What's NEW in VERICUT 9.2.2

IMPORTANT! – Licensing is NOT included with software shipments. See "To Get a License" below for details

January 28, 2022

Dear VERICUT® User:

Thank you for your continued investment in VERICUT, an important part of your NC programming and machining process!

VERICUT 9.2.2 features enhanced graphics, increased speed, and much more. These changes and more will be described in the following pages. Please take a moment to review what's new and improved in this release.

Maintenance and Licensing Information

> NOTE: This software requires VERICUT 9.2 licensing.
>
> **To Get a License** – use the link below to submit a License Request:
> http://www.cgtech.com/vericut_support/request-license/.
>
> Licensing is sent via E-mail only.

VERICUT 9.2.2 runs on 64 bit Windows, and is supported on Windows 10 computers. It is not available for 32 bit Windows computers.

VERICUT's license server will continue to run and be supported on 32 bit or 64 bit computers.

Software maintenance keeps you on the cutting edge - CGTech provides update software to customers with current software maintenance. Your continued maintenance ensures that you have the most advanced verification technology available. If your maintenance has expired, please contact your CGTech representative (http://www.cgtech.com/about/contact-us/).

Sincerely,

Gene Granata

CGTech VERICUT Product Manager

Enhancements and Changes in V9.2.2

Verification

Double tools now use slightly different removal colors for ease of visually distinguishing which tools removed what.

New functions Decimal2BCD and BCD2Decimal have been added to support Fanuc controls.

Support has been added for Near Miss warnings on axis travel.

G-Code Processing

SYSREAD/SYSWRITE expanded with new options (ID504, ID507, ID508) to allow for ability to swap ID values more easily.

Added ability to store radius values for variables in tool files.

The option to check NC Program file size has been added through **SetMaxProgramFileSize** macro.

Tool Manager and Interfaces

"Coolant Through" tooling option has been added.

"% of Progress" option has been added to Tool Manager, Optimization settings.

Zoller interface has added support for parametric tools.

Zoller interface now supports multiple driven points.

CoroPlus now supports more tool types and can import cutting data with Sandvik Coromant tools.

MachiningCloud now supports more tool types.

Reports

Added ability for VERICUT to display "Cannot load Tool report template [name] in VERICUT" and "Cannot load VERICUT report template [name] in Tool Manager" warnings.

Added ability for Reports to generate more detailed tables vis NC Program comments.

Surface finish callouts have been added to Inspection Reports as well as graphical identifiers for instruments and comments for Inspection measurements.

Machine Metrics table and new cutting condition metrics have been implemented.

X-Caliper

Added ability to measure an edge in X-Caliper.

X-Caliper can now measure volume removed from active and hybrid parts.

Annotations have been augmented with multiple new options. It can be toggled between 3D and 2D options, the image background can be configured to match your desired preferences, notes can be edited with a variety of text color and font options, and multiple leader lines can be added to notes. Additionally saved sections can be defined in Annotated Views.

Robots

Added circular interpolation for Kuka robots.

Documentation

Updated Session 14 to include new feature Remove Material and Detect Collisions.

Problems Resolved in V9.2.2

Verification

Issues of unexpected termination have been resolved.

Issues related to Tool Change List changing or removing tools have been corrected.

An issue related to models not transferring between subsystems correctly has been corrected.

An issue related to Imperial units sometimes switching to metric when output has been corrected.

An issue of unexpected termination when using thread mill has been corrected.

An issue of Setup Plan not working as desired has been corrected.

Issues of material removal not working as expected have been corrected.

An issue of Stock Csys not appearing when toggled on has been corrected.

An issue of certain properties not being able to be selected in different setups has been corrected.

Issues of false collision warnings generating have been corrected.

Issues of animation speed slider position altering machining times has been corrected.

Issues of lengthy simulation times have been corrected.

An issue of stock spindle spinning in the wrong direction for the tool has been resolved.

An issue of design components not resetting properly has been corrected.

An issue of File Summary changing uppercase letters in file names to lowercase letters has been corrected.

An issue of active CutterComp resulting in wrong material removal has been corrected.

An issue of turret setups from past versions not being able to be deleted in more recent versions has been resolved.

Optimization

An issue where OptiPath optimized output switched variables when in inverse time has been corrected.

An issue where Force produced different results in different versions has been corrected.

An issue of the Optimization Savings Calculator not working with multi-channel setups has been corrected.

Updated accel/decel logic to prevent issues with OptiPath output.

A Force optimization problem associated with the **CircleMotionPlane** macros has been corrected.

An issue of Save All As Optimization Settings altering optimization values has been corrected.

