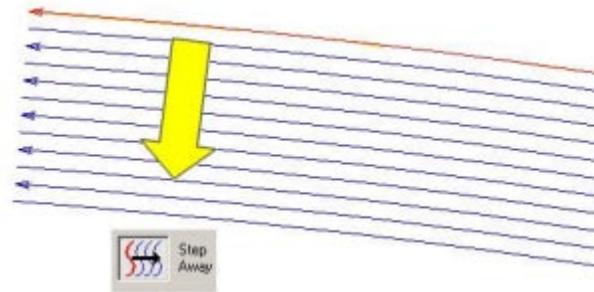


Step Direction lets you choose how to machine relative to the flow curve.

This option is available only when you are not using a Secondary Curve (when you use a secondary curve, you always cut from the primary towards the secondary so this option would be irrelevant).



Step Into causes machining to start from the last offset of the flow curve and move in towards the flow curve you designated.



Step Away machines starts at the flow curve you designated and machines away from it.

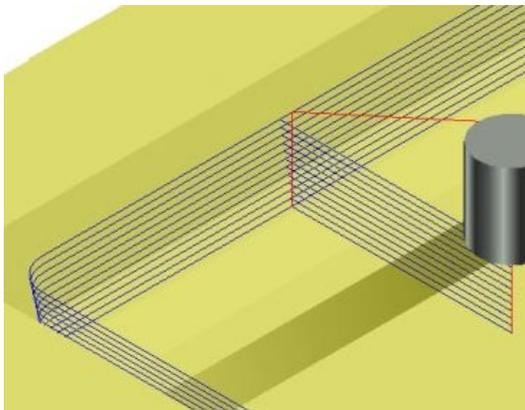
Circular Leads with Z-Planar No Clear

Circular leads provide a smooth transition into the part and away from the part when each level is machined. The benefits of circular leads:

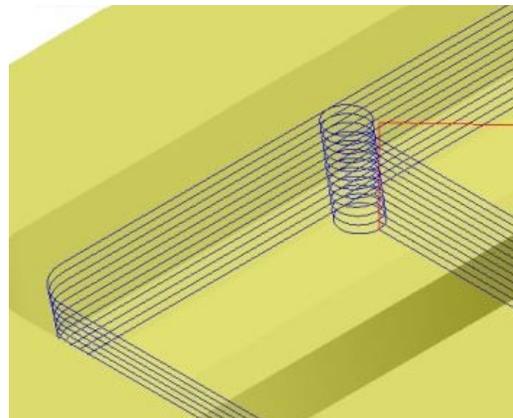
- Less machine time because the right angles are removed from the cutter path. This means the machine does not need to decelerate to a stop before changing direction. Minimizing abrupt changes in direction is a key concept in high speed machining.
- Eliminates the possibility of leaving a witness mark on the part which can occur when making a right angle move towards or away from the part because of the dwell time inherent in deceleration to a stop in one or more axes.
- Smoother machining because the cutter will never encounter a full-width cut.

There are 3 forms of leads possible:

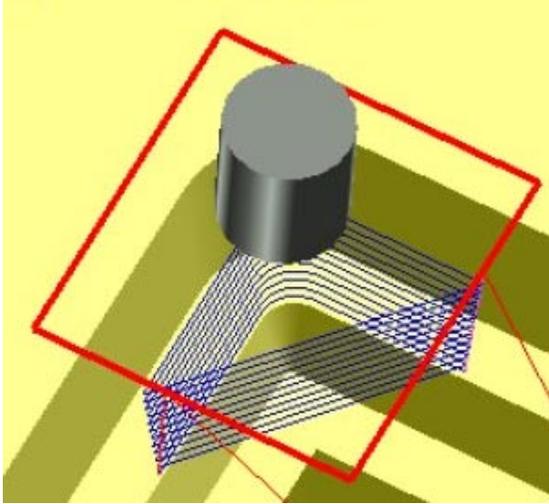
- Circular Leads OFF
- Circular Leads Inside the Window Only
- Circular Leads Inside and Outside the Window



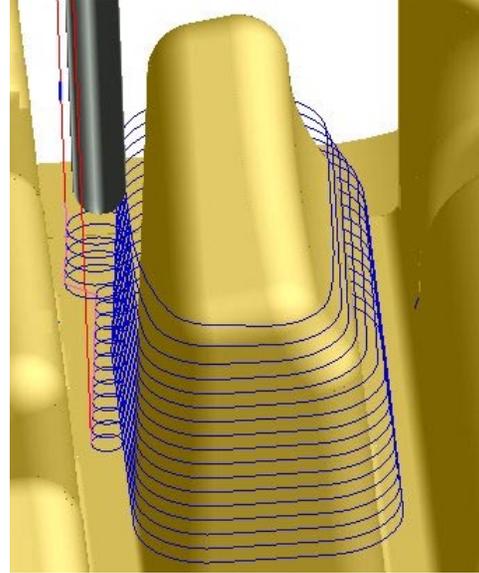
Circular leads off will cause the tool to approach each level at a 90 degree angle.



