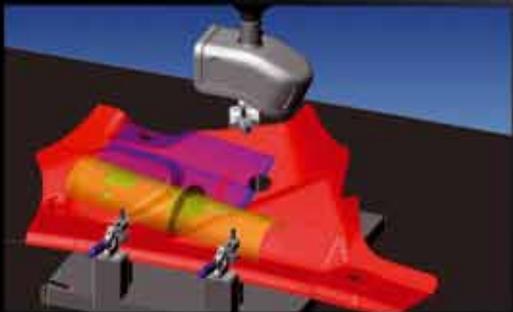
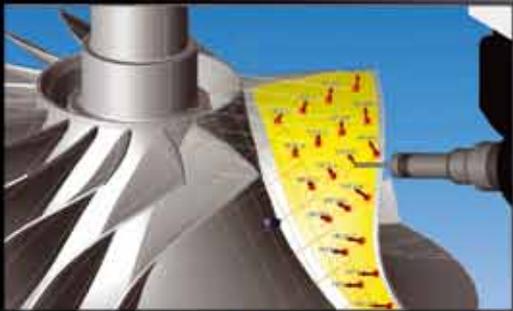




CAMIO7

Multi-sensor CMM software



Productivity-focused metrology software
for tactile and 3D laser CMM inspection

CAMIO7 Multi-sensor CMM software

CAMIO7 offers an integrated approach to the quality control process of CMM inspection. Design and manufacturing teams rely on CAMIO7 software to provide them with the information necessary for maintaining control over production processes and for making informed decisions.

CAMIO7 is true multi-sensor CMM metrology software supporting traditional touch-trigger probes, continuous contact (or analogue) scanning probes as well as the full range of Nikon Metrology laser probes.

Regardless of whether inspecting stamped, moulded or machined parts, **CAMIO7** drives accurate and efficient inspection programs for geometric features or full surface analysis with part to CAD comparisons.

CAMIO7 Button
Create new or open and save existing measurement programs.

Toolbar Structure
Choose from standard Windows 7 ribbon style or user-defined custom toolbar.

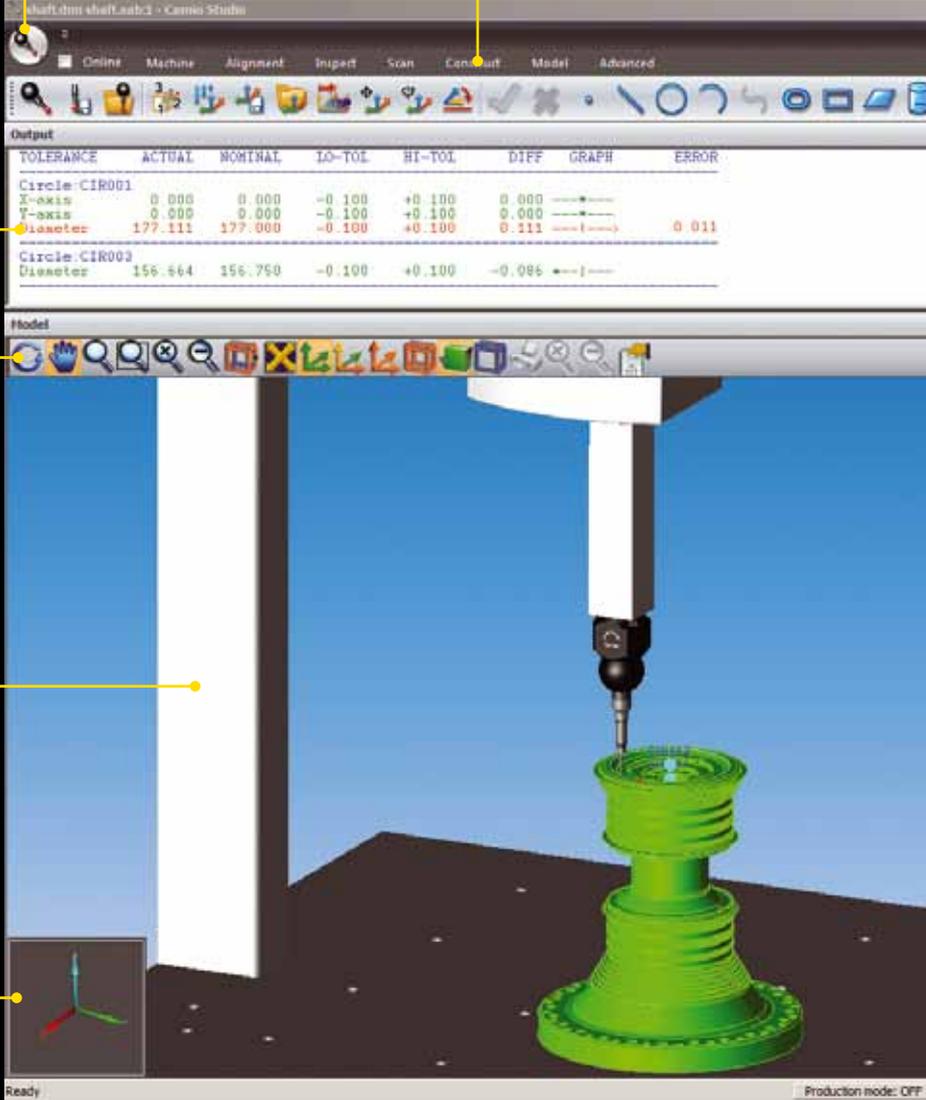
Output View
Display the colour-coded measurement results.

TOLERANCE	ACTUAL	NOMINAL	LO-TOL	HI-TOL	DIFF	GRAPH	ERROR
Circle: CIR001							
Z-axis	0.000	0.000	-0.100	+0.100	0.000		
Y-axis	0.000	0.000	-0.100	+0.100	0.000		
Diameter	177.111	177.000	-0.100	+0.100	0.111		0.011
Circle: CIR003							
Diameter	156.664	156.750	-0.100	+0.100	-0.086		

Graphics Toolbar
Full scene manipulation with orbit, pan, zoom.

