Introduction to ARCO

ARCO is an **Application for Metrology** based on latest Software Technologies.

The modern architecture enhance the following features:

- Implementation of the **native DMIS language** version 5.3
- Total solution for both **prismatic and free form** measurement
- Complete **GD&T**, geometric dimension and tolerances, as per **Asme Y14.5M-2009**
- Geometrical engine supporting **neutral IGS and STEP** format or **native CAD interfaces**
- **Points cloud** inspection with **chromatic CAD reports**
- **Textual, graphical and statistical** output representation
- Fully integrated with **Metrology Gate for Industry 4.0**
- Powerful solution for **single and dual arm** CMM
- Integrated with **articulated arms**
- Interfaced to several **different CNC controller** and measuring instruments
- I++ **compliant**
- **Off Line** Graphical programming tools with **simulation on the program**
- Complete **compensation of the CMM errors** (Bridge, Horizontal and Dual Drive)

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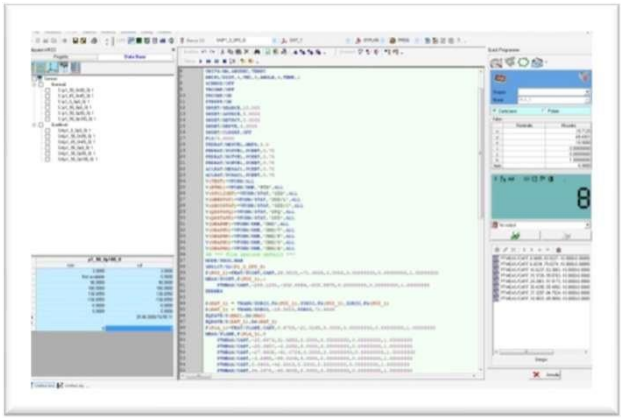
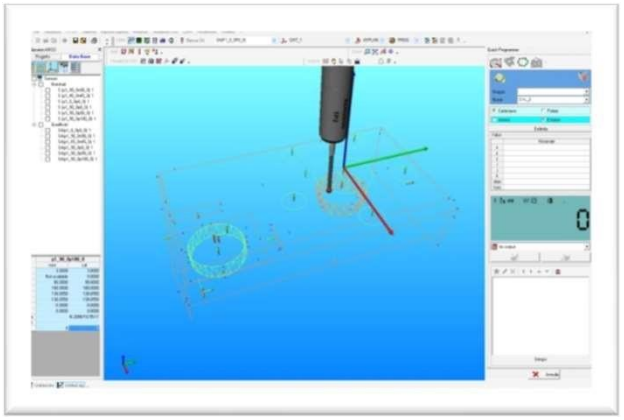
Versions



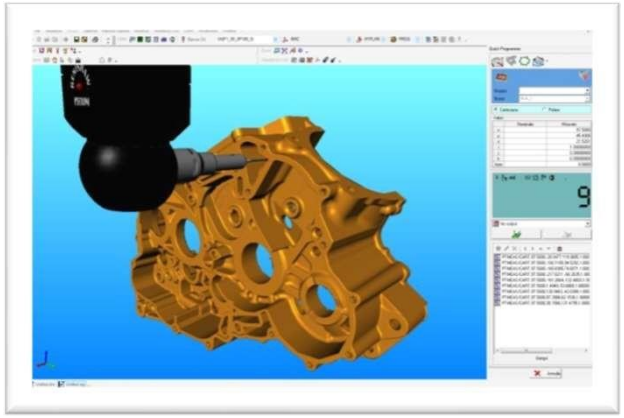
ARCO QUICK



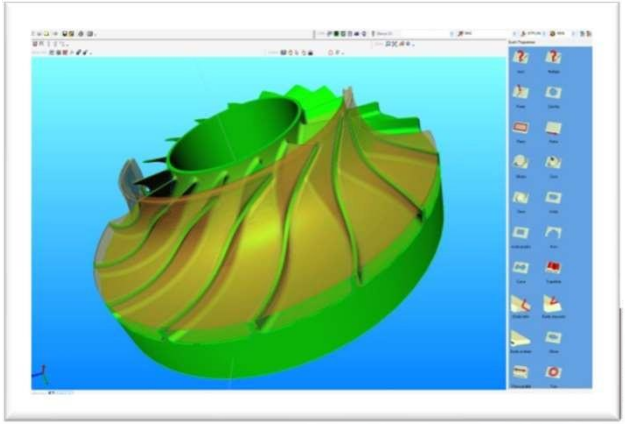
ARCO GRAPHICS

ARCO is available in 4 levels of application

ARCO OFF LINE



ARCO CAD



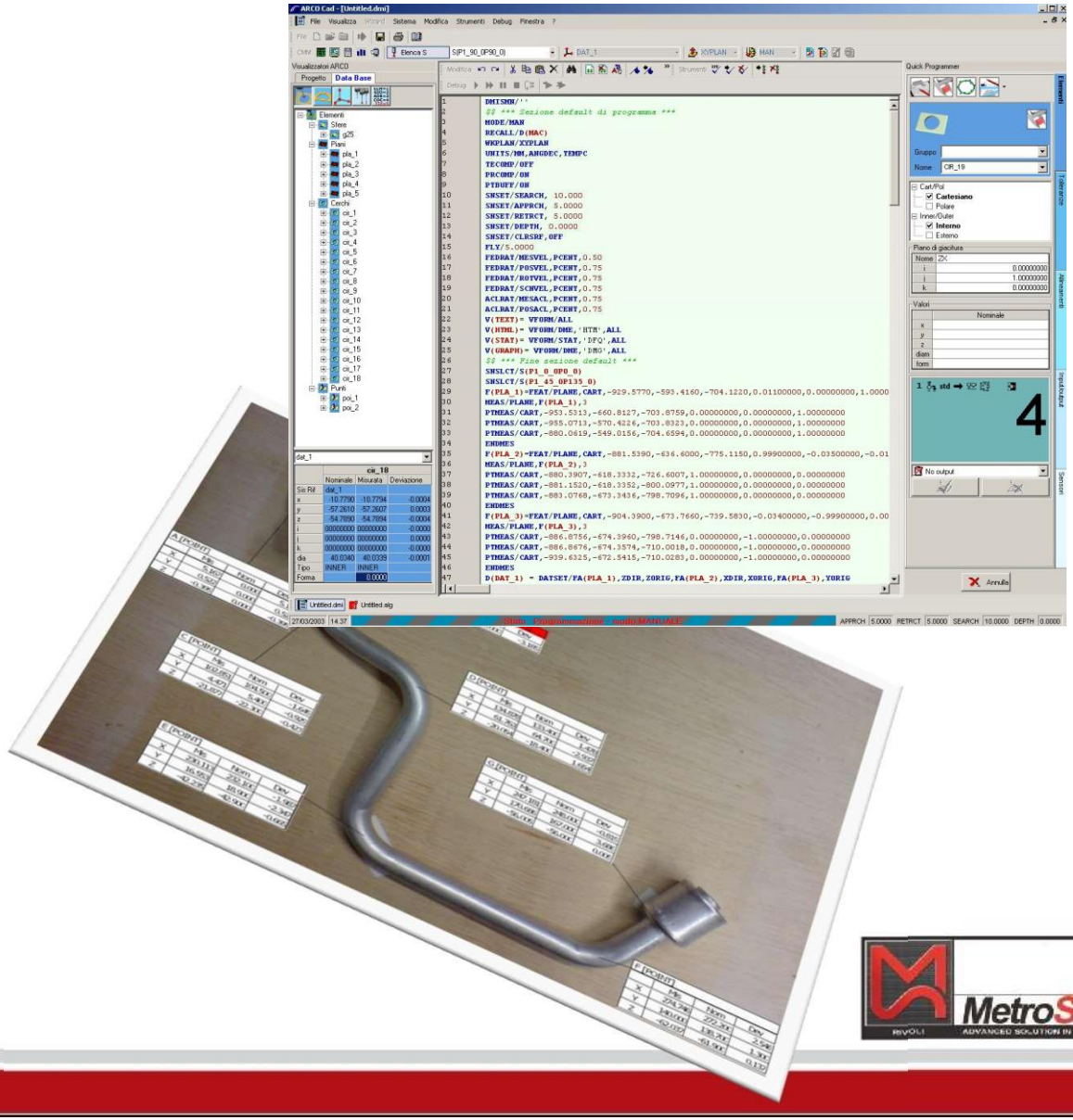
ARCO QUICK – True Geometry

The complete package for inspection of **prismatic components**.

With a self learn panel the program is **automatically created.**

The Data Base Manager show the **results with the deviation in real time**.

Textual and graphical reports can be generated with the support of the **true GD&T** tolerance engine



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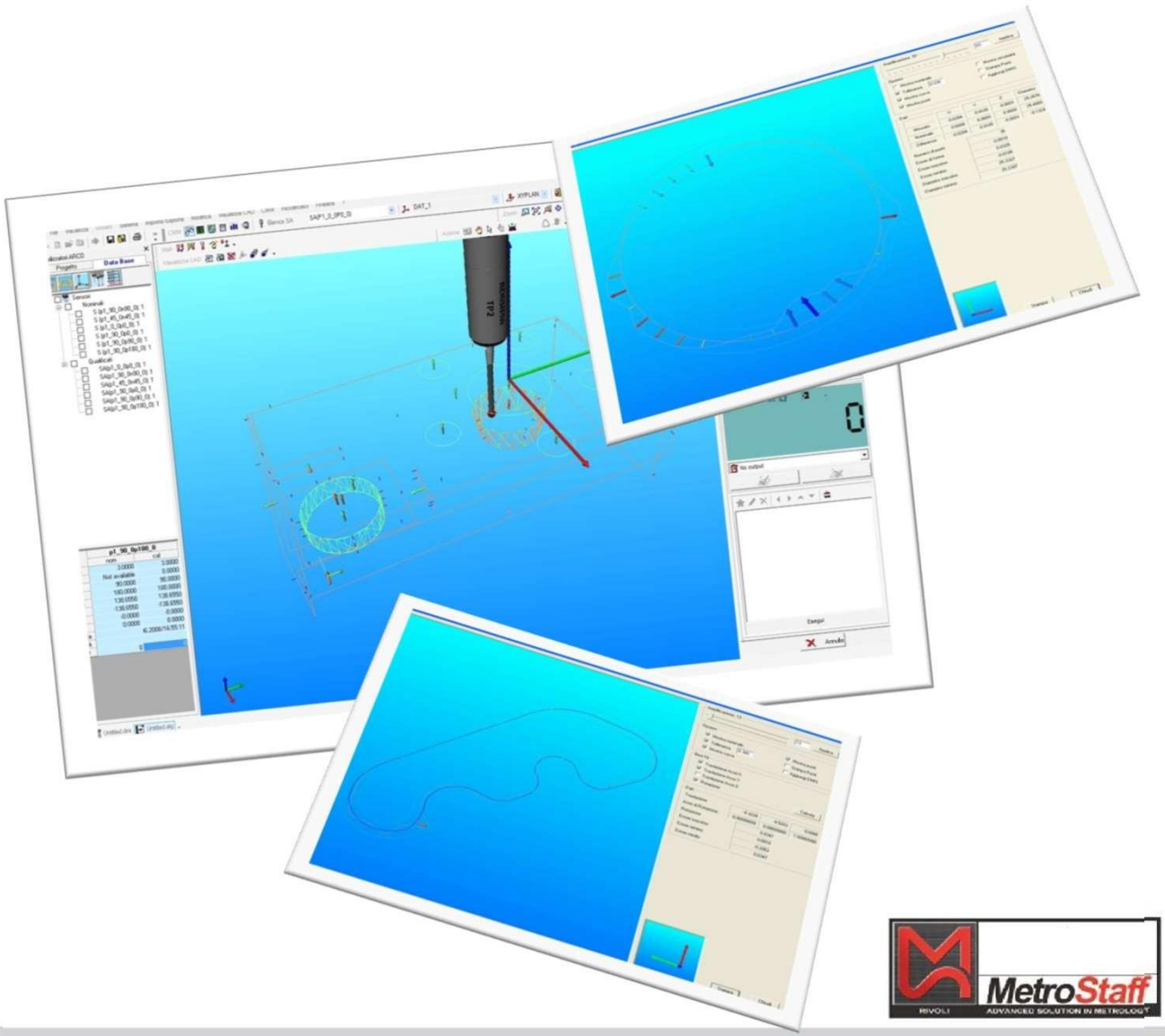
ARCO GRAPHICS – Visual Inspection