Circular leads inside the window will add a smooth lead-in and lead-out provided the leads will fall inside the window.



In this example, the setting circular leads inside the window does not produce leads. This is because the leads would go outside the window if they were inserted into the cutter path.

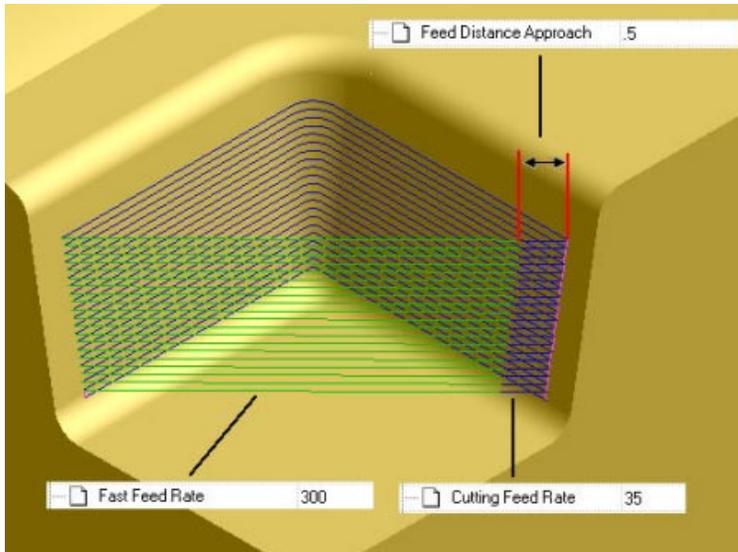


With circular leads inside and outside the window enabled, Prospector will always attempt to add the leads. In this example, the radius of the leads are automatically decreased to avoid gouging an adjacent feature of the part.

Using circular leads Inside and Outside Window will increase the amount of time it takes to generate the program because Prospector has to check to see if it is safe to add the portion of the leads that go outside of the window and make alterations to the lead to prevent gouging the part. It's best to use this lead setting only in situations where you should be concerned about possible gouging.

Automatic Deceleration from Fast Feed Rate

When it's necessary for the tool to traverse at fast feed rate to return to the next cut, a deceleration move will be inserted into the cutter path to slow the machine down as it approaches the part.



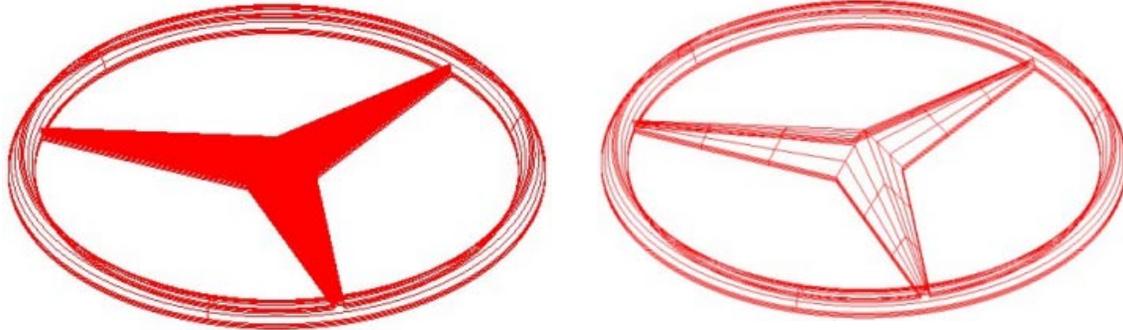
In this example, the fast feed move in green returns to the start of the plunge down to the next level.

As the tool approaches the part, a move is inserted to decelerate to cutting feed rate.

The distance of this slow-down move is controlled by the property Feed Distance Approach.