An issue where alternate OptiPath SMR for Insert cutter could not be activated has been corrected.

An issue where Force's prompt while cutting option failed to generate prompts has been corrected.

An issue of Force Learn Mode not optimizing when creating a new tool library has been corrected.

An issue of Force Optimization sometimes failing after resetting simulation has been corrected.

G-Code Processing and Machine Simulation

AutosetTableAxisArrayVars has been updated to work with generic array names.

An issue of Tool ID numbers shifting between machine view and profile view has been corrected.

Tool Manager

Issues of Tool Manager locking up during attempts to modify reference tools have been resolved.

An issue of Tool Library files not opening as quickly as desired has been resolved.

An issue of holder and cutter assignments not working in DXF Import has been corrected.

An issue of Tool Manager not opening properly has been corrected.

An issue of imported tools not cutting correctly has been resolved.

An issue of tool shanks not outputting diameter correctly has been resolved.

An issue where tools failed to append to an existing tool library has been corrected.

An issue of clockwise and counterclockwise options not working with CAD Tool has been corrected.

An issue where tap shanks were not displaying when imported using TDM has been resolved.

Reports

An issue related to Annotate Tool automatically saving thumbnails to exported Reports has been corrected.

An issue of dimensioned tools not generating on reports has been corrected.

An issue of Min/Max Spindle Speed and Feedrate not generating on Reports has been corrected.

An issue of unique characters not displaying correctly in reports has been resolved.

An issue of PDF Reports generating differently depending on what location the feature was accessed from has been corrected.

X-Caliper

Issues with X-Caliper taking incorrect diameter measurements have been corrected.

CAD/CAM Interfaces

CATIA

An issue related to CATV5 interface not automatically setting preferences has been resolved.

An issue of Run VERICUT button not working in CATV5 has been resolved.

Issues of CATV6 3DX interface losing resources, failing to expand nodes, and not being able to reorder programs have been corrected.

An issue with tools generating incorrectly from product name in 3DX has been corrected.

NXV

An issue of driven point not being populated by 3D export tool has been corrected.

PowerMill

Issues of PowerMill failing to check out licenses and failing to export tools have been corrected.

PROEV

An issue of PROEV not properly exporting tool assemblies has been corrected.

VDAF

An issue of Fastener ID search not working as intended has been corrected.

Restored ability to check machine collisions in MDI in VDAF.

An issue with VDAF sometimes failing to report collisions has been corrected.

Reviewer

An issue where Reviewer did not display correctly after reset has been corrected.

New Macros in V9.2.2

AutosetToolManLength840DVars2
AutosetToolManRadiusVars
CallReturnSubName
HeidBeginPgmName
Ijk2Angles2
InitRobot
OptiGWordModalOnOff
RelationalOffsetUVWOption
SetKinematicAxisVars
SetMaxProgramFileSize
SiemensORISOL2Option
SubroutineCreatesVariableScope
TapeSplitterInOut
TurnOnOffCompNearTravelLimitWarnings
TurnOnOffNearTravelLimitWarnings
TurnOnOffSubsystemNearTravelLimitWarnings
VariableTagConcat
VariableTagSetsSCope
WTapeTurnOffWithCutoff

V9.2.1 Release Notes

Enhancements and Changes in V9.2.1

Verification

Record Cutting Conditions toggle has been added to the Status window to help tabulate removal rates.

AUTO-DIFF Results option now comes with surface translucency setting.

User can now select KRL programs through the NC Program window by selecting KRL as the program type.

Status window can now display Coolant type.

Machine/Cut Stock view can now use VCT files for fixtures.

Accel/Decel logic has been enhanced for greater accuracy.

Optimization

Expanded FORCE material catalog to include the following:
- Tool-Steel+CR7V-L+HRC23
- Tool-Steel+1.2714+HRC25
- Tool-Steel+Uddeholm-Ovar-Supreme+HRC47

Accel/Decel logic has been enhanced to calculate and report optimized machining times while optimizing (instead of via subsequent simulation).

G-Code Processing

Added "RESET" option to AROT in Library Controls.

The Validate feature on the G-Code Processing window now also checks for a Base control record referencing a Word that is not in the Base control.

New **OptiFPRFormat** macro introduced to help optimize IPR and IPM formats.

MotionSpiralOption macro has been added to supplement certain orbital cutting types.

RelationalOffsetUVWOption macro added to supplement **ZRelationalOffsetCompName** macro.

OptiAllowAddCutsCDCCircles macro enhanced to allow circles to be broken up when running cutter comp.

Added Stop at Limit warnings to **AxisMotionLimit** macros.