Enhance the geometrical inspection with the **graphical representation** of the measured elements

The **curve reconstruction** from points, the **export in IGES** format of the measured elements and the **form error visualization** are the main features or this level.

All the feature available in ARCO QUICK are know **enhanced by the graphics**



ARCO CAD – Inspection from the model

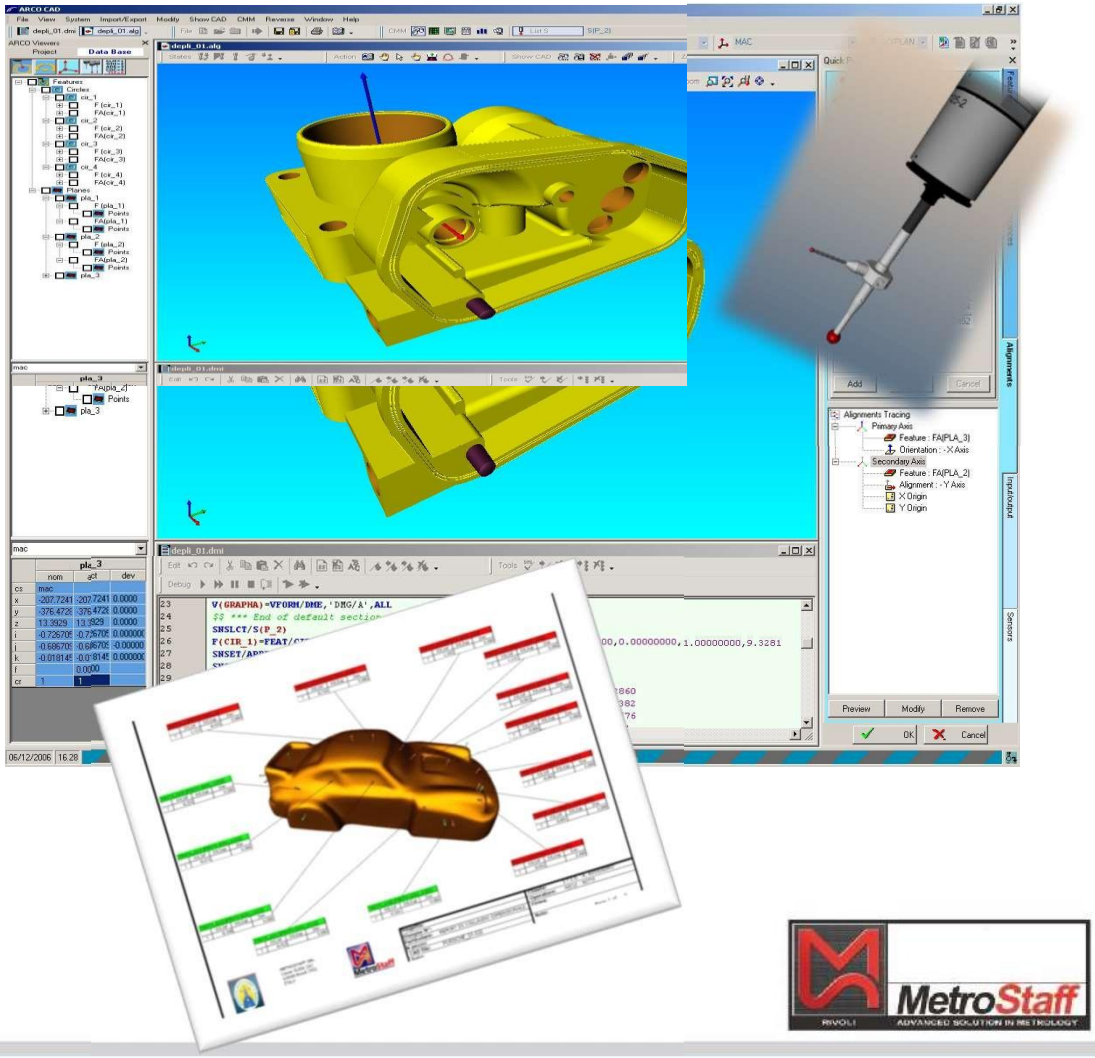
The full package for the **total metrological solution**.

It uses the CAD model to support the **inspection of prismatic or free form model**.

All the nominal **come directly from the models**, the CAD engine let the **free form alignment** to be done and the add-in for **reverse engineering** makes the reconstruction of models possible.

The Cad model it is used to build custom **graphical reports** while **simulation add-in** let the user to preview the path before it is actually performed .

The **graphical representations of the sensors** make the environment more realistic and the choice of the inspection strategy easier



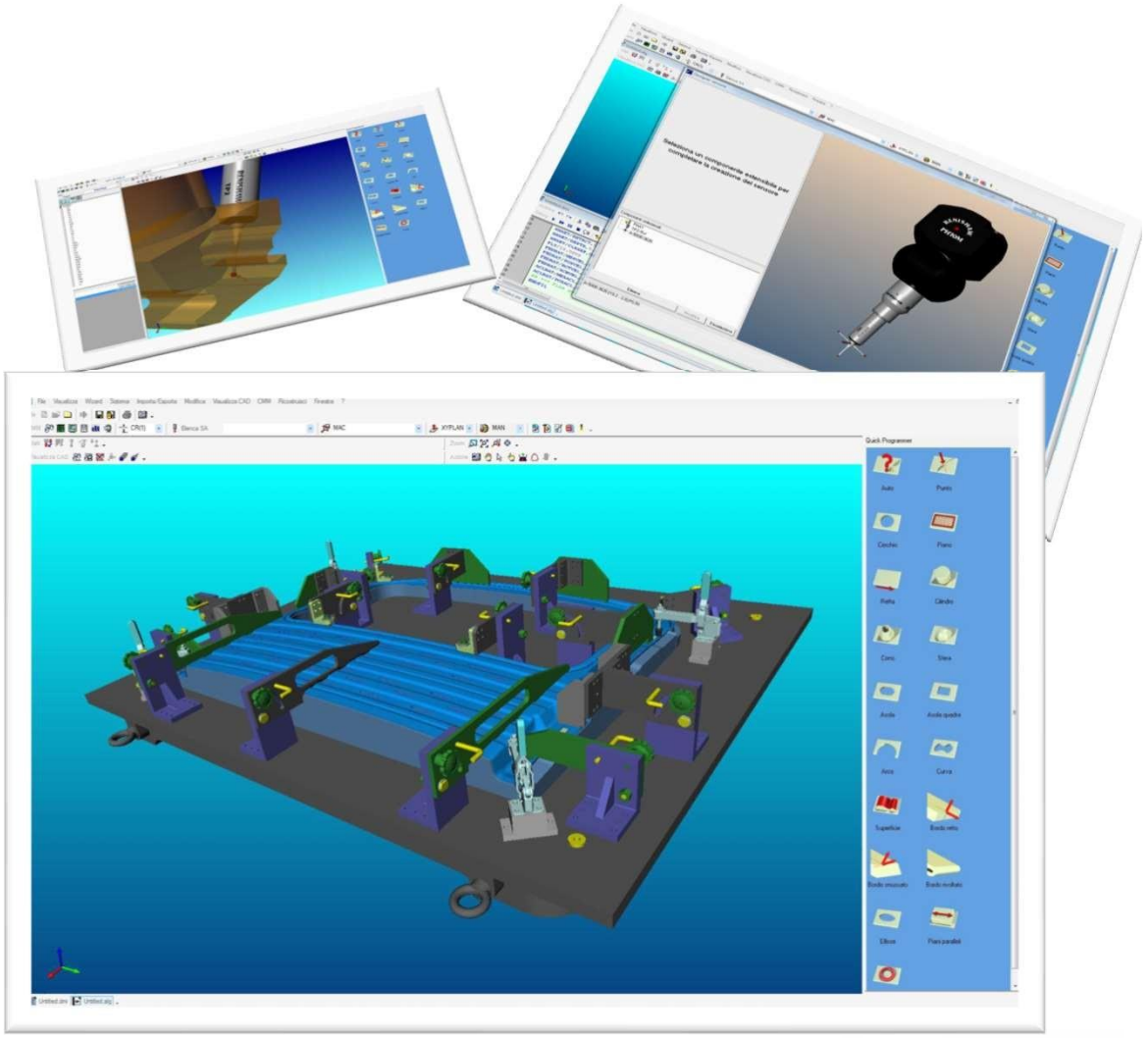
ARCO OFF LINE – Save Time

Use the full set of capabilities of ARCO CAD to build programs **without using the machine**.

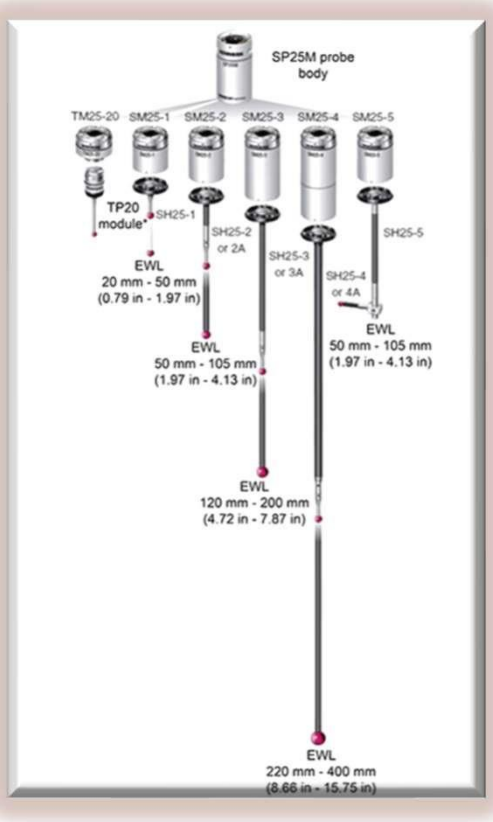
The complete simulation package makes the construction of programs **independently** from the CMM **saving time** reducing the period where the machine is down to build programs.