Simplifying Surfaces for Faster Cutter Path Generation

Filtering surface data can lead to dramatic improvements in the amount of time it takes to generate a 3D cutter path. Filtering surfaces is a process which removes unnecessary control points from over-defined surfaces:



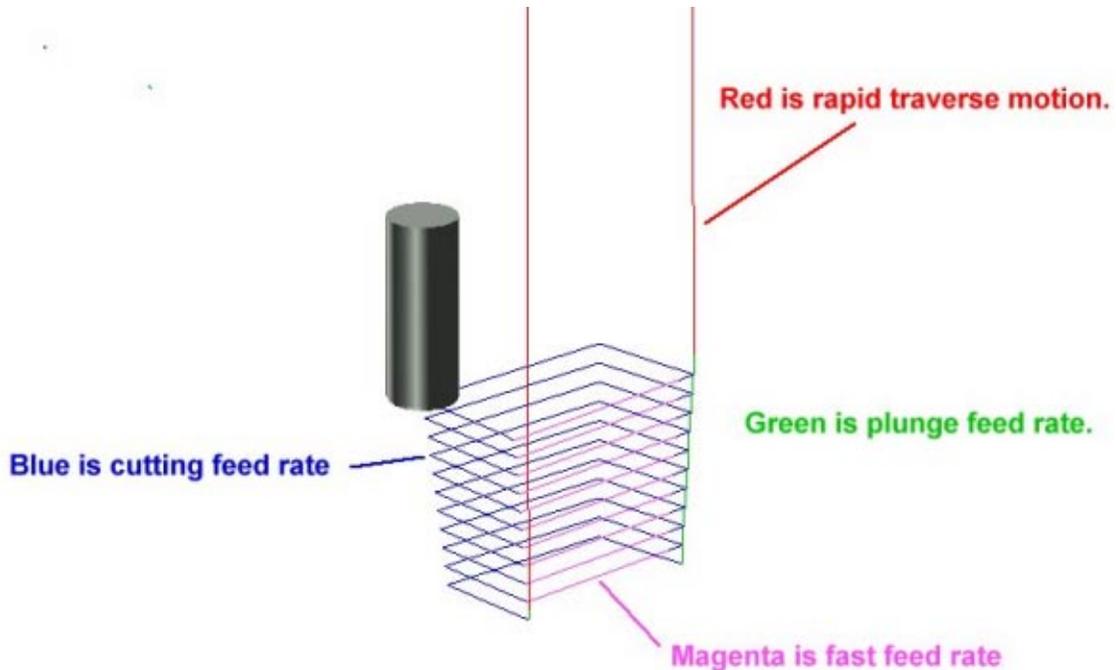
The planar surfaces of this part data are so over-defined the wireframe display of the data almost makes it appear as a shaded image.

After filtering, all the unnecessary points are filtered out. This will dramatically speed up the time it takes to generate 3D cutter paths. In this case, cutter path generation is over 3 times faster because of filtering.

In PowerSource Insight, you can enable the Surface Filtering under Application Settings. Any new projects you create afterwards will automatically cause the surface data to be filtered when new projects are created.

New Colors for Cutter Path Display

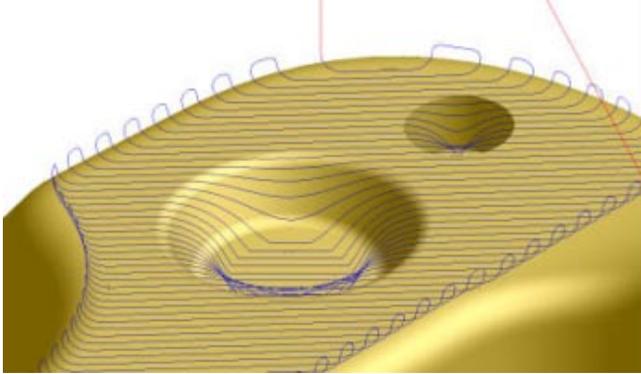
To make it easier to see changes in feed rates in a program, new colors have been added to show plunge feed rate and fast feed rate in addition to the current rapid and cutting feed rate:



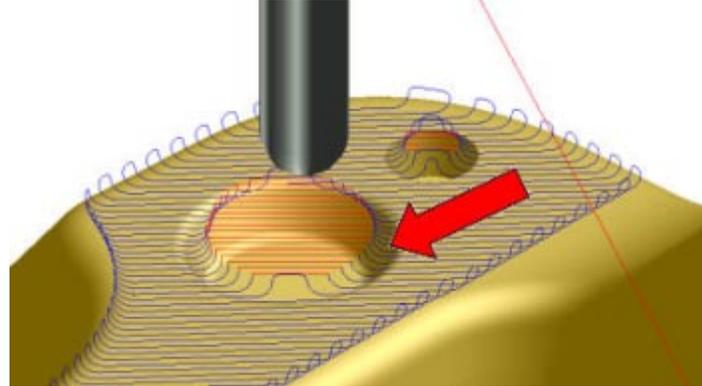
Choose the Colors tab in the Tools/Settings dialog to configure the different feed rate colors.