Added new **MountToolExchange** macro to better support tool change mechanisms.

Support added for multiple End of Block characters.

Tool Manager

Added Reference Path field to CAD Import window.

OK to Mill option has been added to revolved profile Hole Making tools.

OK to Mill option added for Profile and Model cutters.

Indexable mill inserts have been added to CoroPlus interface.

Reports

3D and 2D text (flat to screen) has been added for Dimensions.

Page break controls have been added.

New Machine Metrics Table introduced.

Introduced up and down arrows to Setup Plan window to help organize views.

 "Comments" column option has been added to Inspection reports.

Added Surface Finish option to Annotated Images for Inspection reports.

CAD/CAM Interfaces
EdgeCAM
Support added for EdgeCAM 2022.

GibbsCAM
Tooling outputs are now saved in the GibbsV preferences file.

MasterCAM
Support added for MasterCAM 2022.

NXV
Support added for NX 1980.

Relief diameter and relief length features have been added for some milling cutters.

PROEV

Added option to store settings in ProE project file parameters.

Problems Resolved in V9.2.1

Verification

An issue related to animation speed slider affecting material removal has been corrected.

An issue related to NC Program window continuing to display hidden subprograms has been corrected.

An issue where tool shanks created through TDM interface did not properly display has been corrected.

A regression issue where certain older tool thumbnails failed to display in newer versions has been corrected.

An issue related to turning threads generating false collision reports has been corrected.

An issue related to abnormal material removal affecting helical profiles has been corrected.

An issue of profile views not displaying correctly has been corrected.

A couple rare instances where VERICUT locked unexpectedly have been corrected.

Issues related to incorrect holder collisions generating have been corrected.

An issue where Step Through buttons failed to work correctly on subprograms in NC Program window has been resolved.

An issue where certain edited files could not always save while in use has been corrected.

An issue where AUTO-DIFF Design Component field could not use Design_VCT components has been corrected.

Issues related to unexpected termination caused by using NumSubSequenceOverWrite macro, taking measurements in profile view, using SYNC method Generic on Sin840D, and saving stocks in certain positions have been resolved.

An issue with batch processing causing Reports to generate without filled NC Program fields has been corrected.

An issue related to poor subsystem setups has been corrected.

An issue of invalid tool/stock collisions occurring has been corrected.

An issue of NC Program Review not displaying cut stock correctly has been corrected.

Issues related to unexpected termination caused by using NumSubSequenceOverWrite

macro, taking measurements in profile view, using SYNC method Generic on Sin840D, and saving stocks in certain positions have been resolved.

G-Code Processing

An issue related to **CutterCompFull** macro not working as desired has been corrected.

Tool Manager

An issue where convert units to inch option did not work as expected has been corrected.

An issue where certain imported tools used more memory than was appropriate has been corrected.

An issue related to the Annotate tool not showing proper cutting diameter and radius has been corrected.

An issue where Slice Plane could not be selected for Drill, Reamer, and Center Drill tool types in CAD Import has been corrected.

An issue where coordinate systems failed to display in Tool Manager has been corrected.

An issue where tool assemblies failed to delete correctly has been resolved.

An issue with Tool Manager tool display area not working as desired has been corrected.

X-Caliper

An issue related to X-Caliper displaying radius measurement when diameter is selected has been corrected.

Reports

Reports support a wider array of special characters.

Issue where Create Report > PDF and Generate Report > PDF buttons produced dissimilar outputs has been corrected.

CAD/CAM Interfaces

CATIA

An issue related to unhandled exception errors generating during certain operations has been corrected.

An issue related to indexable tool assemblies not generating correctly has been resolved.

GibbsCAM

An issue related to stock not aligning with certain planes has been corrected.

An issue related to correct gage point failing to generate has been resolved.

An issue where GibbsCAM zoom mouse controls failed to deactivate has been resolved.

An issue with tools not orienting properly in the GibbsCAM interface has been resolved.

MasterCAM

An issue where certain tools disappeared after using the Merge Tools into Setup Template option has been corrected.

NXV

An issue where attach component field for coordinate systems could only be set to "Machine Origin" has been corrected.

Corrected issues of misplaced driven point IDs for 3D tools translated by NXV.

An issue where tool exporting via boring bars in NXV created undesired parameters that could not be edited has been corrected.

An incorrect output for drill tools has been corrected.

An issue where attach component field for coordinate systems could only be set to "Machine Origin" has been corrected.

PowerMILL

An issue related to datum export errors has been corrected.

An issue related to PowerMILL interface licenses not checking in properly has been corrected.