The **collision avoidance** verifies the path and helps to **create a collision free program** to run on the real CMM.

ARCO OFF LINE make your CMM a real **production instrument** letting ARCO OFF LINE build programs and the ARCO RUNNER execute.



Probe Compliancy



- ☐ **Touch Probe**
- ☐ **Continuous Scanning**
- ☐ **5 Axis Head**

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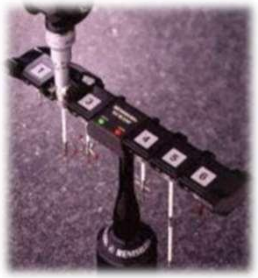
Tool Changers

The build-in wizard makes the use of **Multiple Tool changers** easy and **immediate**.

The handling of all the tool changers is included as a **standard feature** of ARCO



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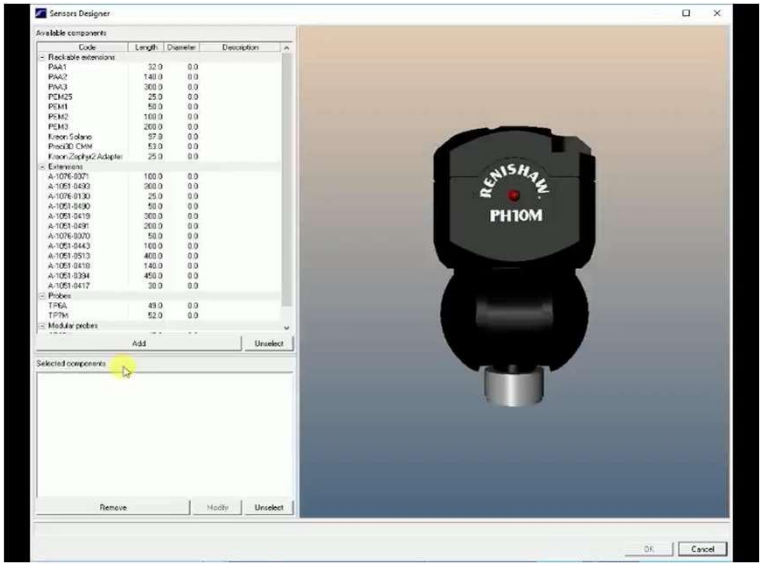
Tool Calibration

With ARCO CAD the **calibration of the tools** can be done with a **graphical** wizard that drives the construction in a **fast and easy way.**



Click to Play

The **Calibration Wizard** automatically build and run the calibration program for tools such as:

- **Trigger**
- **SP25 or SP80 scanning tools**
- **Laser Scanner**
- **Star and custom tools**

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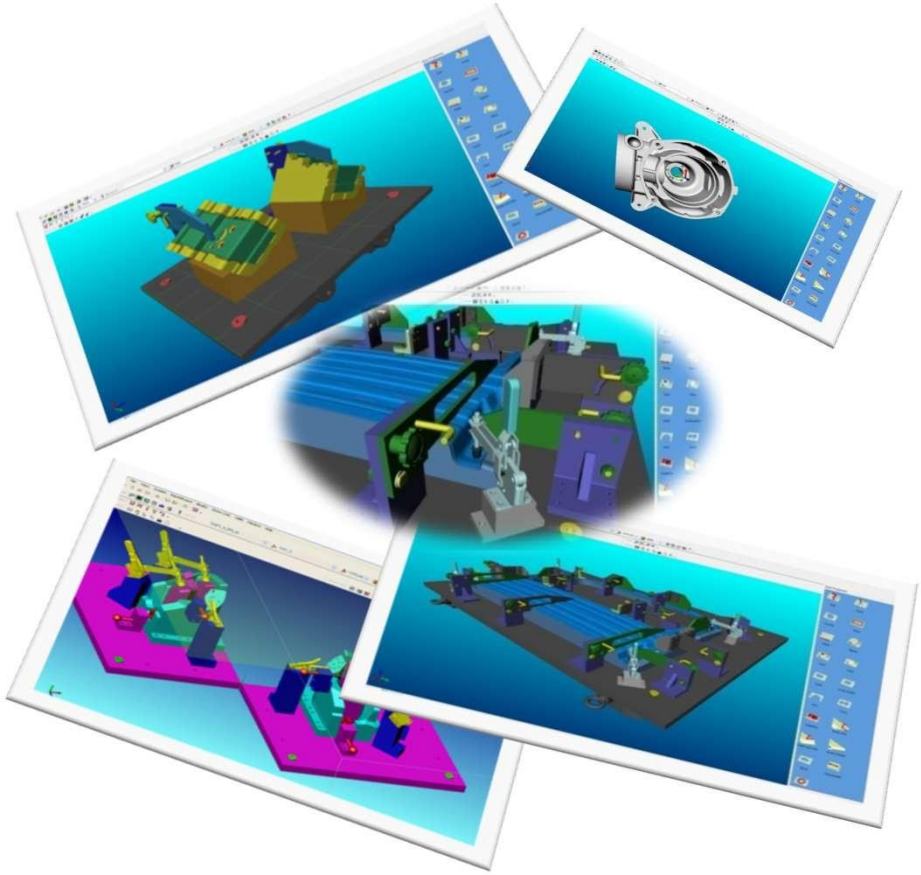
CAD Models

ARCO CAD supports, as a standard, the *neutral format IGES*.

Using **proprietary licences** ARCO is able to use the following native formats:

- ☐CATIA V4
- ☐CATIA V5
- ☐PRO-E
- ☐UG
- ☐SOLID WORKS
- ☐VDA-FS
- ☐STEP
- ☐ACIS
- ☐PARASOLID



The models are brought in ARCO maintaining the **original colours** and layer structure.

All the geometrical information (CAD and features and Points Cloud) can be **exported in IGES format**

DMIS Editor

All the programs are shown in a DMIS Editor with **a colour code representation** for an easy reading of the language

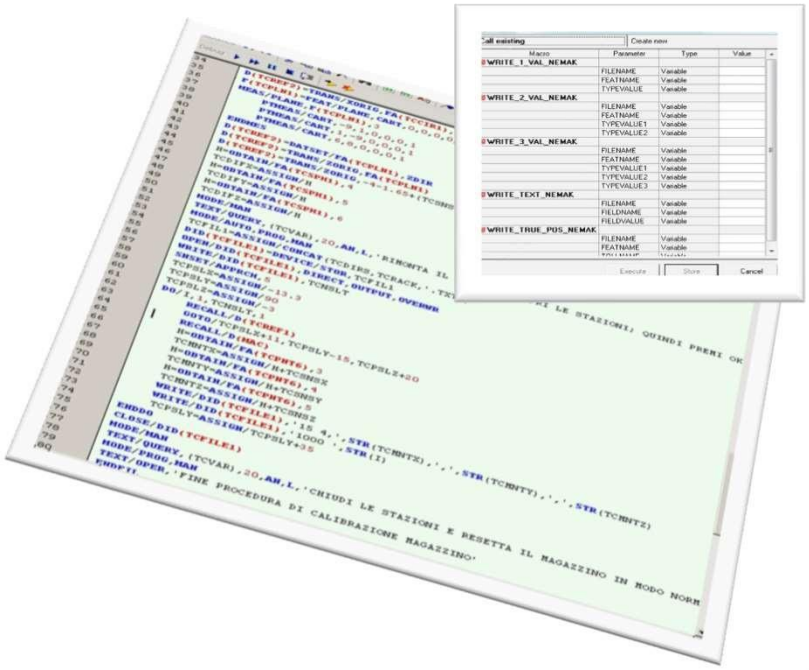
The editor carries a **DMIS assistant** that helps to write native DMIS code when doing advanced programming and the **syntax analyser** finds the typos.

ARCO use all the DMIS language capabilities to write **advanced syntax** in building parametric programs

It is also possible to **build macros** and procedure to speed up the programming.

Libraries of functions can be moved from one system to another.

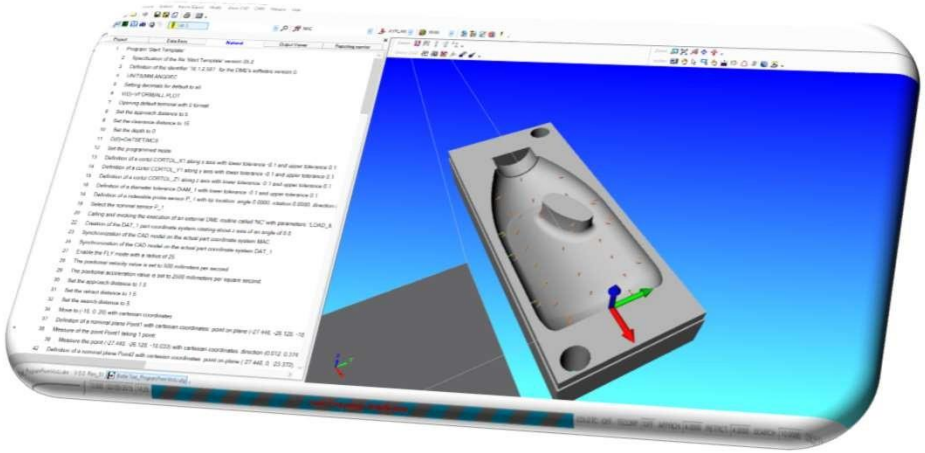
The execution of a program can be **started and stopped at any time** while a program being built can be tested with a **step by step execution**.



Natural Language

The standard **DMIS Editor** works side by side with the natural language view.

The **DMIS language** is now translate in human language!