Cutter Path Editing

When trimming programs with the High Speed Machining option for circular leads enabled, the same circular leads will be added into the program in areas where the cutter path has been trimmed:

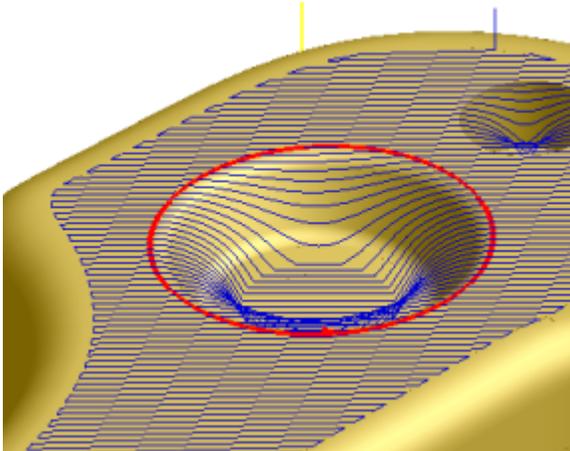


This lace cut was created with the high speed machining option for circular leads enabled.



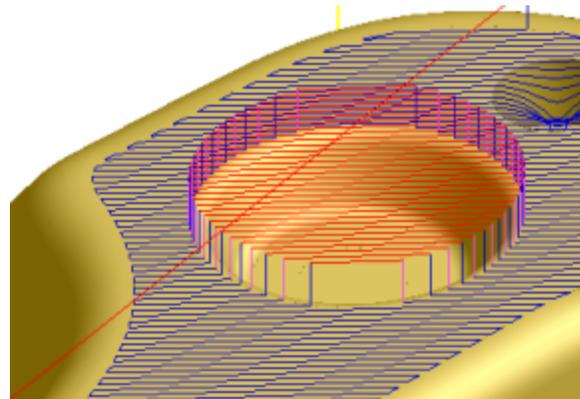
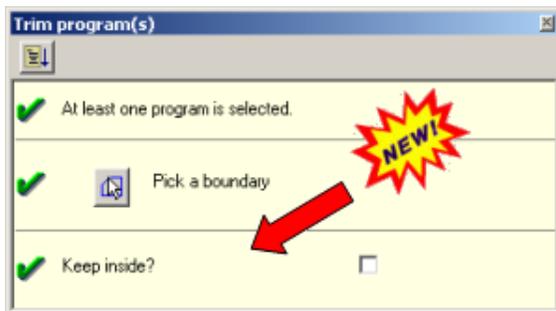
After trimming, the leads are added back into the program to lift off the part to avoid the pockets.

A new option to cutter path trimming lets you choose to keep either the portion inside the trimming curve or outside the curve.

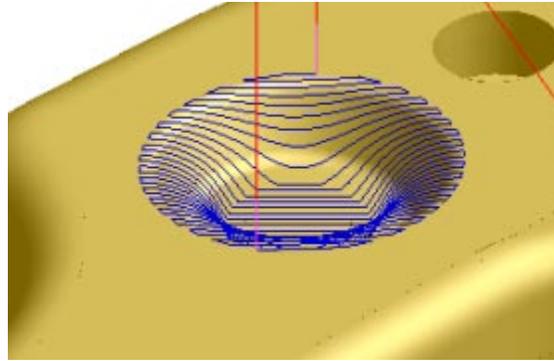
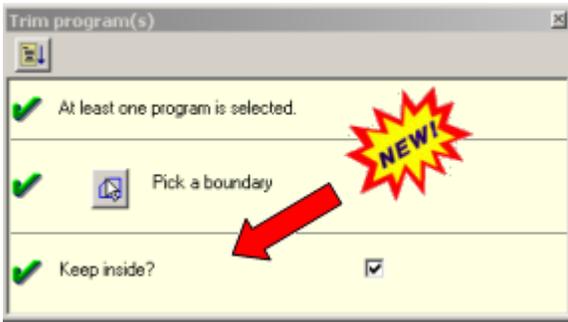


This cutter path drops into this pocket.

We can choose to keep the outer portion of the program or just the piece inside the pocket



Disabling the Keep Inside? switch keeps everything that is outside the pocket.



Enabling the Keep Inside? switch retains just the part of the program than machines inside the pocket.