Robots

An issue related to join positions rotating incorrectly has been resolved.

Reviewer

An issue related to certain Reviewer files losing stock has been corrected.

An issue related to Reviewer graphics not working as desired has been corrected.

An issue where a stock workpiece became coupled to a tool spindle and couldn't be removed by normal methods has been corrected.

New Macros in V9.2.1

AxisMotionLimit
MachineMetricChild
MachineMetricParent
MotionSpiralOption
**MountToolExchange**
OptiAllowAddCutsCDCCircles
OptiFPRFormat
RelationalOffsetUVWOption

VERICUT 9.2 Release Highlights

Collision Checking

VERICUT 9.2 brings significant speed increases and improved accuracy to collision checking and overall performance. Users gain substantial speed increases for deep concave collision penetration, turning operations (especially inside diameter work on large parts), and collision checking between highly detailed models such as those having high triangle counts. Simulate material removal at tight cutting resolutions up to 30% faster.
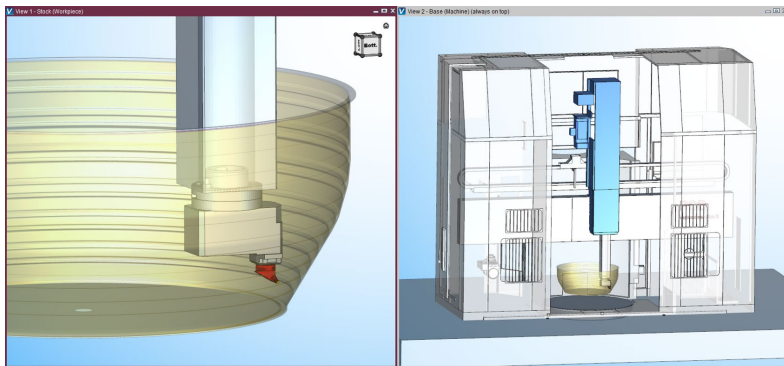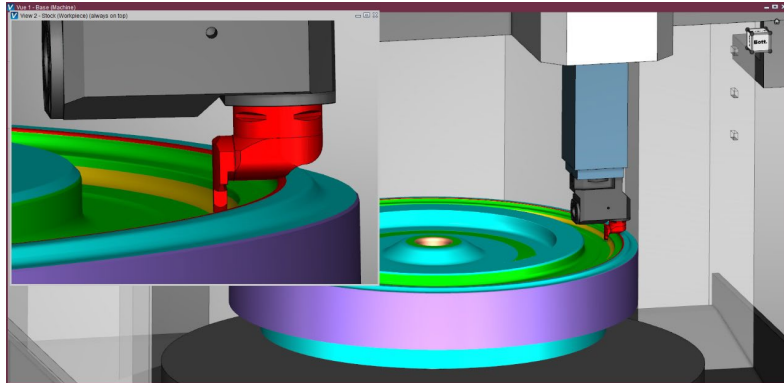
Improved Graphs

The new dockable Graphs window combines Info Graphs and Force Charts into a comprehensive and configurable Graphs window. Select any combination of Cutting Conditions and Force Conditions to view in graphs, apply tool colors, display cutting limits and compare optimized versus original values. "Learn From Results" in Graphs can send Force or OptiPath optimization settings, or change optimization strategies for corresponding
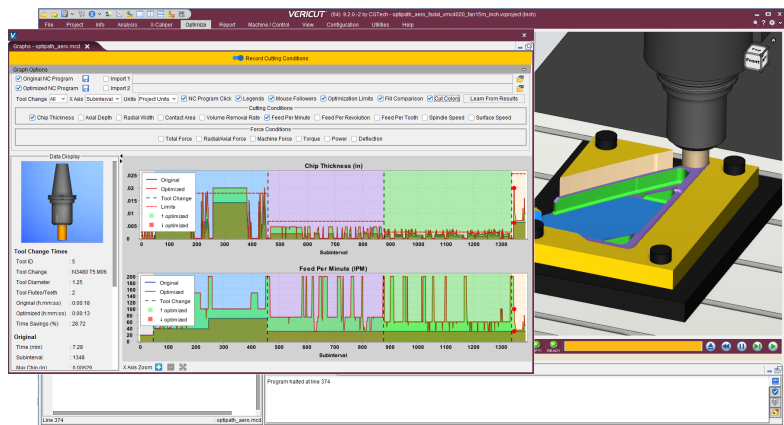
cutters.
More Optimization Options