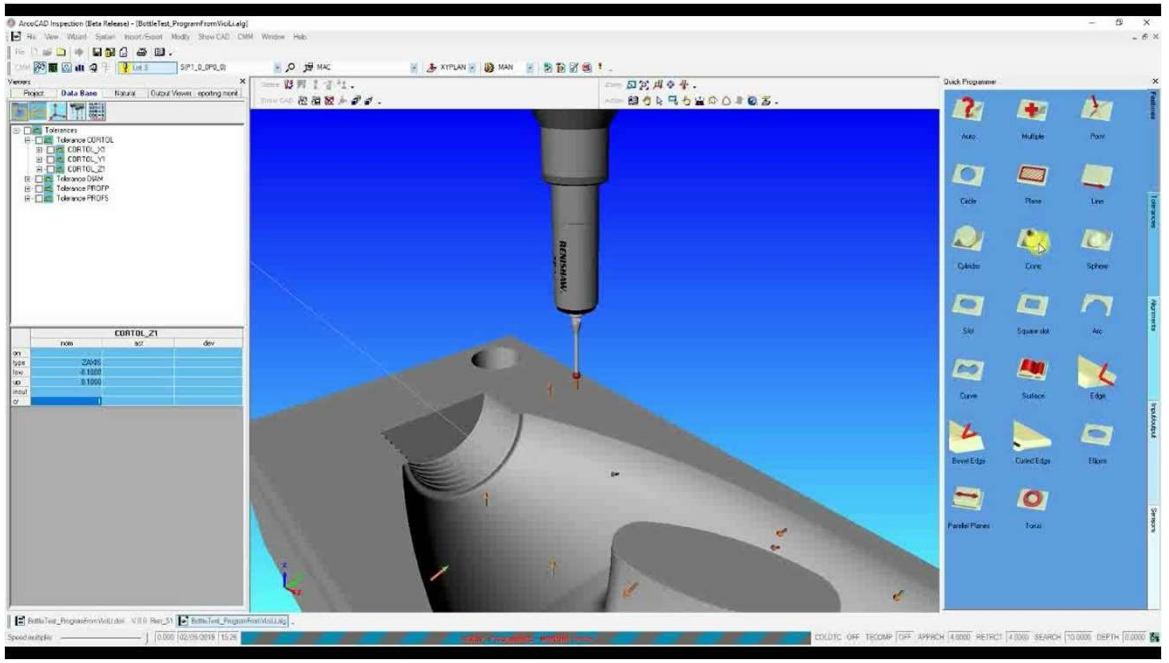
Opening default terminal with 0 format.
Set the approach distance to 5.
Set the clearance distance to 15.
Set the depth to 0.
D(0)=DATSET/MCS
Set the programmed mode.
Definition of a cortol CORTOL_X1 along x axis with lower tolerance -0.1 and upper tolerance 0.1
Definition of a cortol CORTOL_Y1 along y axis with lower tolerance -0.1 and upper tolerance 0.1
Definition of a cortol CORTOL_Z1 along z axis with lower tolerance -0.1 and upper tolerance 0.1
Definition of a diameter tolerance DIAM_1 with lower tolerance -0.1 and upper tolerance 0.1
Definition of a indexable probe sensor P_1 with tip location: angle 0.0000, rotation 0.0000,
Select the nominal sensor P_1.
Calling and invoking the execution of an external DME routine called 'NC' with parameters
Creation of the DAT_1 part coordinate system rotating about z axis of an angle of 0.0.
Synchronization of the CAD model on the actual part coordinate system MAC.
Synchronization of the CAD model on the actual part coordinate system DAT_1.
Enable the FLY mode with a radius of 25.
The positional velocity value is set to 500 millimiters per second.
The positional acceleration value is set to 2500 millimeters per square second.
Set the approach distance to 1.5.
Set the retract distance to 1.5.
Set the search distance to 5.
Move to (15, 0, 20) with cartesian coordinates.
Definition of a nominal plane Point1 with cartesian coordinates:
Measure of the point Point1 taking 1 point:

Self Teach Panel and Data View

The main component of ARCO is the **Quick Programmer** from where **all the programs are build.**

In a single panel ARCO can do:

- ☐Inspection of Feature
- ☐GD&T tolerance
- ☐Creation of Alignment
- ☐Build Output
- ☐Manage Sensors

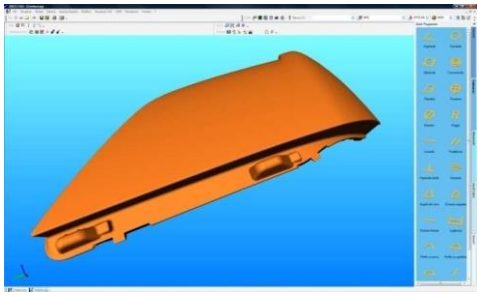


Click to Play

All the **results are available** for consulting in the practical viewer.

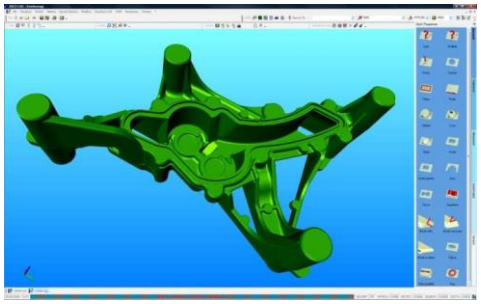
Building a Coordinate System

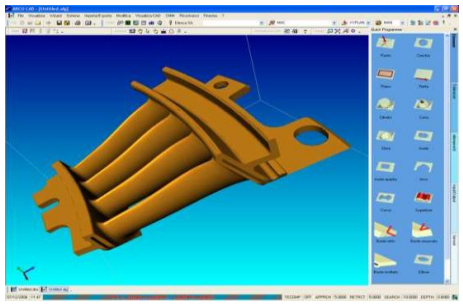
The alignment can be created in **several ways** with a **preview on the CAD** area. This **reduce drastically** the editing time due to error in alignment.

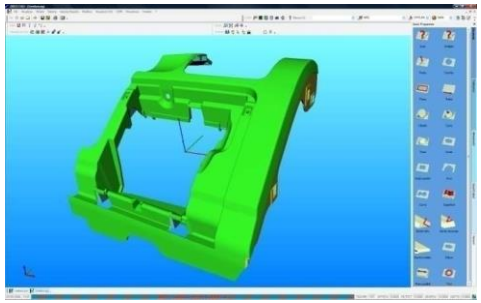


ARCO handles **all the free form** alignments:

Both **Best Fit and RPS** are managed in order to solve the sheet metal and plastic alignment requirement.







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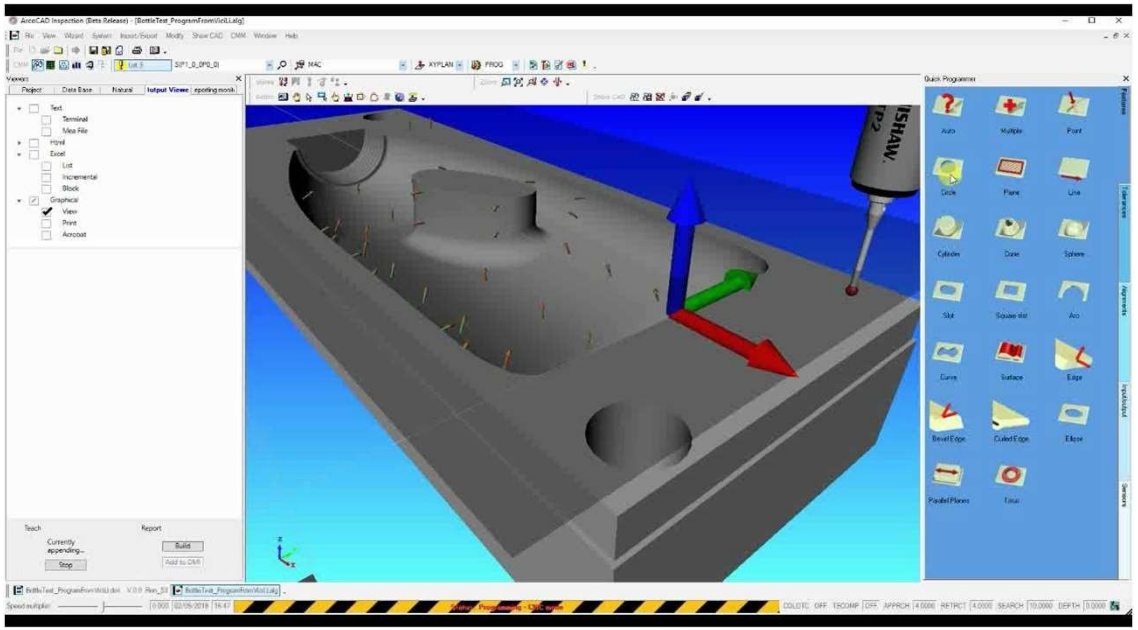
Definition of feature from the CAD

ARCO uses his CAD capabilities to **extract the nominal definition** of the feature from the model.

With a **single selection** the feature is defined and ready to be measured with the current Canned Cycle.

When the program is ready and some modification is to be done, then ARCO CAD provides the **graphical editing tools**.

Redefinition of nominal and **path editing** can be easily done by clicking and repositioning to the new location.

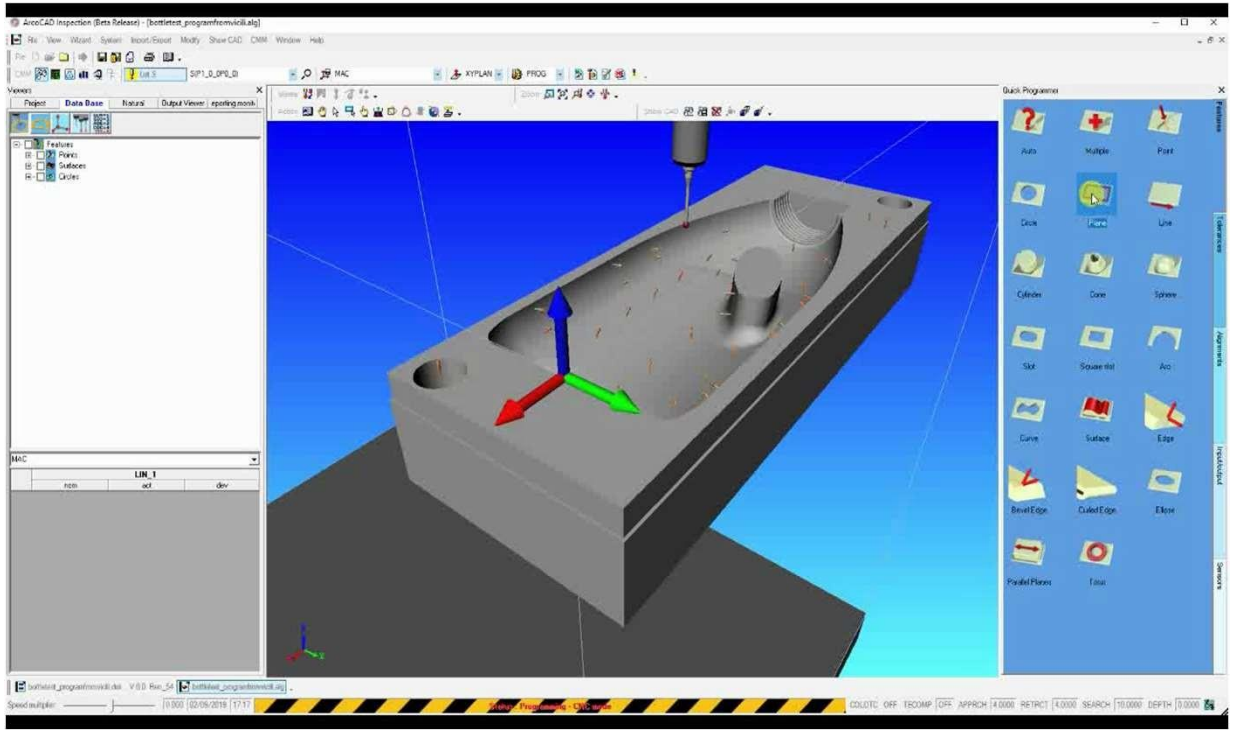


Click to Play

When the **output option is enabled**, then the tolerance is applied and the chosen **report can be created immediately.**

Measure and Construct Features

A **quick inspection** of an element ARCO CAD is made with the **TECH CAD** utility.
Each click with the mouse over the model is **transformed into an inspection point**.
The path can be simulated or directly executed.