Graphics Window
Display the current measurement with full machine simulation.

View Axis System
Display the current X Y Z axis system of the graphics view.



Ready Production mode: OFF

Industry standard compliance:



Program and System Settings

Configure software and programming preferences.

Help Facility

Context sensitive help and Nikon Learning Centre.

Program Run Toolbar

Including a program stop icon for CNC operation.

Measurement Database

Displays all the features, PCS and tolerances.

Digital Readout

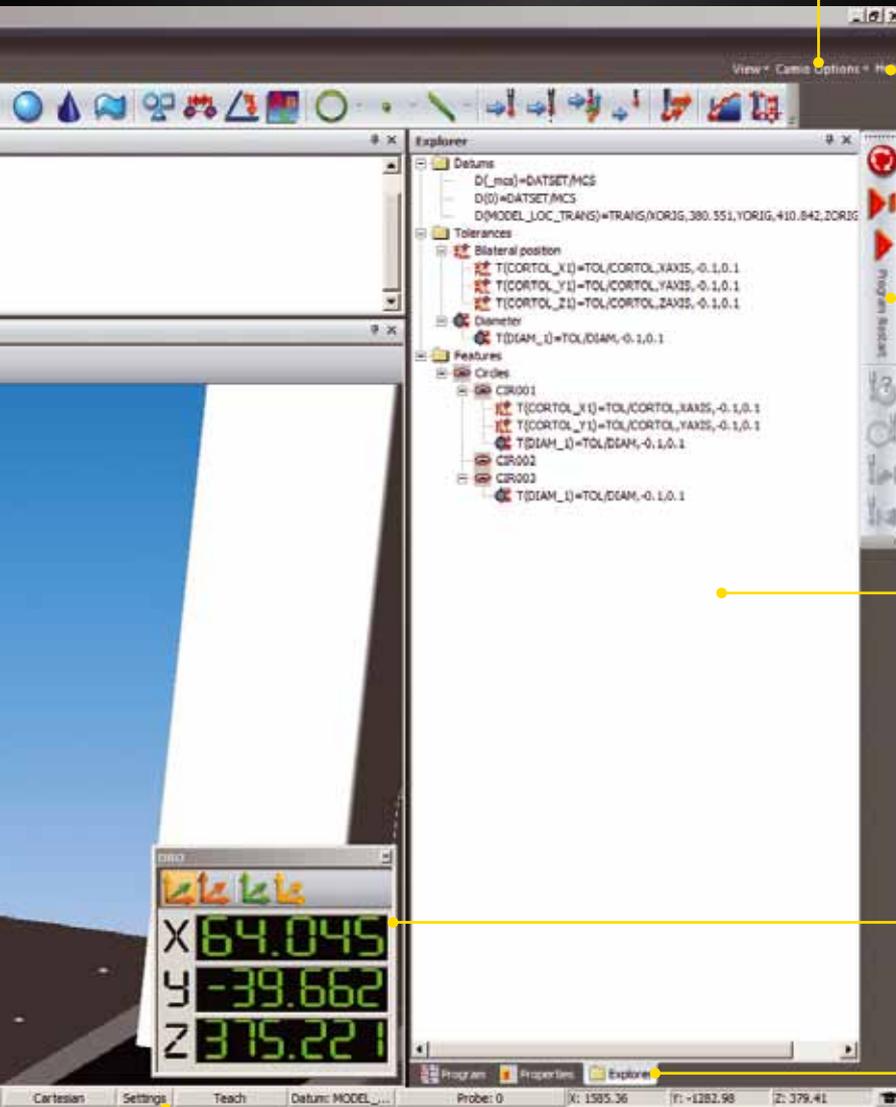
Displays the current machine position.

Custom Interface

User defined views can be 'tabbed' for instant display as required.

Toolbar Structure

Choose from standard Windows 7 ribbon style or user-defined custom toolbar



CAMIO7 offers a brand new user interface

- The new **CAMIO7** interface reflects the latest standard in Microsoft® Windows® featuring the ribbon style toolbar. All software functions are now centrally located eliminating the need to search through long menu structures.
- Software functions are collected into logical groups. Each group contains all the required operations to help prevent the need to constantly navigate between groups on the ribbon (for example, GD&T tolerances are located on the Inspect group so that feature output is immediately available).
- Each icon has a fully defined tooltip, some with graphics, to help the user understand its function. Tooltips are displayed simply by hovering the mouse cursor over the icon.
- The **CAMIO7** button provides access to all aspects of program management including a list of recently used CMM programs. The more frequently used programs (such as a probe calibration program) can be pinned to the menu for instant access.

Quick Access Toolbar

Fully customisable to display the user's choice of functions.

Ribbon Toolbar

A central location for all software functions logically grouped into tabbed sections.



Tooltips

All icons feature tooltip help.

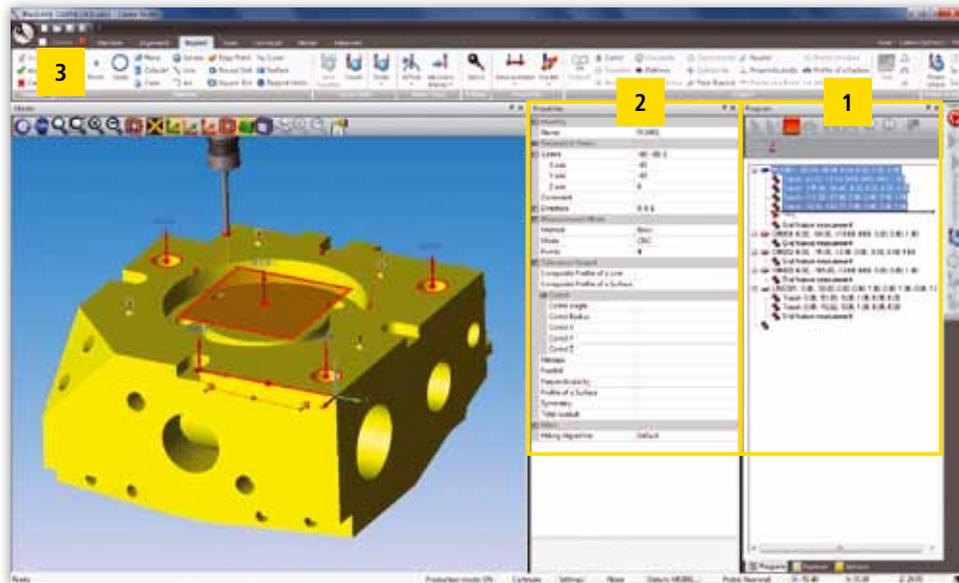
CAMIO7 Button

Single point location for all program file management.



and a simplified programming work-flow

With fewer mouse clicks required and instant access to all programming functions from the single ribbon toolbar, DMIS programming experience is both faster and easier than previous versions of the software.