In 9.2, use Force to optimize NC programs to cut with an ideal chip thickness as much as possible, while simultaneously limiting any combination of excessive cutting forces, spindle power demands, or tool deflection. Force can now also control the Spindle Speed. OptiPath has a new "Learn" mode similar to Force, enabling users to choose how aggressively to learn from current cutting results.
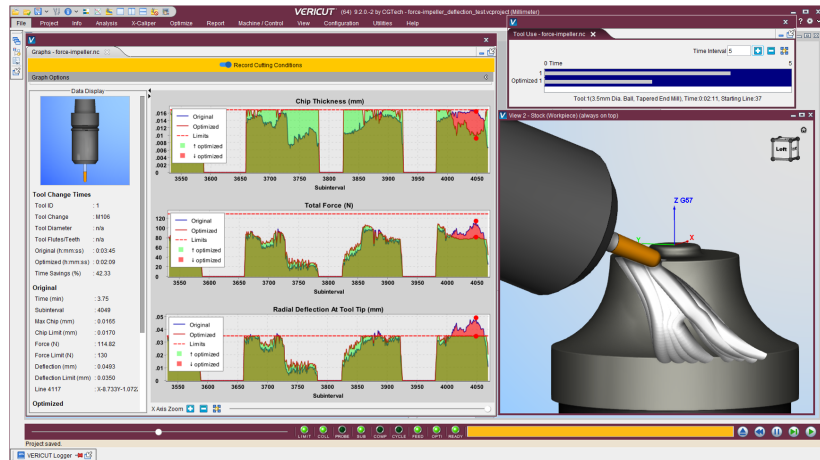

Force Turning Improvements

Extend the life of turning inserts used in hostile "interrupted cut" machining conditions. New 'Adjust Turning Interrupted Cut' settings slow feed rates on motions through gaps or obstructions on turned parts.
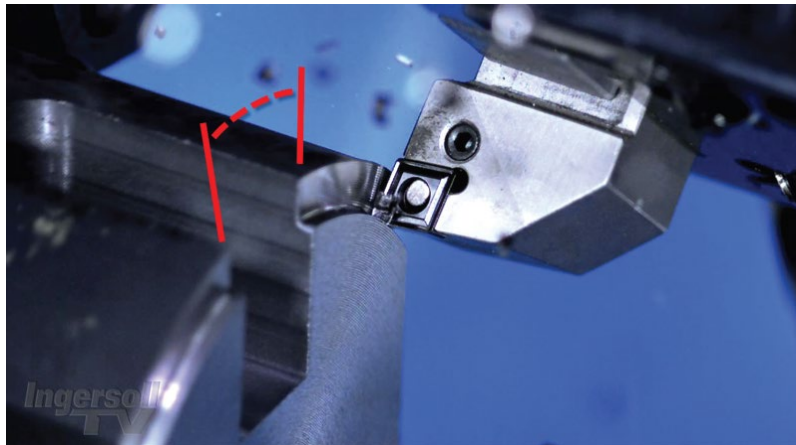
New Assembly Manager

Manage libraries of component assemblies, such as robot end effectors, interchangeable machine heads, bolt-on rotary tables, part/fixture setups, and more- to use in other VERICUT projects, or be accessible to other users. Export/import assemblies via right-click options added to the Project Tree, or options in the Configure Component panel.
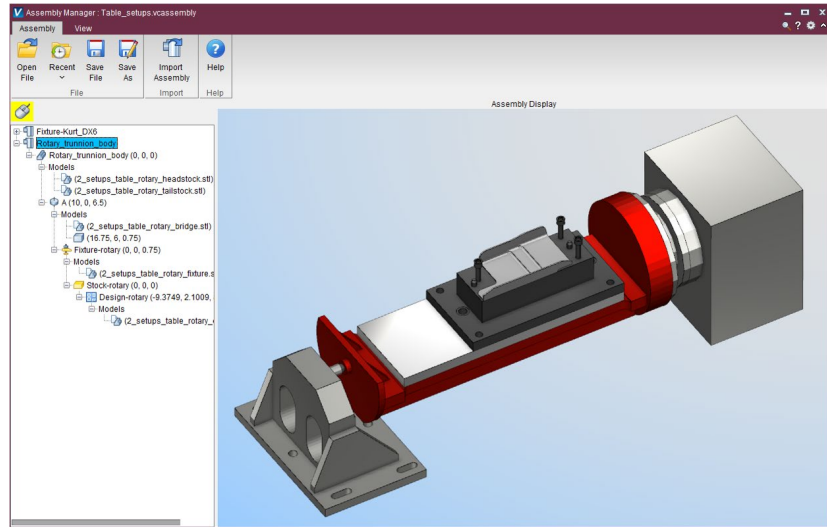
Report Enhancements

Detailed reporting for tools set in Multi Tool Stations can be added to the Tool Summary table. Tables are enhanced with control over text fonts and colors, table header and cell fill colors. Inspection report measurement and tolerance value(s) can be modified to suit specific part features, and an "Instrument" choice with corresponding column in Inspection table can be used to provide guidance about how to check dimensions.