Click to Play

Once the features are created, it is possible to construct element **extremely fast with the graphical selection**.

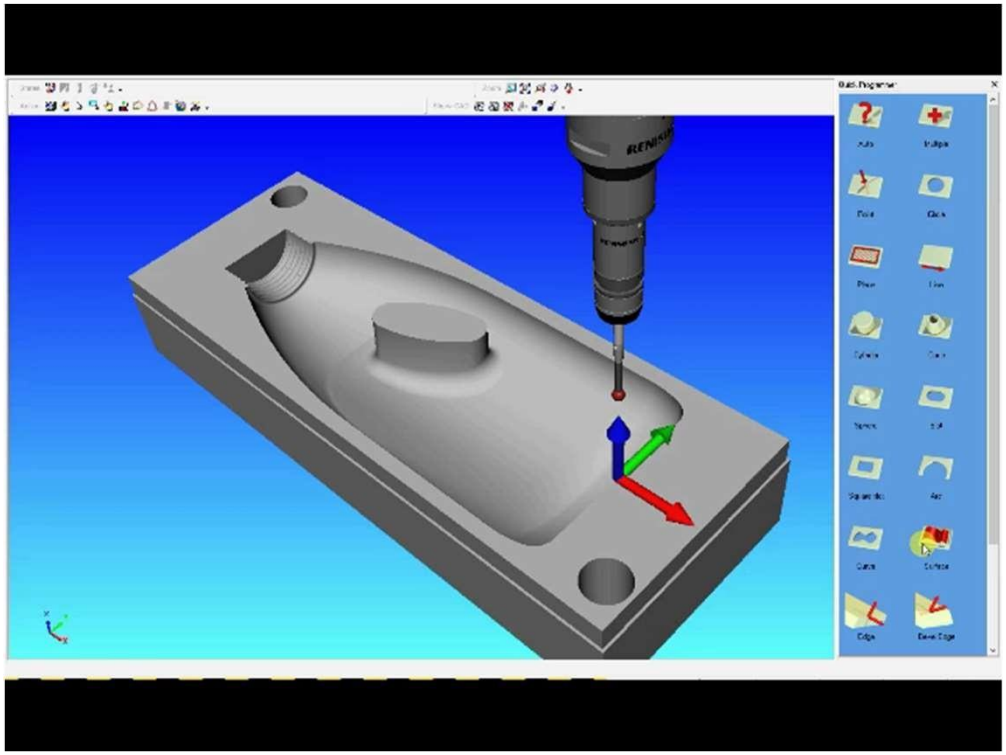
Inspection Path

With the selection of the surfaces that define an element, ARCOCAD can **evenly distribute the points** in order to quickly create the inspection path

When a free form surface is to be inspected, ARCOCAD **provides all the tools** to make it possible.

Sheet metal thickness, relative inspection of elements, grouping the surface, boundary measurement: **all the capabilities are there**.

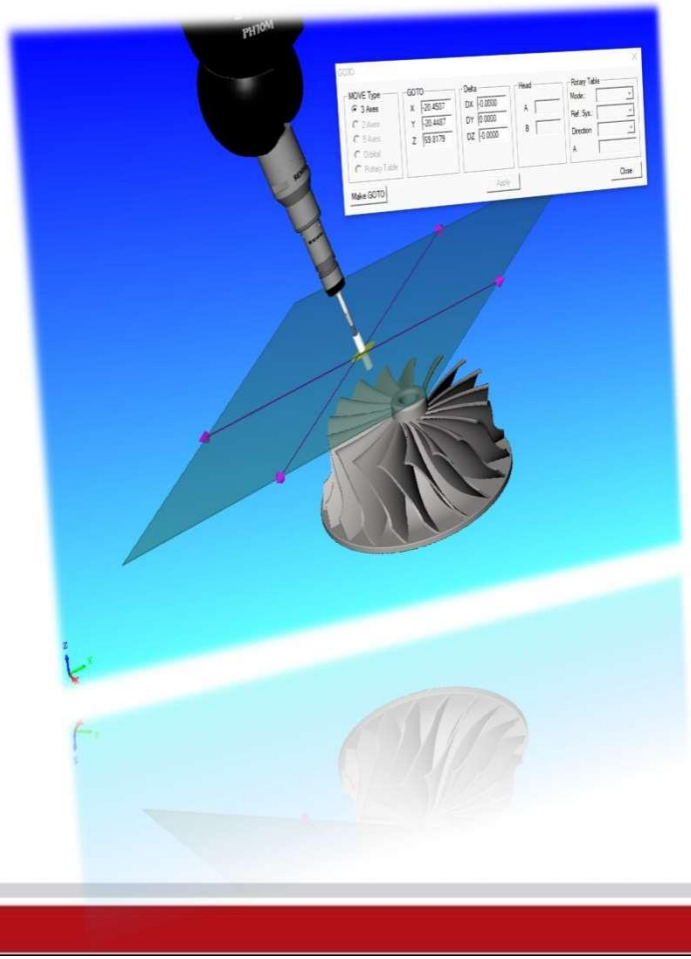
The surfaces are measured in real time both in manual or CNC mode.

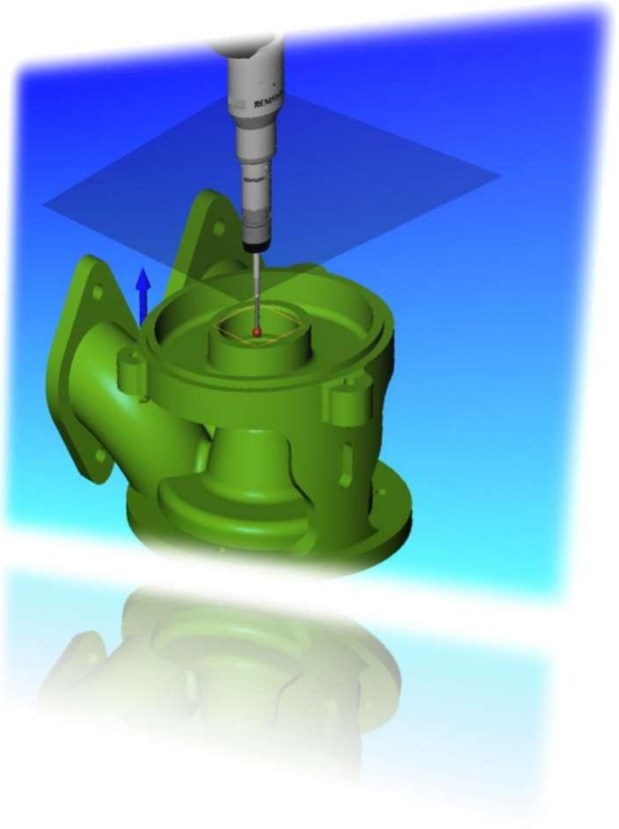


Click to Play

Graphical GOTO

During the creation of the program, ARCO CAD makes enhance an **advance automatic Safety Plane capability**

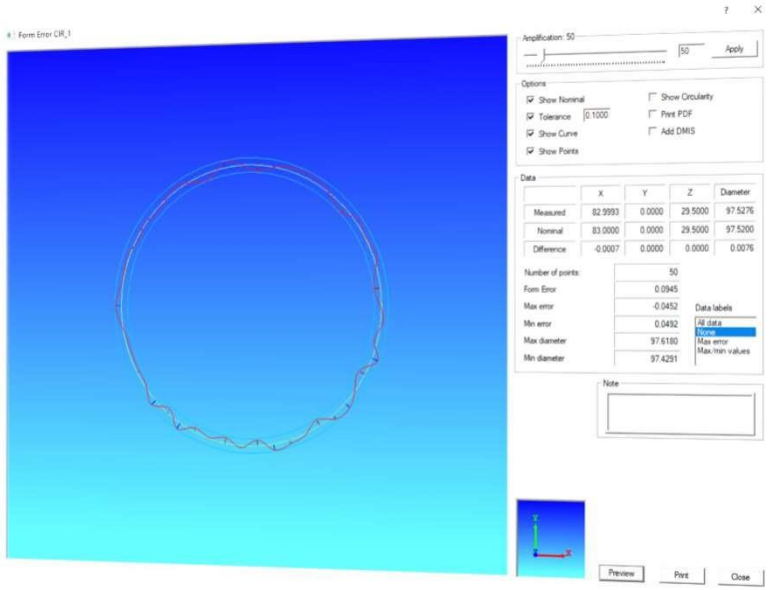


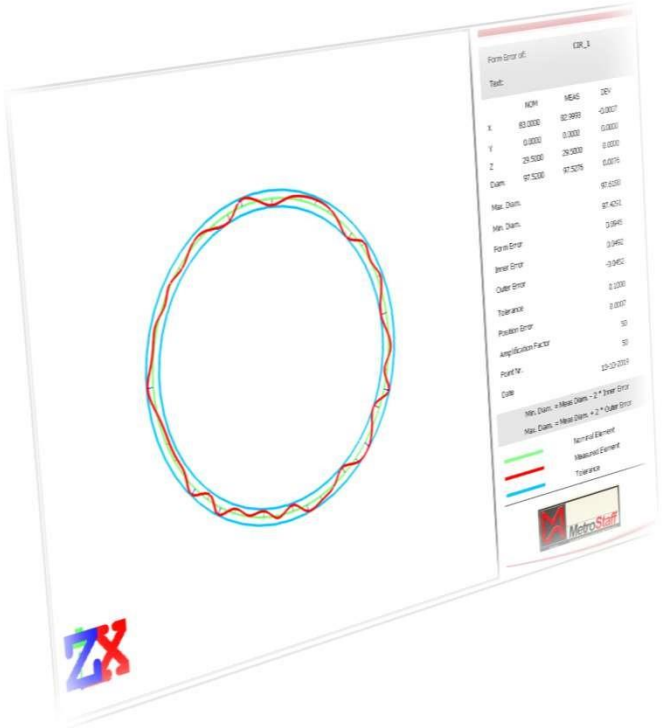


When there is a specific need, ARCO CAD provide the user with a **powerful tool of graphical creation** of intermediate points.

Form Error Representation

For each geometric element inspected ARCO provide the **graphical representation of the Form Error**.