Three steps to fast and simple programming...

1 Step one



- Select any combination of features to measure.
- Selection can be made by 'teach and learn' from the handbox, picking from a CAD model or manually typing co-ordinates from the component drawing.
- If necessary, pick or teach any specific touch points, otherwise **CAMIO7** automatically programs the touch points for each feature.
- As features are selected, they are automatically added to the Program view.



2 Step two



- Highlight any feature to display its properties, where modifications or additions can be made.
- By highlighting any group of multiple features, their common properties are automatically filtered down to allow global modifications to all features in this group in a single operation.
- For example, modification to the nominal co-ordinates, measurement mode, fitting algorithms or the addition of GD&T tolerances, etc.

3 Step three

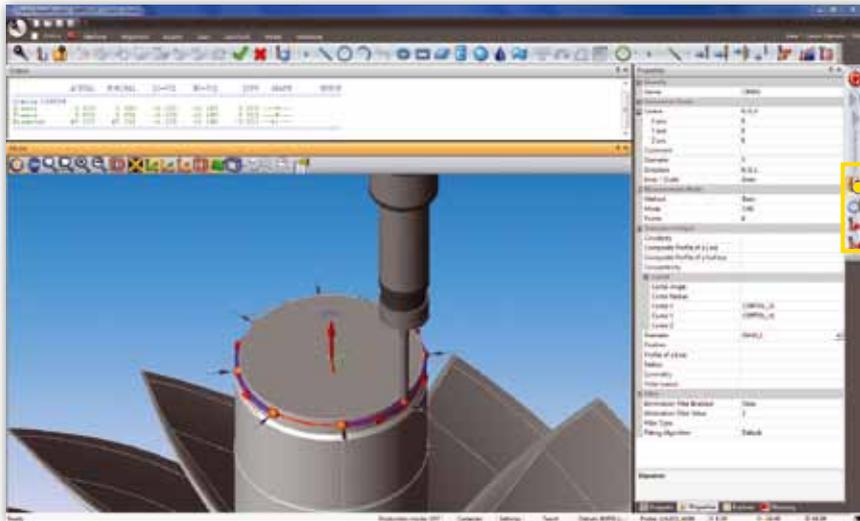


- Click Apply!

CAMIO7 Programming Productivity

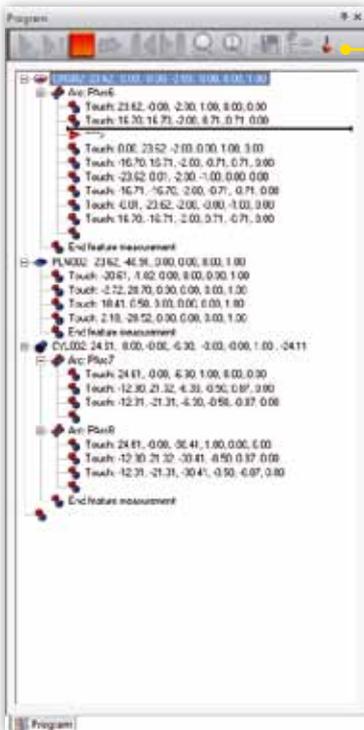
- Generating CMM inspection programs feature by feature can take a long time. **CAMIO7** supports a new technique to allow users to program multiple features of different types within a single operation. This both simplifies and speeds up the programming task.

- Full graphical interaction with the software allows the program to be fully simulated prior to operation. The 'Probe Check' function steps the probe model around the programmed path (forwards and backwards) and edit clearance moves and probe selection as required, optimising the program.



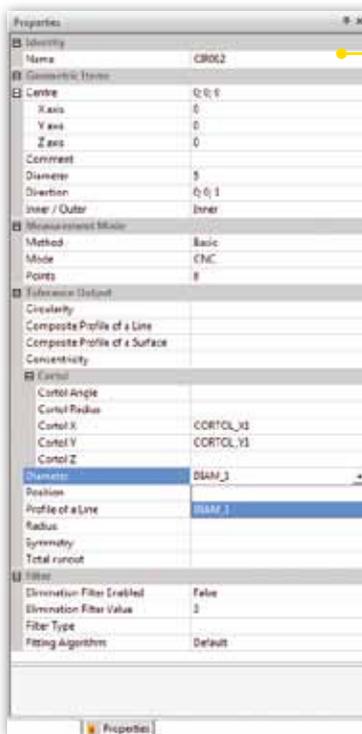
Probe Check

Step around the measurement path (forwards and backwards) and edit clearance moves and probe selection as required, optimising the program.



Teach Path

- Using a standard Windows tree view, the selected features and their measurement points are displayed in the Program tab.
- Full edit or delete can be performed prior to operation.
- Note how multiple feature types are contained in this view.