Tool Manager

New Conical End Mill ("Chamfer" mill), Spherical End Mill ("Lollipop" cutter), and new Thread Mill tool type with (3) different cutter styles have been introduced. Hole Making cutters defined via Profiles or CAD models can now specify the type of cutter it represents (Drill, Reamer, Tap, etc.) enabling VERICUT to check for machining errors according to that tools' capabilities and limitations.
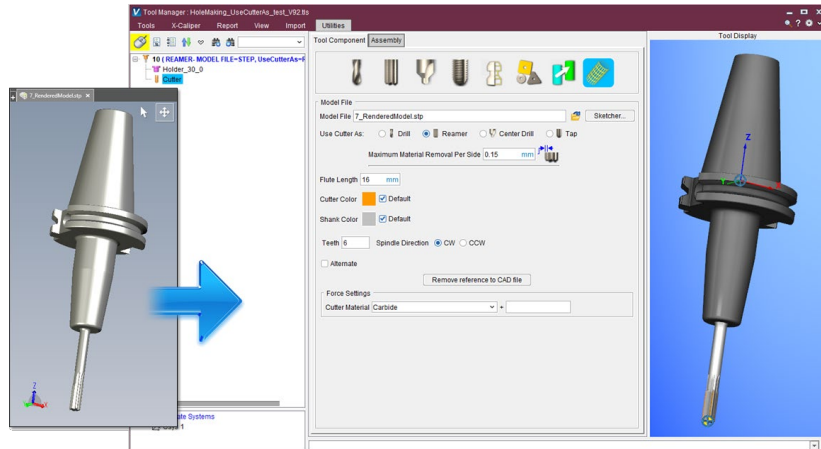
Enhanced Tool Reporting

Create reports with detailed cutting tool information quickly using Annotate Tools. Automatic dimensioning for cutting tools, including parametric cutter values, flute length, overall cutter height, stick-out and tool gage distances. New Section capability in Tool Manager sections tool holders or entire tool assemblies to show cutters and adapters fit properly inside the holder.