A **graphical report** can be printed

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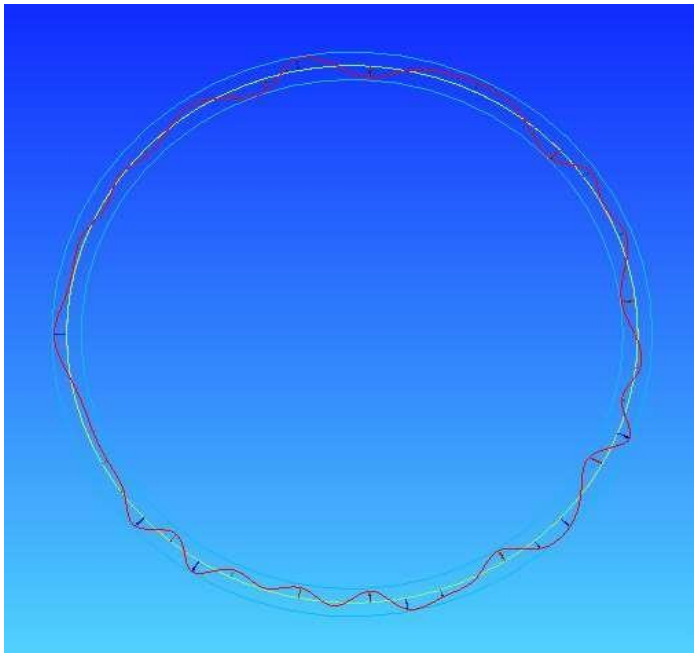
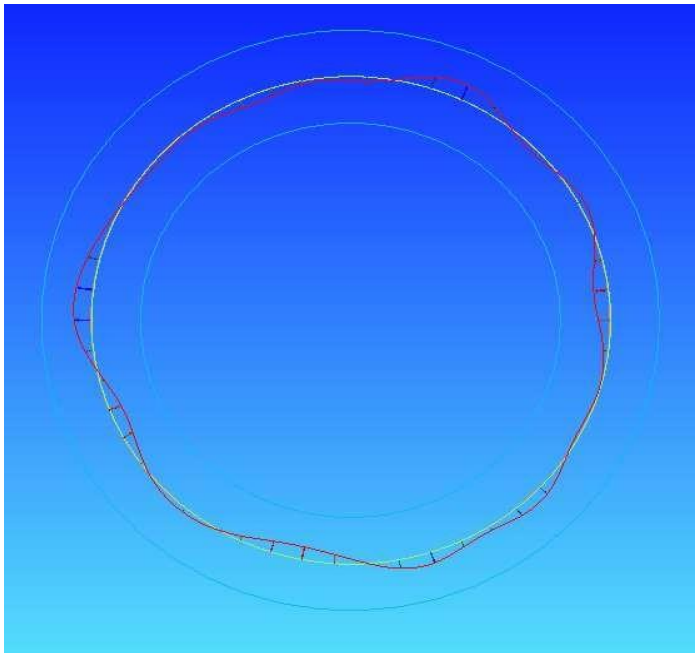
Gaussian Filters

CMM Inspection give **noise in the measured points** due to the harmonic vibration of the structure, this problem can only be solved with **gaussian filters**.



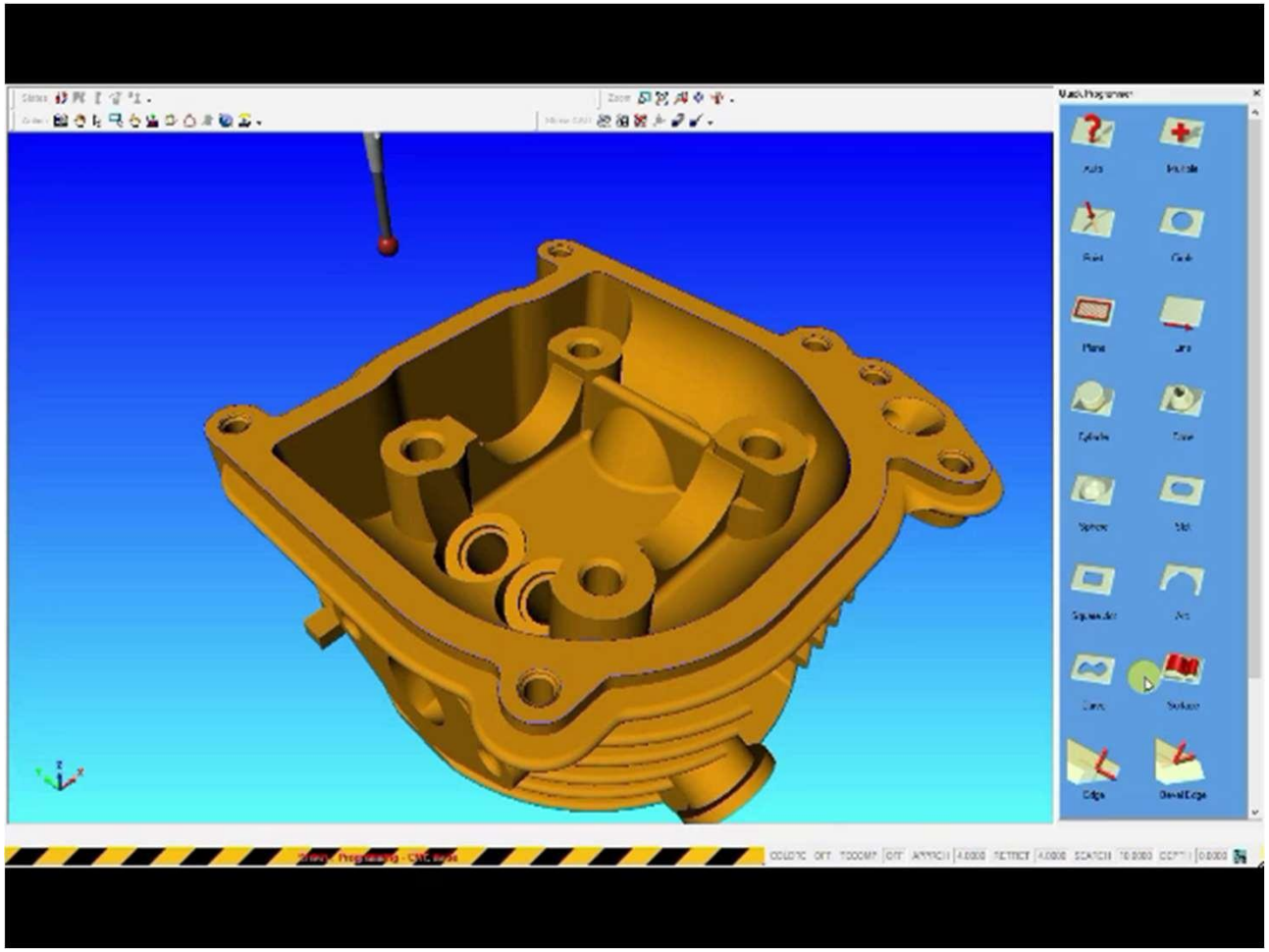


ARCOCAD filters as standard feature

Profile Analysis

The CAD information of a **2D profile** can be used to build an inspection path.

After the measurement the **graphical evaluation** with **fitting tools** is available for sub sequential analysis



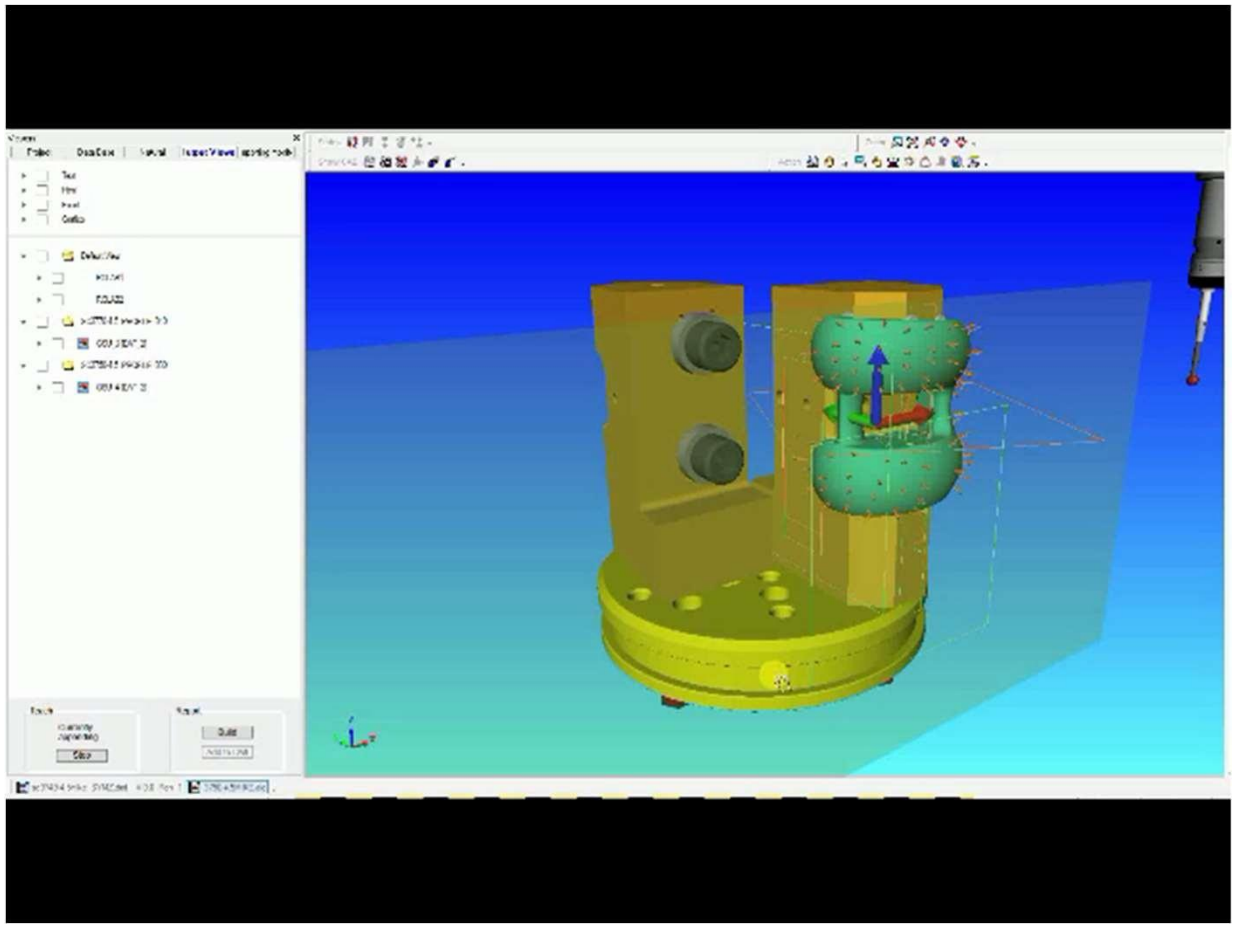
Click to Play

Output

The **Output of the Results** can be formatted in **different formats:**

- **TEXT**
- **HTML**
- **EXCEL**
- **GRAPHICAL**
- **STATISTICAL**

The **Output Viewer** Allows the **edit** of the report **graphically** with no access to DMIS CODE