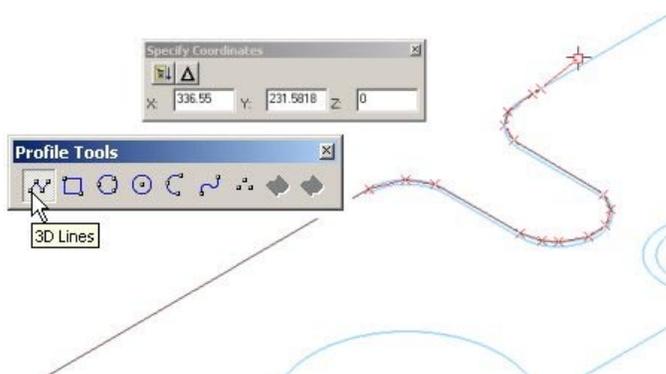
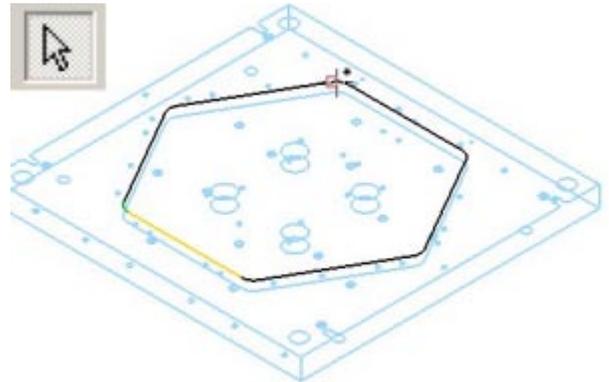
New User Interface Concepts

All new for Version 6.0 is the concept of being in a mode. Unlike all previous releases where digitizing would develop a current profile by adding a new line segment to it, the effect of digitizing will depend on the mode you are currently in.

Select Mode

By default, Prospector will be in select mode when you start a session. Anytime you are in another mode (for example 3D Line mode), you can enter select mode by choosing Select Mode from the Edit menu. Other modes will also let you exit to Select Mode by choosing it from the mode sensitive menu. The Esc short key will also return Prospector to Select Mode.

When you click the left mouse button, you will be selecting the entity nearest the cursor provided there is an entity sufficiently close. Holding down the Ctrl key while clicking the left mouse button acts as a selection toggle to select or de-select the entity nearest the cursor.



Profile Tool Modes

The Profile Tools let's you choose a mode to create profiles of a designated type. In the example to the right, 3D Lines is the tool being used to create a profile consisting of 3D line segments. A rubber-banding graphic display lets you see the effect of each point you add before you commit to it.

At any point, you can enter precise absolute or incremental coordinates for the geometry.

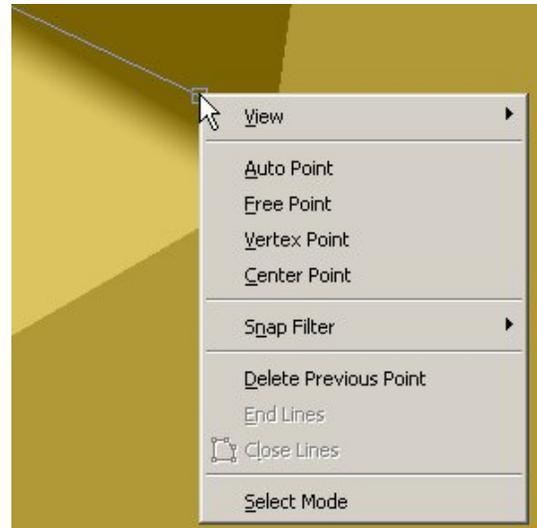
As you create new profiles using one of these tools, the geometry is automatically selected. This usually saves you the step of having to select the geometry later on to participate in a machining operation.

Mode Sensitive Menus

When you click the right mouse button, a menu is posted next to the cursor. This menu is called a Mode Sensitive

menu. The contents of the menu changes depending what mode you are currently in. The menu choices are commonly used functions that are useful for that mode. In the example to the right, we are in 3D Line mode.

Useful commands for 3D Line mode include adding the next point with a particular snap filter or modally changing the snap filter. Delete previous point, ending the 3D Line definition to start a new line and automatic closing of the line are also very common functions you would use in 3D Line mode. The View pull-right menu is always included to make it easy to change to any of the standard view and Select Mode is included to exit 3D Line mode.

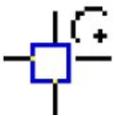


Inferencing

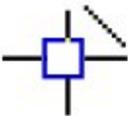
During many operations, as you move the cursor around the screen, you'll notice that the appearance of the cursor changes to provide feedback about the position of the cursor relative to the geometry nearby. This is called inferencing. For example, if you are digitizing points to create a profile the cursor appearance will provide feedback to let you know if the next point you digitize will land precisely on existing geometry.



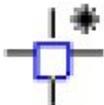
The pointer cursor indicates that there is no geometry sufficiently close to produce an inference.