17
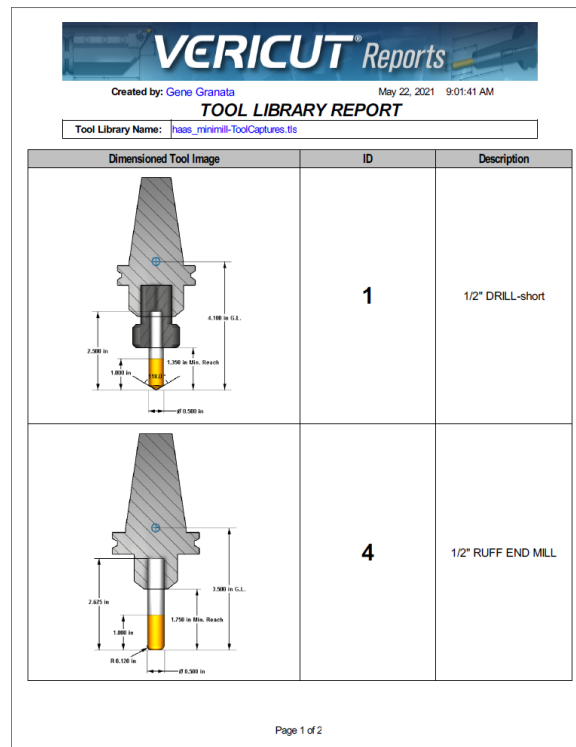
New 3DLive™ Interface

Simplify the VERICUT machine building process and create more realistic setups in just seconds by importing 3DLive data. Import GDML format files containing 3D geometry, including colors for CNC machines, fixture components and cutting tool holders- along with kinematic information, travel limits, min/max feed rates for axes and initial machine position.
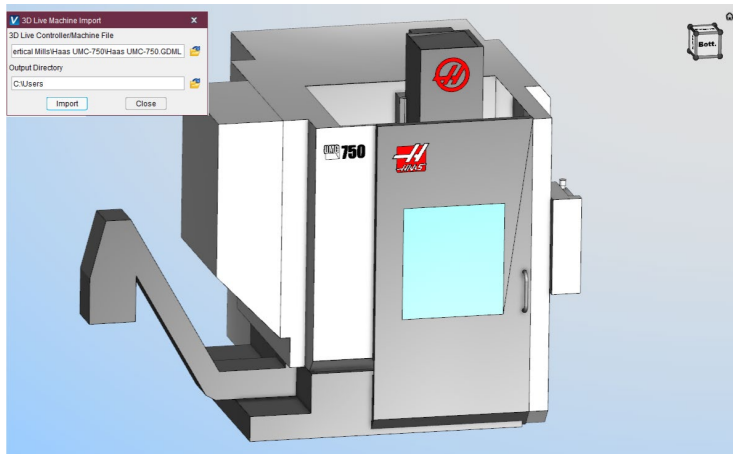
Enhancements and Changes in V9.2

Verification

Inspection Features populates Tool ID values with data from Tool Manager.

Tool Use window has been separated from Graphs window and is now dockable.

Delete Detached Stock updated with streamlined actions as well as introduced optional checks for tab thickness.

Multi Tool Station: check spin direction for "dead" (non-spinning) tools option added.

NC Program window: view previous lines processed, plus new customizable Toolbar. Left/Right arrow icons step backward/forward (up to line where processing stopped). Far-left icon returns to last NC program line processed.

New View Attributes: Spun Tool Display and Spun Part Display. This feature can be accessed from View tab > Attributes or by using various other features on the View tab such as Saved Layouts.

Machine and Control notes textboxes got scroll bars to allow increase their size with the size of the window.

Syntax Check has been enhanced to greatly decrease the total time, especially for Siemens projects.

Implemented string substitution based on the values in the Substitute tab of the Control Advanced Options window.

Stock/Tool spinning and stationary displays are now controlled by toggles. When toggled off, entire branch under spindle is static. This affects all spindles of that type on machine.

Inspection Features populates Tool ID values with data from Tool Manager.

Optimization

Animation slider position no longer affects optimization results (automatically temporarily set to 100% during optimization).

Force: maximum Tool Deflection as a limit, use any combination of Force limits.

View Force Material Catalog Data now contains icons for ISO material group categorization. An additional feature is the "Filter" field which will find materials by the text input. The user can filter by the ISO Group and then further find (Carbide or Serrated; or specific material name; or hardness etc…). Users also have the ability to type in any material code and potentially find the equivalent in our FMC.

"Adjust Turning Interrupted Cut" introduced to Force optimization for turning cutters. Options and behavior similar to Adjust Entry/Exit Cuts, and applies when turning operations encounter a void during cutting.

Force can now specify the Spindle Speed (Optimization tab: Advanced Settings...) and Learn mode has been enhanced to learn the spindle speed from the NC program.

Standardized Air Cuts options across all projects.

Axial and Radial cut added to csv Force Graphs.

Tool Manager

Convert units to inch option added in MachiningCloud/NOVO tool import widows.

Hole Making "Profile" or "Model File" cutters: added options to use as Drill, Reamer, Center Drill, or Tap.

Import CAD Tool window: new "Hole Making" tool options (Drill, Center Drill, and Reamer), and added support for Shanks.

Annotate Tool and automatic dimensioning has been added for cutting tools.

Convert units to inch option added in MachiningCloud/NOVO tool import widows.

Hole Making "Profile" or "Model File" cutters: added options to use as Drill, Reamer, Center Drill, or Tap.

G-Code Processing

Machine and control notes textboxes now increase their size with the size of the window.

Support added for SYSREAD ID50 NR1 and SYSREAD ID50 NR2.

Library subroutines hei530.h, hei640.h, hei530.xsub and hei640.xsub were modified for greater compatibility with Variables panel.

Probing cycles 401, 402, 404, and 405 added to library control hei530 and hei640.

Added CYCLE997 Probe spheres to sin840d.xsub.

Accel/Decel logic has been enhanced to better match real machine cycle times.

Enhanced **ToolChange** orient and **ToolChangeSpindleOrient** to support to support either local or machine coordinates for the spindle orientation.

Added support for Heidenhain Q/QR/QL variables on TCH PROBE statement.

Added message in VERICUT 9.2 when end sequence number (Q) is not found in current subroutine.

Introduced **RtcpUses** macro to select between offset types like in Control Settings.

IfCheckZero macro introduced to assist **IfCheck** macro.

AddCommentToVar macro enhanced to create numeric variables.

Fanuc G65/G66/G66.1 logic has been completely rewritten to support a wider array of subprogram options.

Reports

Inspection: added "Instrument" choice column in Inspection table. Inspection also allows "Measurement" and tolerance value to be edited.