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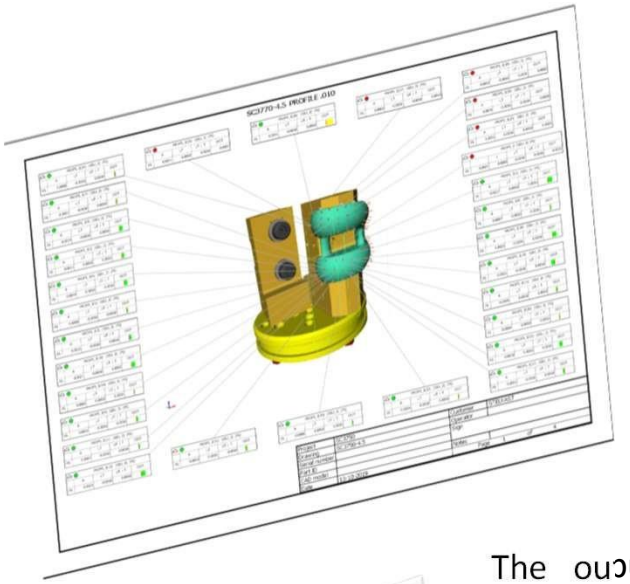
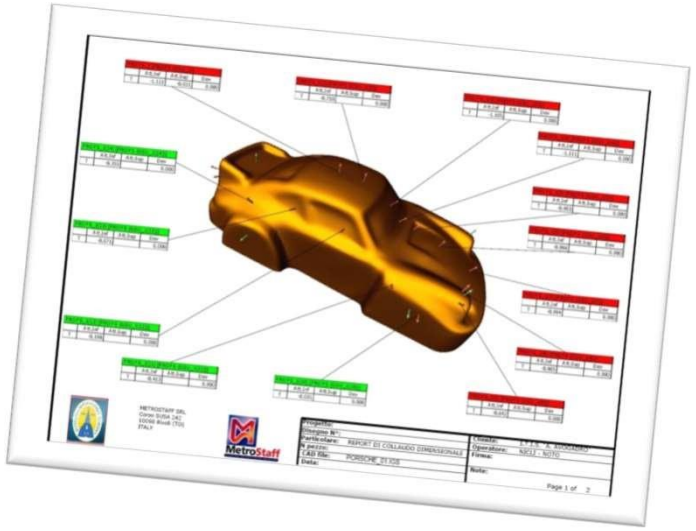
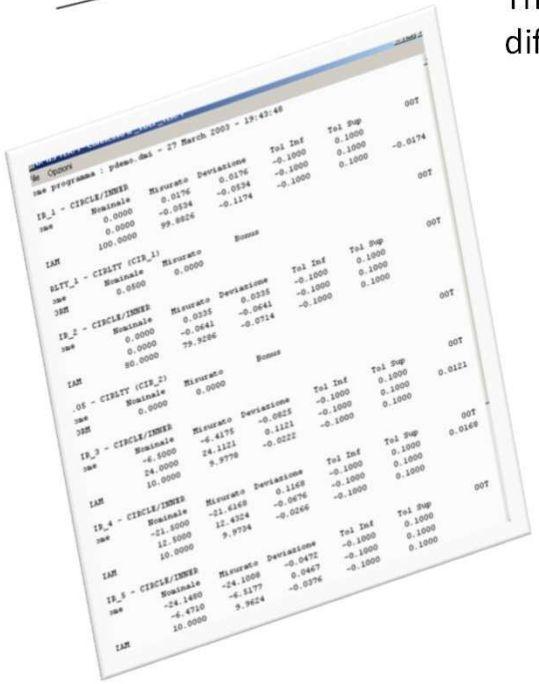
Output

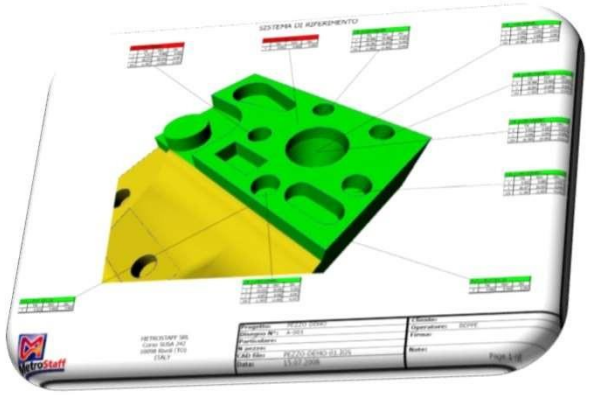


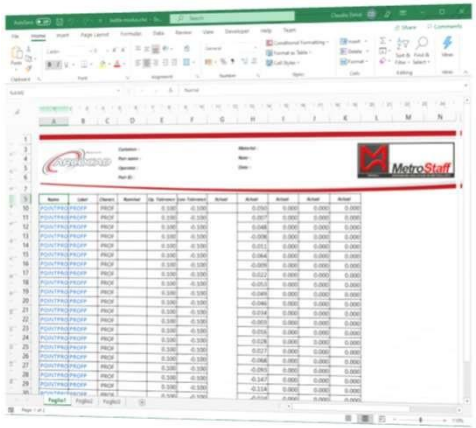


The output of the Results can be formatted in different formats:

TEXT, HTML, EXCEL, GRAPHICAL, STATISTICAL







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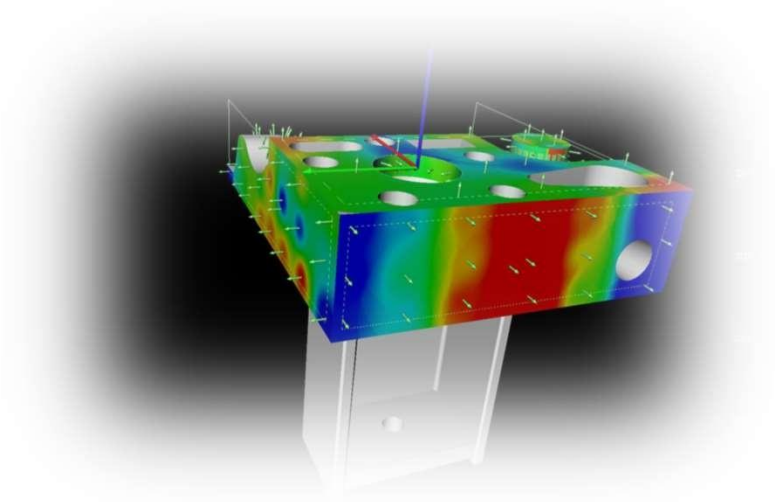
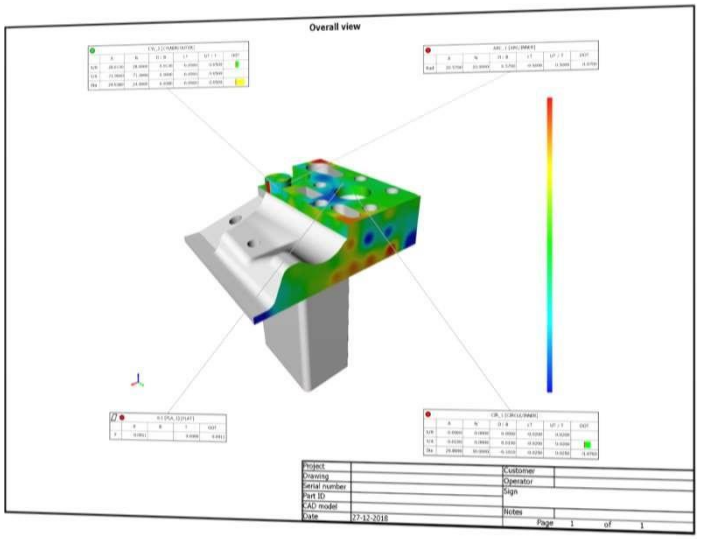
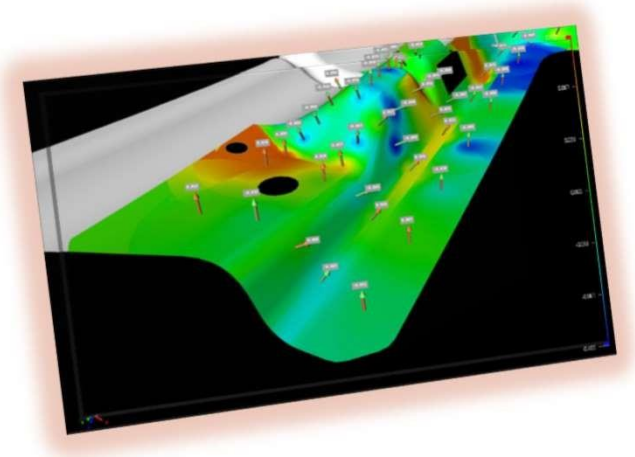
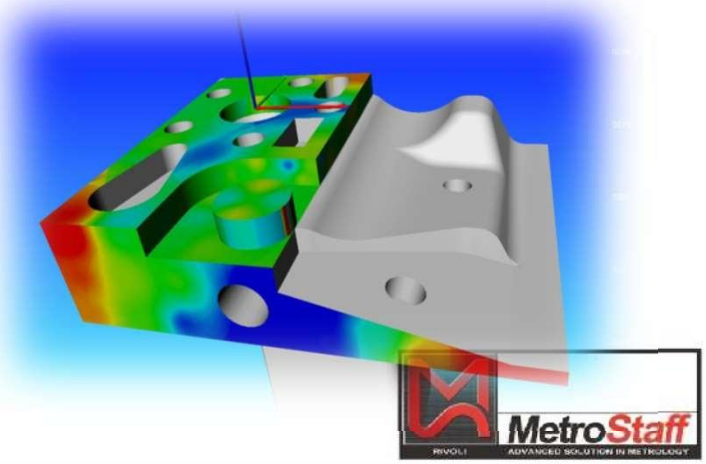
Output



