

Advanced Machine Features

New machining techniques and control capabilities require greater simulation capabilities. In order to meet these requirements and support them in the future CGTech consolidated several advanced machine & control features into a single module. The following features require the Advanced Machine Features module.

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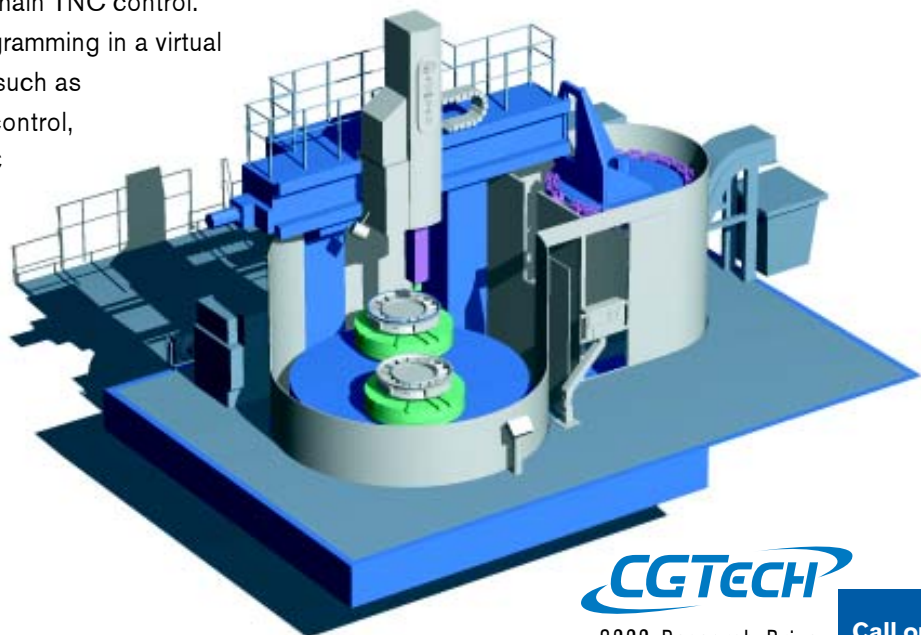
CNC control features which rotate or define 3D coordinate systems and offsets

The Advanced Machine Features module enables VERICUT to simulate certain capabilities of complex 3D transformations.

Some newer CNC controls provide transformation routines that enable the NC program to be independent of the machine's physical axes configuration. These features require VERICUT to read the NC program and do the same transformation in order to move the "virtual" axes. Some of these complex transformations establish a new secondary coordinate system, such as TRANS, ROT, ATRANS, and AROT on the Siemens 840D control, or CYCLE DEF 19.1 on the Heidenhain TNC control. Some transformations allow programming in a virtual "workpiece" coordinate system, such as TRAORI on the Siemens 840D control, or M128 on the Heidenhain TNC control. Other control transformation features enable work offsets to dynamically adjust axis positions based on rotary axis positions, such as Fanuc's G54.2.

Automatic part transfer between fixtures

Machine tools that automatically transfer the workpiece from one fixture or machining station to another (such as between the main spindle and sub-spindle of a lathe, for example) require a more complex simulation. *The Advanced Machine Features module enables VERICUT to clamp and unclamp the workpiece with fixtures or other automatic work holding devices. It also gives VERICUT the ability to simulate automatic transfer of the machined stock between fixtures.* In turning operations, the stock can be divided into two pieces, such as when a piece is clamped in a turning center's sub-spindle and cut-off.



VERICUT[®]

Software Solutions for Manufacturing

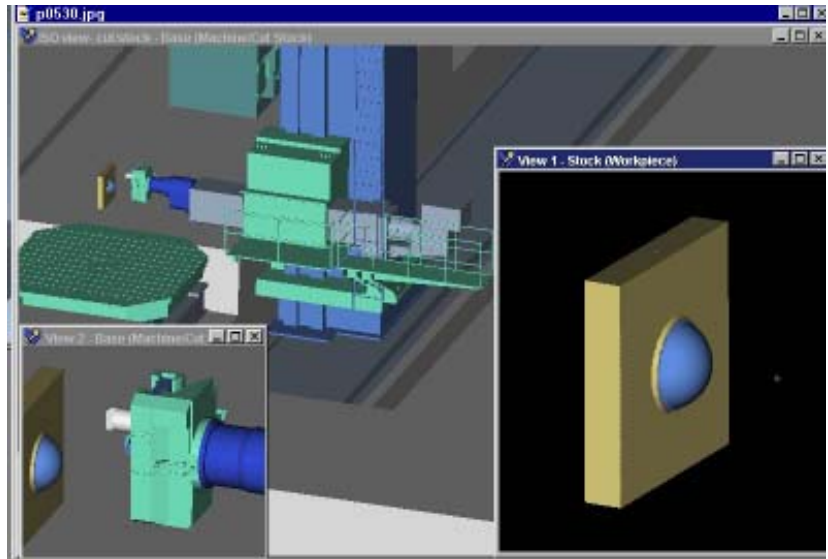


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Index® mill/turn machining center's multi-channel programming & synchronization

The Index mill/turn machining centers use a unique programming approach to control and synchronize different axes groups, called “channels.” Index’s multiple channels are programmed using a main program which calls sub-programs for each channel. In the VERICUT simulation, the axes for each sub-system (channel) is driven by a sub-program which is synchronized with another sub-system driven by a different sub-program.



Facing head (or “programmable boring bar”)

A facing head is a milling machine head or spindle attachment containing a programmable linear axis perpendicular to the spindle axis. A facing head is usually used on large horizontal machining centers, such as machines from Giddings & Lewis, DS Technologies, Ingersoll, Waldrich Coburg, and others. The tool attached to the facing head is a single point turning tool or boring bar. Simulation of the facing head motion requires VERICUT to spin all components connected to the spindle, and remove material with the spinning tool.

CNC controls which allow programming of the tool axis using IJK tool axis vectors

Some newer CNC controls allow programming a machine tool's rotary axes by specifying the cutting tool's orientation relative to the workpiece using IJK vectors, rather than the traditional direct programming of the A, B, or C axis angles. The CNC control is doing the work typically done in the post-processor. Simulation of this motion requires the equivalent calculation to drive VERICUT's virtual machine axes. Advanced Machine Features enables VERICUT's IJK-to-ABC calculation function.

Turning operations which are not symmetric about the lathe spindle, such as crankshaft turning

Special turning operations not symmetric about the lathe spindle are used in some machining operations. These asymmetric turning operations, such as when turning the connecting rod pin on an automobile engine crankshaft, can be simulated in VERICUT with the Advanced Machine Features module. This also supports non-turning material removal using a non-rotating tool, such as when broaching.

Parallel kinematics machines

Some machine tools orient the tool axis using a linkage mechanism rather than the traditional rotary axes. This is commonly called “parallel kinematics.” VERICUT specifically simulates the Ecospeed® tripod head from DS Technologies. Other kinematics are available upon request.

Note: Many of the above features were developed for a specific customer or small group of customers. Check with your VERICUT representative to make sure the feature applies to your specific application. Custom software development is available and may be licensed by this module.