Added option to include Program Name in Reports.

Identifier numbers list numerically in Reports.

Improvements for Table fonts, header/cell colors, Tool Summary reporting for Multi Tool Stations/Sub tools.

Dimensioned Tool Images added to reports.

Ability to copy/paste entire tables has been added.

CAD/CAM, Tooling, and Model Interfaces

3DLiveTM Interface reads 3DLive models of machines, components/fixtures, & tool holders. Import the 3DLive machine files through Machine/Control tab > 3DLive Machine Import as well as several other areas throughout the software.

MachiningCloud/NOVO import: added "Inch" units option and add Hole Making tool options.

Robots

VERICUT Robots support has been overhauled with enhanced machining logic to speed up manufacturing times, reformatted documentation for ease of use and navigation, and has received a wide array of macro updates to enhance its utility.

VDAF

In Fastener Programming, locations in tables can now be refreshed. Different parameters for the same cycle name can be entered for different locations.

Reviewer

An issue where .vcreview files imported incorrect models has been resolved.

Implemented Driven point and tool tip axes in Reviewer. Axes need to be on during simulation to be captured for Reviewer.

Added driven point saving in 9.2 review file. Driven point axes need to be displayed during simulation in order to capture their values and replay them in Reviewer.

Problems Resolved in V9.2

Verification

Syntax Check has been enhanced to greatly decrease the total time, especially for Siemens projects.

Multiple instances of VERICUT slowdown or delay have been corrected.

An issue of displays appearing incorrect in Profile View has been corrected.

An issue where "Clear All" did not function as intended in the Tool Change List has been corrected.

An issue of Refine Display not working as intended has been corrected.

An issue with active offsets not deleting properly has been corrected.

Issues of unexpected termination have been resolved.

An issue of multi tool not removing material correctly has been resolved.

An issue of feedrates not being read correctly by the control file has been corrected.

An issue of sectioned edges appearing even when Section was not active has been resolved.

An issue related to profile views generating incorrect displays has been corrected.

An issue related to STL model insert cutters causing false turning plane errors in multi station turret tool setup has been corrected.

An issue of STL cutters not removing material has been corrected.

An issue with deleted branching models affecting simulation has been corrected.

An issue related to inactive holder tools affecting shank errors has been corrected.

An issue of tools passing through material without removing it has been corrected.

Optimization

An issue related to animation slider affecting OptiPath optimization rates has been resolved.

An issue where Force Optimization settings lights displayed incorrectly has been resolved.

Tool Manager

An issue where invalid Adjust Entry/Exit data values affected optimized output has been corrected.

An issue where certain .tls files were not initializing correctly has been corrected.

Tool Manager no longer allows the same name and number to be reused for different tools.

G-Code Processing

Fanuc G65 and G66 logic has been rewritten to standardize value outputs.

An issue related to deleted sub programs causing run time issues has been corrected.

ToolChange orient and **ToolChangeSpindleOrient** support both local and machine coordinates for the spindle orientation

An issue of bracketed equations not performing the expected order of operations has been resolved.

An issue of incorrect errors generating depending on subroutine order has been corrected.

Reports

Issues related to Report headers not generating correctly have been corrected.

An issue related to **StockEnvelop** macro generating incorrect report outputs has been resolved.

Added "Event ID" in Tool Summary Table Column options.

PDF Reports have been tweaked to have Headers behave similarly to previous versions of VERICUT.

Reviewer

An issue where certain features disappeared in the Reviewer app when entering Reviewer Mode has been corrected.

An issue where certain machine models rotated incorrectly once opened in Reviewer has been corrected.

An issue where transferring files to Reviewer did not work as intended has been resolved.

An issue related to certain tools disappearing from Reviewer after saving the file has been corrected.

New Macros in V9.2

ChannelTagPosition
CoolantOnType
CutterCompBottleneckDetect
CycleTurnGrooveXRetract
CycleTurnGrooveYRetract
HeidSysWrite502ApplyRotationPlane
IfCheckZero
Ijk2AnglesApplyWORotation
OptiXWordExpression
OptiYWordExpression
OptiZWordExpression
RelationalTablesRefresh
RestoreDWO
RestoreRpcp
RestoreRtcp
RoedersForLoop
RtcpUses
Siemens840DSyncInitChannel
Siemens840DSyncInitSub
Siemens840DSyncStartSubChannel
Siemens840DSyncWaitEndChannel
SiemensCONTPRON_YZOption
SiemensSetFrame2
TapeMTorresGetTowData
ToolNoseCenterCalcs
WTapeMTKnife1Angle
WTapeMTKnife2Angle