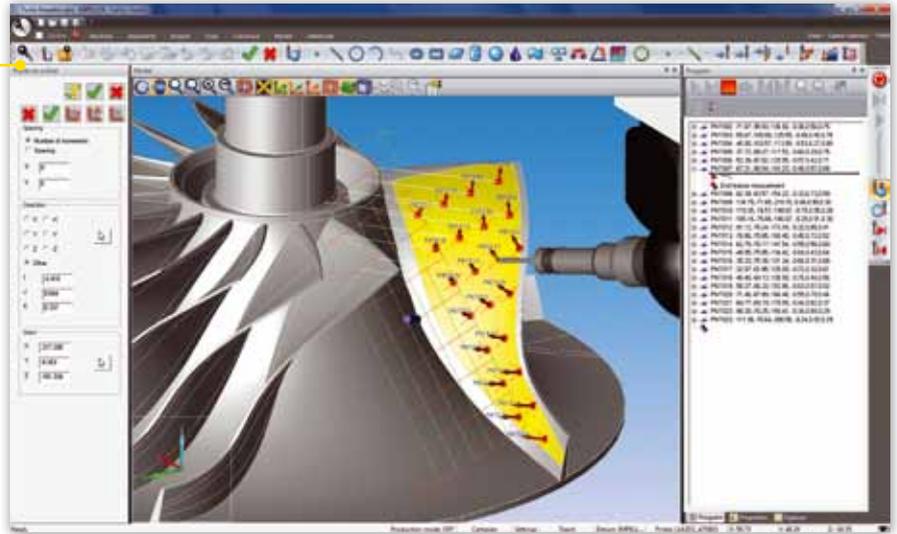


Feature Properties

- All of the properties for a single feature or all the common properties for multiple features (single or multiple types) can be edited from a single property listing.
- This allows a fast and simple configuration of the chosen inspection path including the feature definition, measurement strategy, GD&T tolerance selection and filtering.

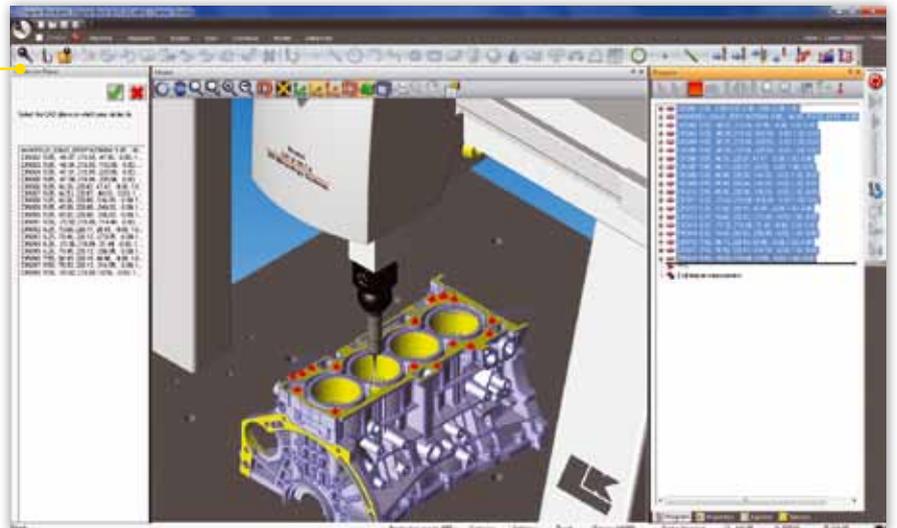
Points on a Grid

Surface areas that require a multiple number of touch points can be programmed in a single operation. Simply cover the area with a configurable grid and the software will automatically project a measurement point onto the surface.



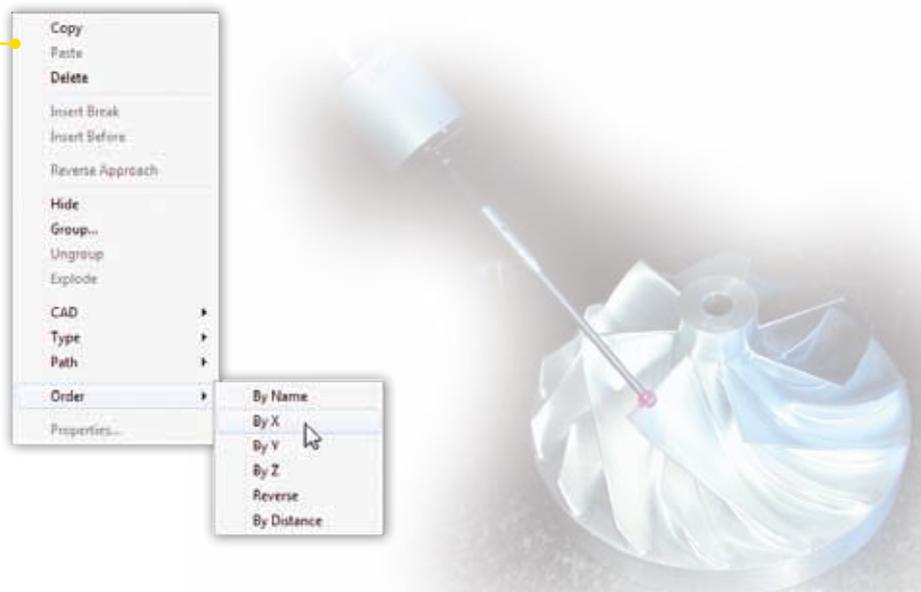
Circles on a Plane

When multiple circles reside on a single plane, a single click on the plane will select all the circles for measurement. Individual circles can be deleted or additional circles added to complete the inspection.



Program Optimisation

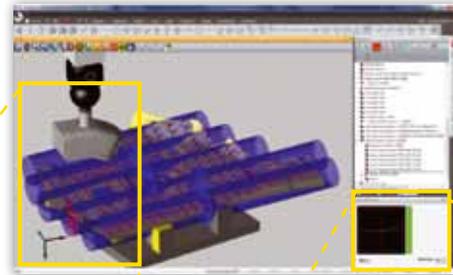
Context menu options allow for any teach path to be configured and edited to optimise the measurement. Here, we have chosen to measure the features in the direction of the X axis.



Laser Scanning Support

CAMIO7 includes full support for the programming and reporting of geometric features measured with a laser probe. This provides true multi-sensor capability to change between contact and non-contact probing within the same measurement program in order to measure surface and geometric features

Full graphical representation of the planned scanning path is displayed along with a 2D preview of the image received by the scanner.