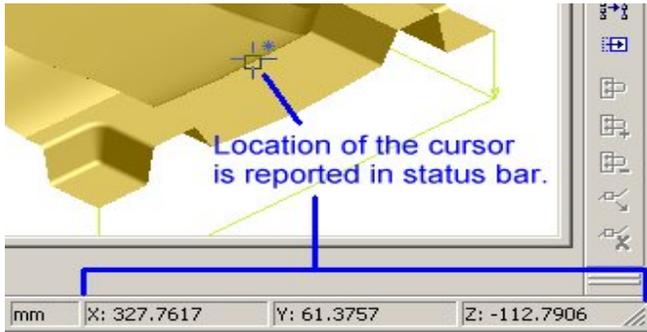
This shape indicates that the system has inferred you wish to indicate the center of an arc or circle.



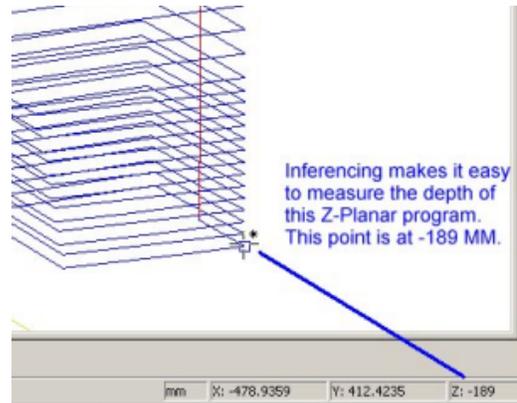
This shape indicates that the system has inferred you wish to indicate a point that lies exactly on an existing profile that is nearest the cursor.



This shape indicates that the system has inferred you wish to indicate a point that lies exactly on the vertex of an existing profile that is nearest the cursor.



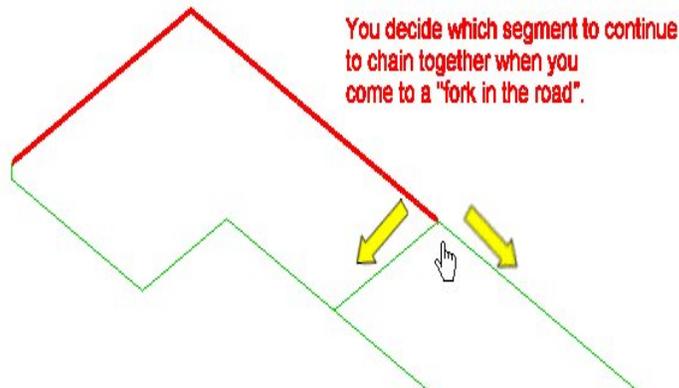
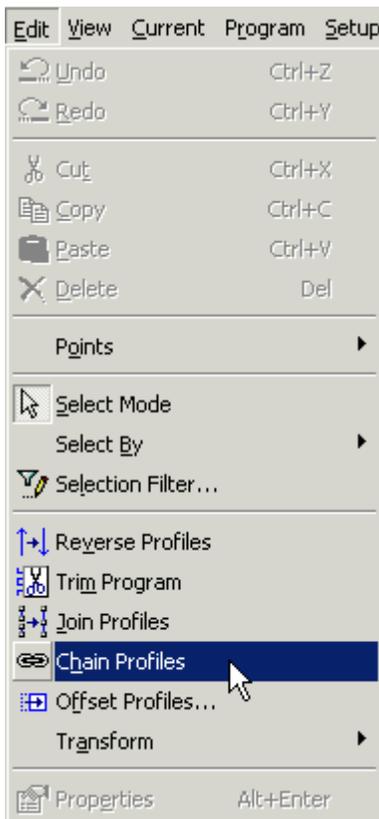
In all cases, the location of the cursor is always indicated in the status bar.



Inferencing works for both geometry and programs. This makes it very easy to measure for example the depth of a Z-Planar or pocketing program

Interactively Joining Geometry with Chain

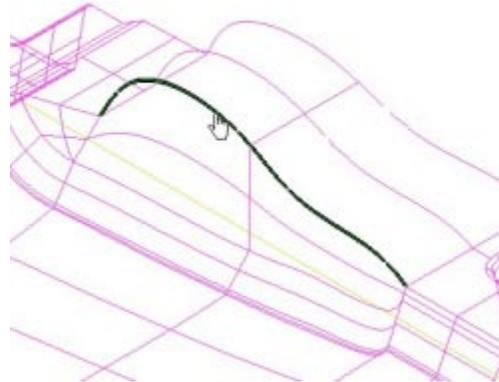
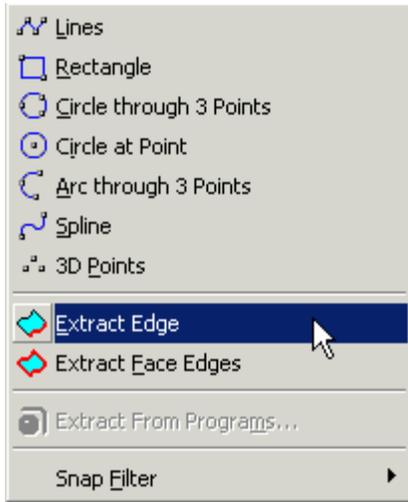
Chaining is a feature that lets you interactively join together geometry to form one continuous profile. When you choose Chain, you enter a mode. You'll be in Chain mode until end the current chained profile or choose to do something else.