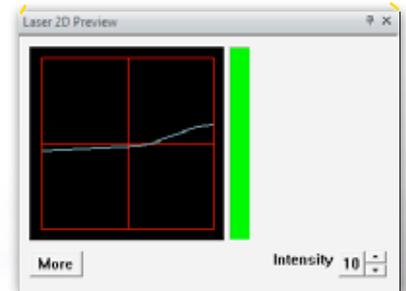
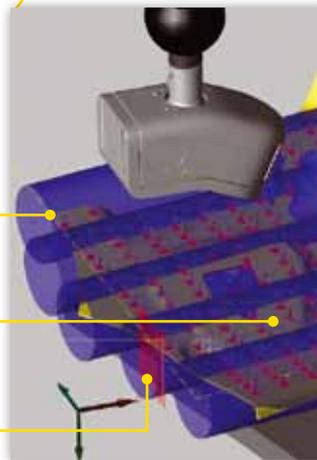


After defining an area to scan with three points, **CAMIO7** automatically calculates the number of passes over the surface based on the field of view (FOV) of the selected laser scanner.

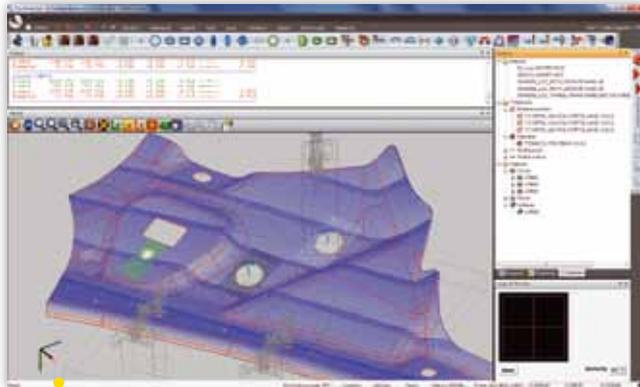
Each individual pass can be adjusted for length simply by dragging the end of the tube to the required location.

Defined points can be automatically given a tolerance to provide a colour contour CAD to surface analysis of the component.

Laser scanner field of view (FOV).



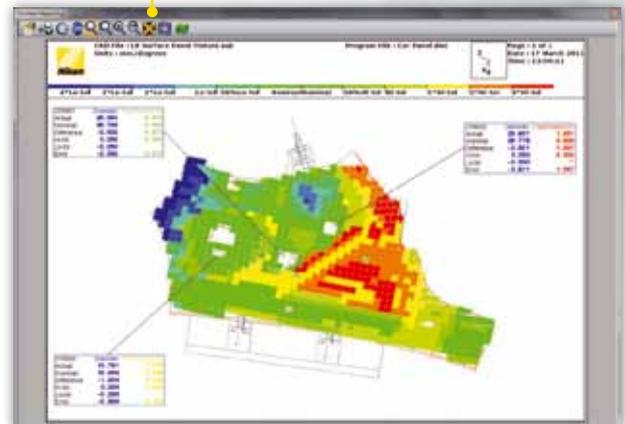
2D preview of the laser scanner image



Point clouds are displayed directly on the screen and can be saved as ASCII text or STL mesh files.

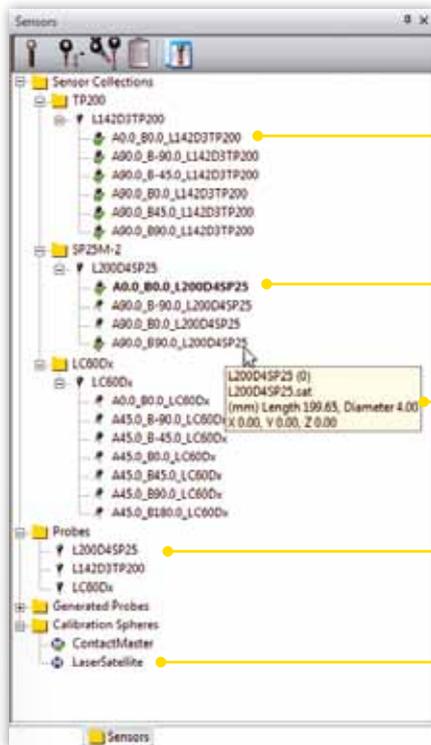
Geometric features can be programmed in the same way to the touch probe or automatically extracted from a surface point cloud scan.

Print full GD&T features and CAD compare graphical reports direct from **CAMIO7** software.



Probe Management

- Probe management is simplified in CAMIO7 to use a Windows style tree structure.
- The tree stores individual probe assemblies, collections of probe head angles (for each assembly) and calibration spheres.
- Probe assemblies are built using a wizard by selecting components from a list of Renishaw® touch and Metris laser components.
- Once an assembly is created, single or multiple probe head angles can be defined ready for calibration and selection.
- The calibration wizard automatically creates a calibration routine for all the selected probe head angles using the chosen calibration sphere.



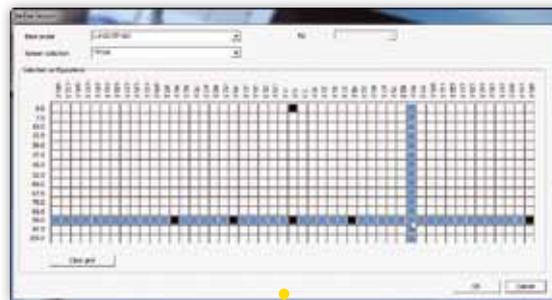
Probe angles are marked with a 'tick' when they are calibrated.

The active probe is shown in **bold** text.

Tooltips show the configuration and status of each available probe angle when the mouse is hovered over the tree item.

Individual probe assemblies are added then dragged into a collection to define the probe head angles.

Multiple calibration spheres can be created and selected for use. This is usually for laser probes and twin column machine configurations.



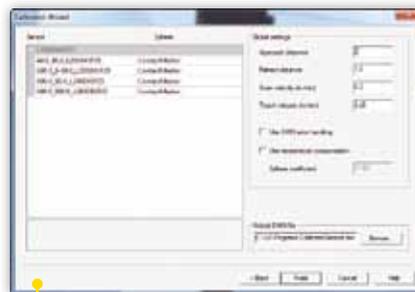
Define Probe Head Angles

Multiple probe head angles from the assembled probe can be selected from a single view and added to the tree.



Probe Wizard

New probe assemblies can be created from items in the Renishaw parts list.



Calibration wizard

Single or multiple sensors can be selected from the tree to calibrate using the chosen calibration sphere. A single operation calibrates the chosen angles.

CAD Interface Specifications

Read and write CAD data in **CAMIO7** through international exchange languages (IGES, STEP, VDA-FS) or directly from the native CAD format with the use of optional CAD interface licenses. The full list of supported formats and versions is shown in the table:

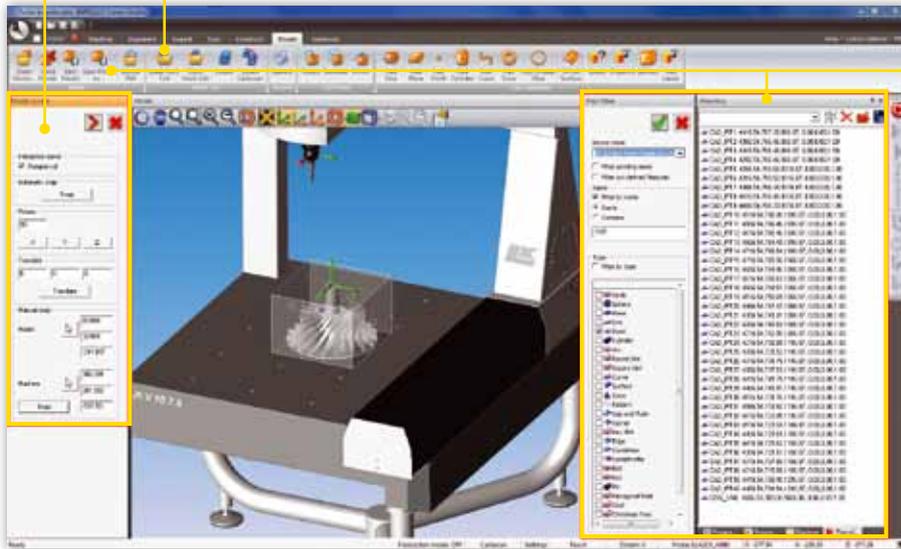
Format	File Extension	Supported Version
IGES	.igs / .iges	up to V5.3 (read and write)
VDA-FS *	.vda	up to V2.0 (read and write)
STEP *	.stp / .step	AP203 & AP214 (read and write, geometry only)
ACIS (SAT)	.sat / .sab	up to R21 (read and write)
CATIA V4 *	.exp / .model / .session	4.1.9 to 4.2.4 (read and write)
CATIA V5 *	.CATPart / .CATProduct	R2 to R20 (read), R6 to R20 (write)
Unigraphics *	.prt	11 to 18, NX1 to NX7.5 (read only)
Pro/ENGINEER *	.asm / .prt	16 to Wildfire5 (read only)
Parasolids *	.xmt_text / .xmt	10 to 21 (read), 12 to 21 (write)
SolidWorks *	.sldasm / .sldprt	98 to 2011 (read only)

* option

correct for version 7.0

Model Locate

- Once a model is read into **CAMIO7**, it is important to be able to locate the model within the virtual machine volume. This is done directly using the mouse to drag the model or by selecting a location point on the model to match to the machine simulation.
- By positioning the model relative to the hole pattern on the granite table, it is then possible to position the component in the same place once the real inspection begins.



CAMIO7 Planning

- To utilise the full potential of the **CAMIO7**, Product Manufacturing Information (PMI) data can be uploaded direct from the CAD model database. This provides instant access to the component datum and feature and tolerance information stored within the model.
- Using a combination of 'drag-and-drop' to select features for measurement from the PMI data and full program simulation, component programs can be created and tested offline within the **CAMIO7** environment.

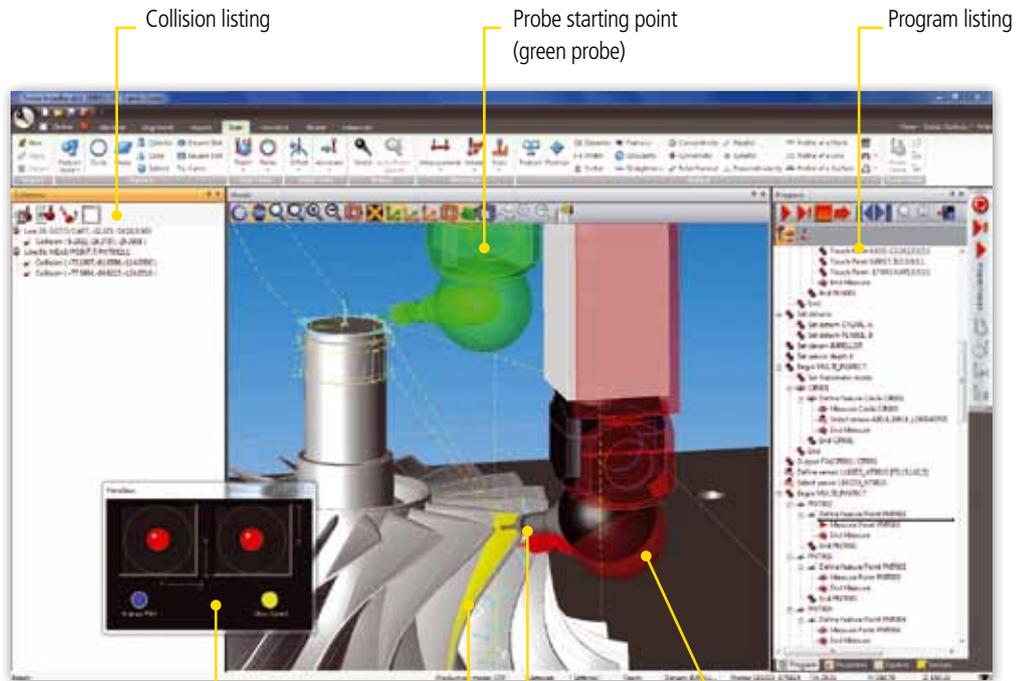


Model Ribbon

- The Model ribbon contains the tools to open and control the CAD model. Modifications to the native file cannot be made, but translation, rotation and mirroring of the model is permitted and extra CAD entities can be added to the original model data.
- Full layer control is available with layers taken from the native file. New layers can be created with the option to move entities as required to aid the visualisation of the model.