Chain will put together pieces of geometry provided they lie end-to-end and the end points are sufficiently close to each other. As long as the gap between 2 entities is within the gap tolerance for chaining, the entities can be joined. If you wish, you can change the gap tolerance using the mode sensitive menu for chain.

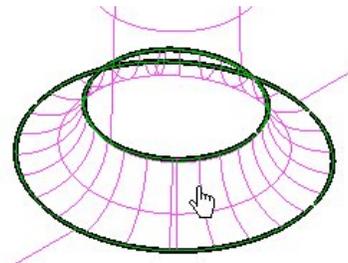
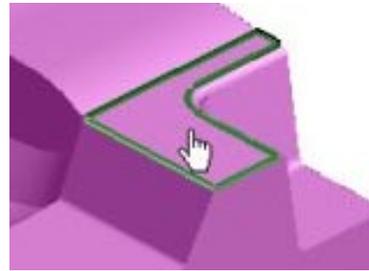
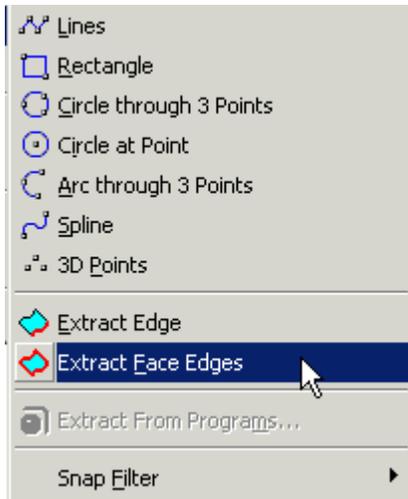
Extracting Curves from Surfaces and Solids

New tools for extracting curves from surfaces and solids have been added to make it much easier to develop complex geometry for flow and radial machining.



The **Extract Edge** tool let you choose and edge of a surface or solid model to use as a curve.

The edge you pick can be the edge of a surface or solid or an interior curve.



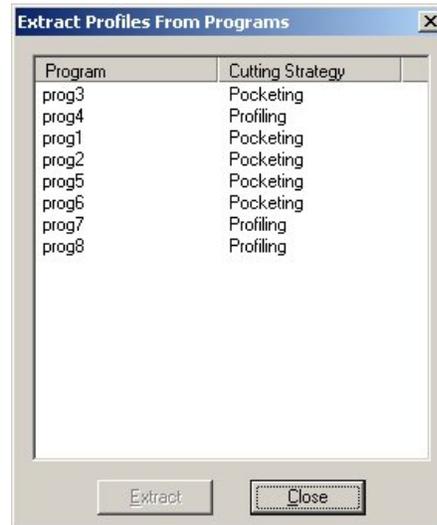
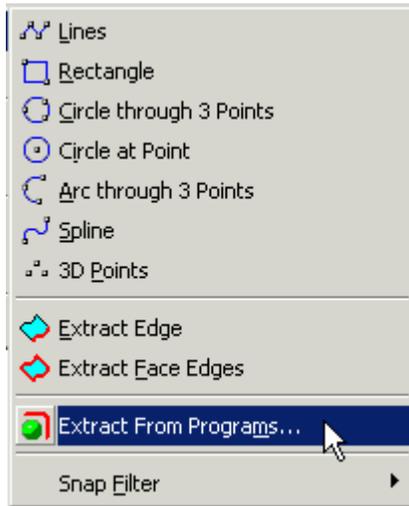
Extract Face Edges returns curves that bound the surface or solid face you indicate.

This tool is useful for developing precise windows and is also very handy for creating curves for radial machining.

Reusing Geometry from Previous Programs

Extract from Programs lets you reuse the geometry you created for programs during the current session or in a previous session. For example, if you drilled a series of holes and later realized that you needed to also ream the holes, you can open up the project and then reuse the point set you developed for the original drill program to create the reaming program.

Extract from Programs is also handy to reuse flow and radial curves to re-machine those areas of the job with a smaller cutter or different stock allowance.



Extract from Programs lets you reuse geometry from previous programs you created in a project.

From the selection dialog, choose the program from which you want to extract the geometry used to create it. The geometry will highlight in the 3D view. Click the Extract button to copy the geometry from the program.

Dynamic Zoom

If you use a wheel-style mouse, the wheel has been programmed to let you to dynamically zoom in and out.