Collision Avoidance

- As the program is executed, collisions can be detected and highlighted.
- Each collision is stored and can be recalled for amending by the addition of probe clearance moves or modifications to the probe head angle.
- Collision avoidance settings allow for a safe working distance to be applied to the machine and the model before a potential collision is reported.

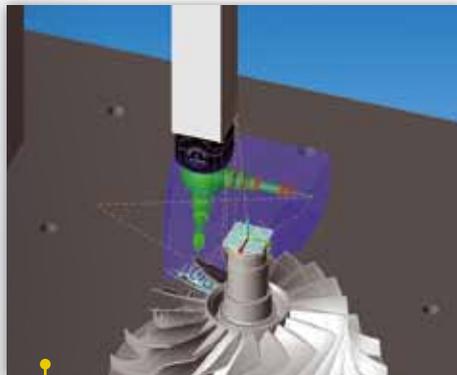


Handbox driven clearance moves can be added to correct the collision condition

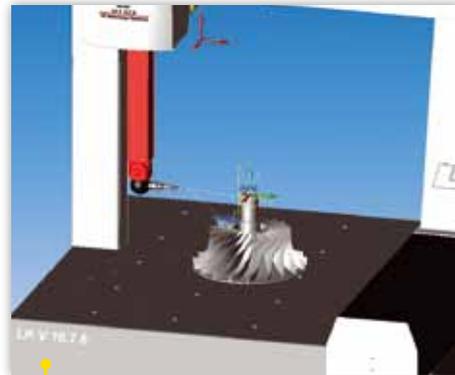
Collision surface (yellow highlight)

Collision point (normal probe colours)

Programmed end point (red probe)



Probe head movement



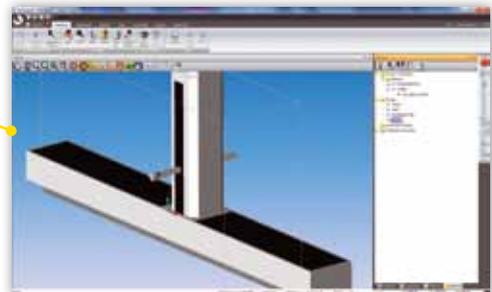
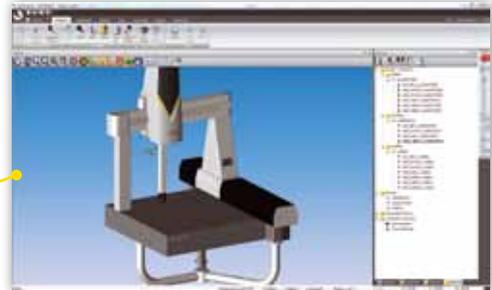
Machine volume violation (Y axis)

Collision detection	
<input type="checkbox"/> Enable	<input type="checkbox"/> Stop program
Collision clearance (mm)	<input type="text" value="1"/>
Rotary collision increment (deg)	<input type="text" value="1"/>
Axis violation	
<input type="checkbox"/> Enable	<input type="checkbox"/> Stop program

Collision settings

Machine Compatibility

- Many companies have multiple CMMs to program, often with different brands of machine. Having the ability to make programs for each specific machine is essential.
- Using Machine Launch, **CAMIO7** is opened with the chosen machine model and the software is set with the correct configuration for the machine (i.e. working volume, probe head etc.).



Machine Simulation

- Full machine simulation is available for on-line or off-line simulation and program testing.
- This can also include all CMM accessories such as tip and probe changing racks.



Data Storage

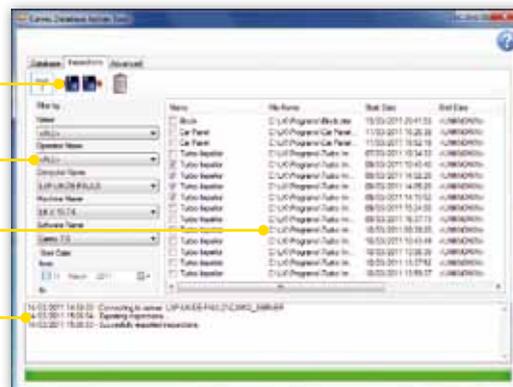
- **CAMIO7** uses Microsoft SQL Server 2008 to store both inspection results and machine specific data (i.e. probe calibration data).
- Inspection data is stored at program level by date and time and the database can be filtered to show a user defined list of entries. ie to display machine or operator specific programs.
- Database management is achieved through the Database Administration Tool with options to import and export data to files for back-up purposes.
- Data storage is no longer CAMIO version specific. This means that when the software is upgraded, the existing database is re-used and access to archived machine and previous inspection data is instantly available.
- For customers who have access to an existing Enterprise version of Microsoft SQL Server, **CAMIO7** can be connected directly to this to take advantage of unlimited storage space.

Import and export to a file

Data filtering options

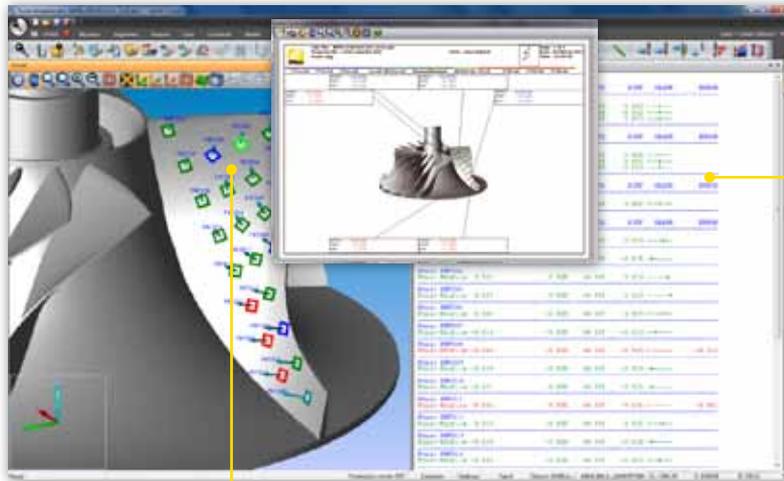
Database entries for inspection programs

Status



CAMIO7 Reporting

Many different flexible reporting options makes **CAMIO7** the perfect software for CMM inspection.



Output Text

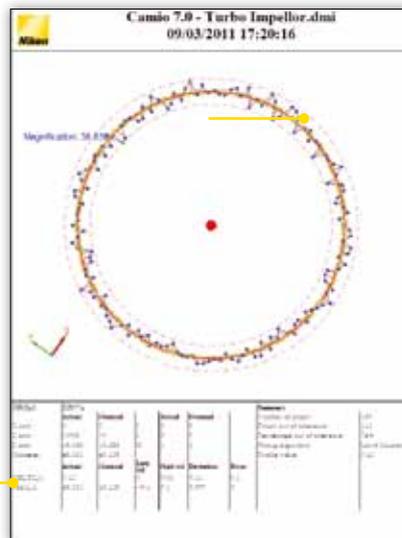
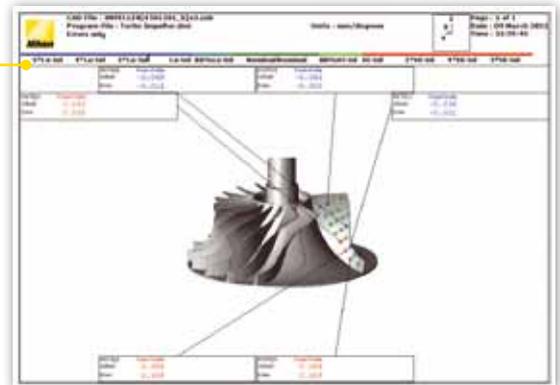
Standard output text is always available to view.

On-model deviation markers give instant profile feedback for the feature.

Constant Reporting

- Constant Reporting produces instant graphical reports. Configuration is user defined but the layout is automatically set.
- The report is created from a single mouse click.

Reports can be sent directly to the printer, saved as .pdf files or saved as report templates for future use.



Feature form can be displayed as individual reports with graphic and text information.



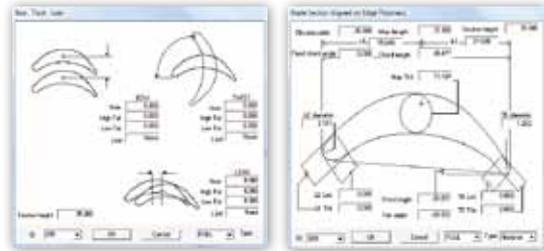
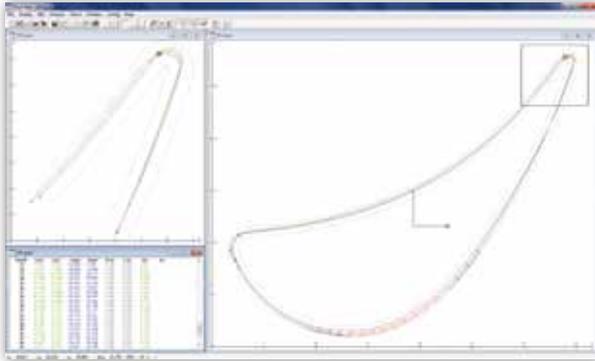
Results are available for output in black and white ASCII text (.res), coloured text (.rtf), Excel® compatible (.csv), web browser ready (.xml), Q-DAS® compatible (.dta) and AIMS® compatible (.tdf) formats.

Optional CAMIO7 Modules

DIGIGRAPH7 Profile Reporting

DIGIGRAPH7 profile reporting manipulates and analyses 2D scanned data. Direct comparison of actual to nominal profiles and automatic best-fit functions can be used to generate text and graphical reports.

Macro based operations can be executed direct from a CAMIO7 measurement program for fully automatic analysis and reporting.



Optional DIGIGRAPH7 Blade Analysis

Use Blade Analysis to output specific airfoil dimensions from scanned sections of a component.

Outputs include LE/TE radius, position and width, chordal length and angle, lean/bow/twist.

LAUNCHPAD7 Graphical Operator Display

LAUNCHPAD7 enhances the operation of the CMM to allow unskilled workers to execute measurement programs via a user-defined menu structure. Using any combination of graphics files (.bmp/.jpg/.tiff), pre-recorded voice and video operator instructions, a procedure guide will lead the operator through the stages to position the component and start the program. Reporting can be automatically executed at the end of the measurement program.



CAMIO7 Involute Form Gear Analysis

Using a 4 stage programming interface, probe calibration, gear alignment and gear tooth lead and profile measurement programs can be automatically created. Gear nominal data are entered into the software.

Analysis and reporting is made automatically through Zeiss® Gear Pro® software.

Gear support is for external and internal spur gears, straight and slanted tooth with involute form.

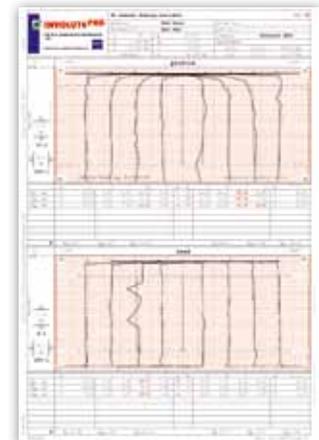


Step 1
Nominal gear data entry

Step 2
Probe definition and calibration

Step 3
Alignment

Step 4
Tooth measurement





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