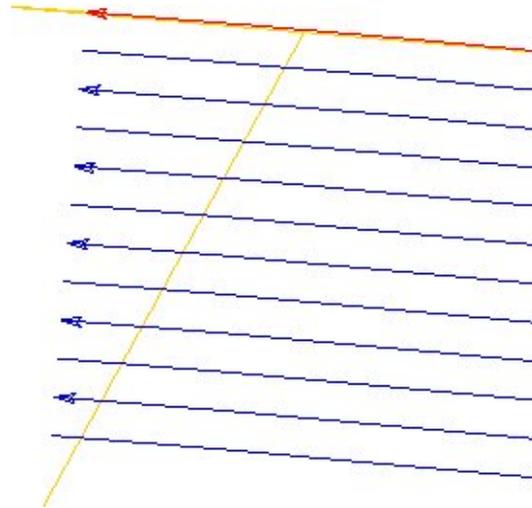
Rolling the mouse wheel will dynamically zoom in and out.



Support has been added for input devices from 3dconnexion. 3dconnexion specializes in innovative products such as the SpaceBall® 4000. With the SpaceBall® 4000, you can intuitively zoom, pan and rotate models, exploring and navigating your designs as naturally as if they were objects in the real world. To learn more, visit them on the web at www.3dconnexion.com.

Showing the Direction of Profiles

All profiles have a direction. The direction of a profile is important for many machining operations. For example, 2D profiling of open curves relies on the direction of the profile to choose which side to place the cutter. Flow and radial cutting use the direction of the flow or radial curves you choose to pick a direction for the cut.



Show Profile Direction is a toggle. When enabled, the direction of wireframe profiles is indicated by drawing arrows along the profile to show its direction.

Show Direction also shows the direction of the cutter when you choose to preview cutter paths.

Hiding and Unhiding by Color and Layer

The ability to hide and unhide by layer and color has been extended to apply to surfaces and solids.



Hiding and unhiding by color or layer used to apply only to profiles.

Surfaces and solids can be hidden and unhidden in Version 6.0 by color and layer.

Important Note: Hiding a surface or solid does not mean it should not be machined! All surfaces and solids inside a window will be machined regardless of whether they are visible or not.

Customer Closed Track IDs

Track is the electronic database system that records all customer and internally generated requests for corrections and enhancements. When you report a problem or request an enhancement, our customer service representatives will input your request into the Track system and give you a Track ID number. When we complete a release, we set the status on all records in the Track database that have been addressed to closed. The following is a list of closed customer Track IDs for this release.

Track ID	Customer	Synopsis
1245	HS Die	Implement rubber-band effect to preview dropping of points.
1552	ETM	Implement extract edge to aid in development of window geometry.
2423	Mach Mold	Implement ability to snap to a corner.
2703	Impact Tool & Mould	Implement an easier way to isolate 3D radii for machining.
2836	Advantage Engineering	Add rectangle tool to Profile Tools
2838	Advantage Engineering	Add option to trim inside or outside of a cutter path.
3516	Impact Tool & Mould	Show directional arrows for 2D curves.
3557	Proto Mould	Delete point is not always active when it should be.
3890	Impact Tool & Mould	Add coordinate display for cursor in status bar.
4632	Impact Tool & Mould	Add re-use geometry like re-use windows for 2D and flow and radial.
4941	Basic Tool	Ability to generate Z-Planar circular leads outside of the window.
4943	Basic Tool	Allow Show/Hide by layer and color to work with surface and solid data.
4944	Basic Tool	Retain circular leads and links after cutter path trimming.
4953	ITW Drawform Inc.	Ability to generate Z-Planar circular leads outside of the window.
4964	SECO/Carbology	Improve diagnostics when user specified plunge point is not appropriate.
5013	Model Die	Add color display of cutter path for Fast Feed Rate and Plunge Feed Rate
5017	Model Die	Fast feed for Z-Planar No Clear should reduce feed as it approaches the part.
1464	SECO/Carbology	Enhance IGES translator to detect incorrect designation of inner and outer trim regions and swap as needed.
1471	Basic Tool	Modify IGES translator to handle incorrect 3D curves for trimmed surfaces of revolution written by ProEngineer.
1487	Basic Tool	Modify IGES translator to handle incorrect 3D curves for trimmed surfaces of revolution written by SolidWorks.
1507	Gage Pattern & Model	Modify IGES translator to ignore incorrect offset vector for offset surfaces written by SolidEdge.
1507	Gage Pattern & Model	Modify IGES translator account for trim curves written out in the wrong order by SolidEdge.
1520	Mach Mold	Modify IGES translator to handle parametric trim points outside the range of surface parameterization.