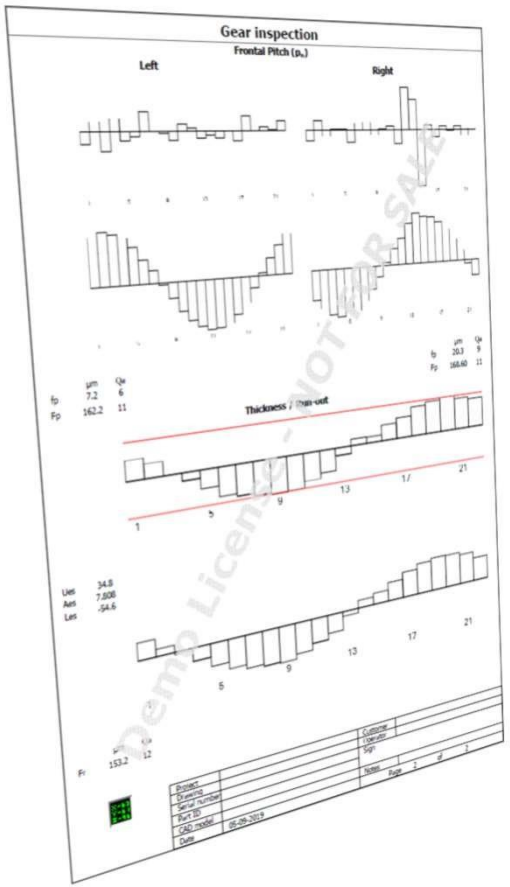


Color Map on both Scanner data and Point to Point inspection





ARCO GEAR



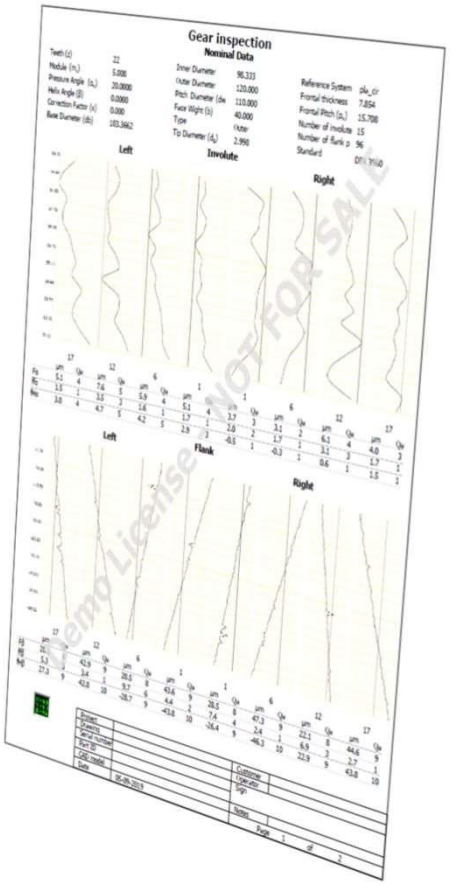
The optional module the measure **GEARS in ARCOCAD** allows the **inspection on CMM** of:

- ☐ **Helical Gears**
- ☐ **Spur Gears**
- ☐ **Partial Gears**
- ☐ **Inner/Outer Gears**

The measurement is **extremely easy!** A wizard **guides the user along** the all process with no possibility of programming errors.

The Measurement can be achieved with:

- ☐ **Point to Point touch probe**
- ☐ **Continuous Scanning probe**
- ☐ **5 Axis head**
- ☐ **Rotary Table**



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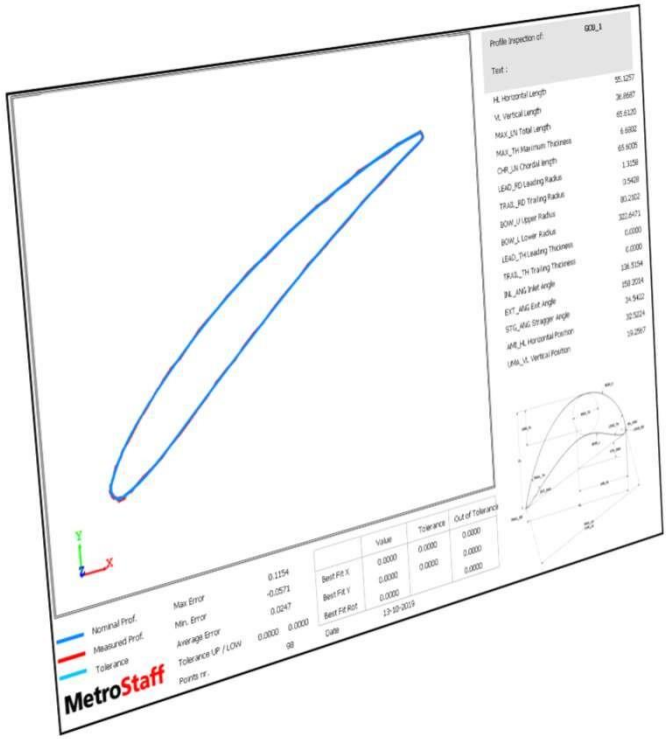
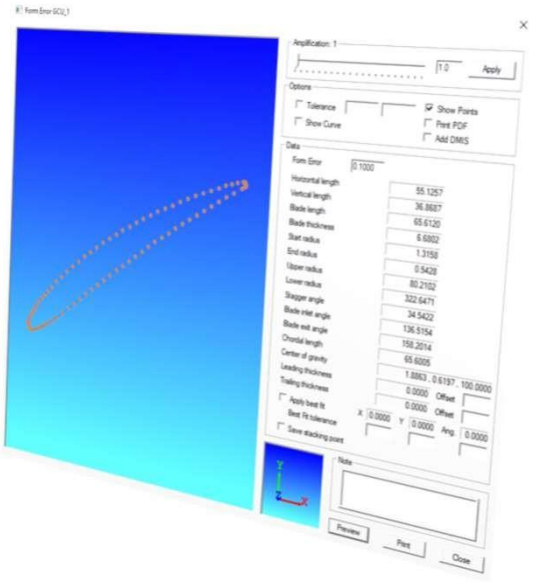
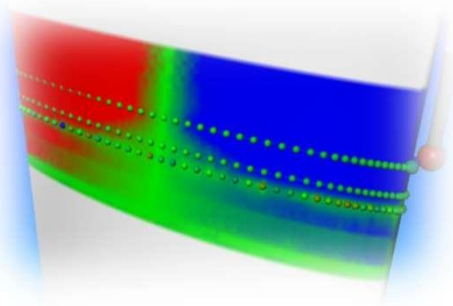
ARCO BLADE



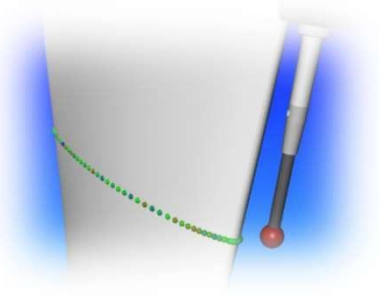
The optional module the measure **BLADES in ARCOCAD** allows the **inspection of aerofoils w**ith a geometrical report with all the major dimensional parameter.





The inspection is available for all the measuring probes technologies:

Point to Point touch probe
Continuous Scanning probe
5 Axis head
Rotary Table
Laser Scanner



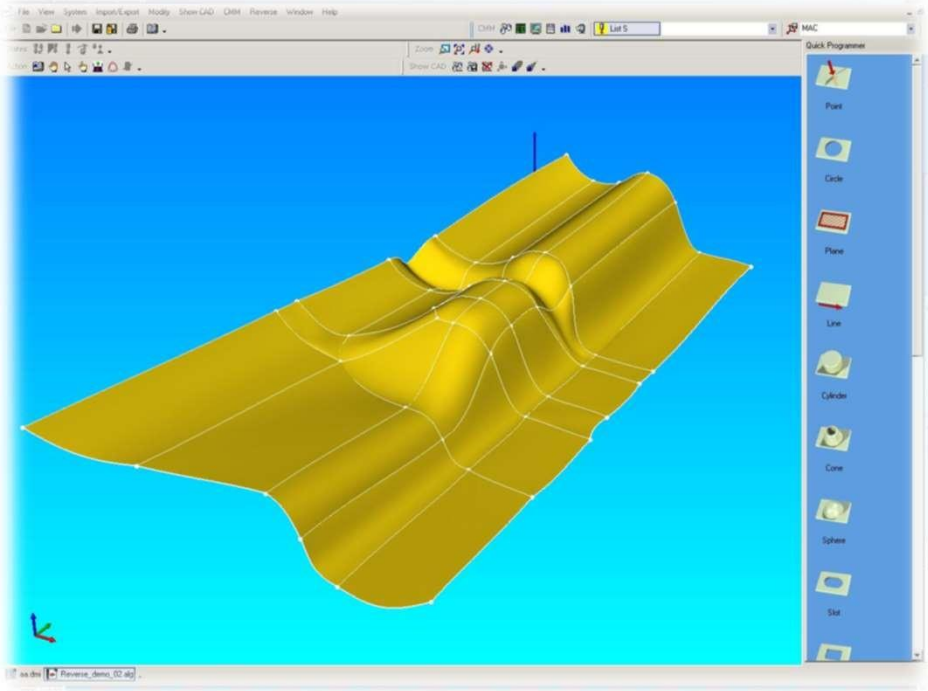
The Measurement needs the CAD profile of blade for automatic generation of the inspection path and 2D best fit.

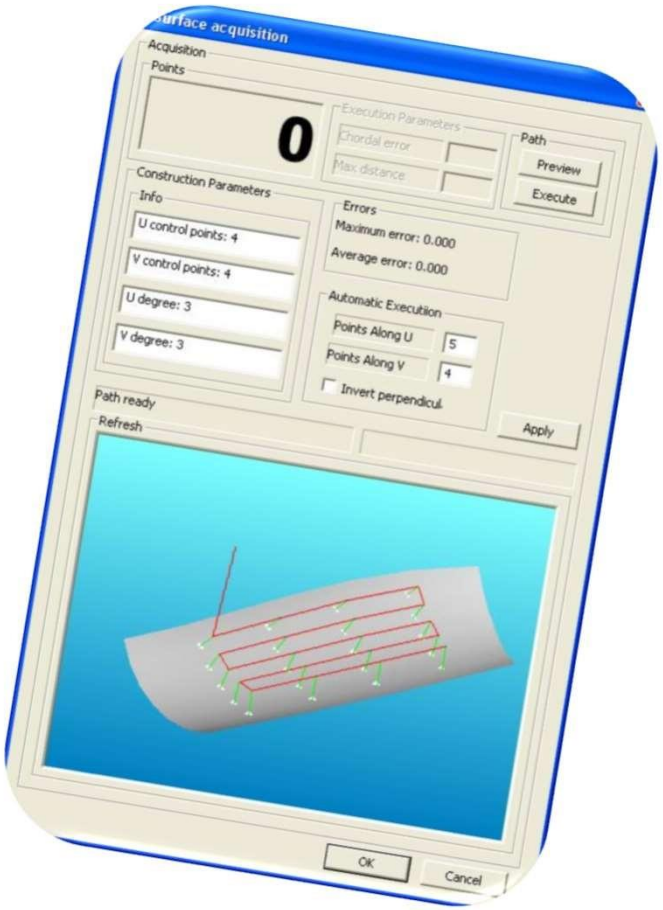
ARCO Reverse

ARCO Reverse is the Add-in of ARCO CAD.

The utility makes available the possibility of rebuilt free form surfaces starting from the boundaries.

The iterative procedure let the user decide the correct resolution of the reconstruction





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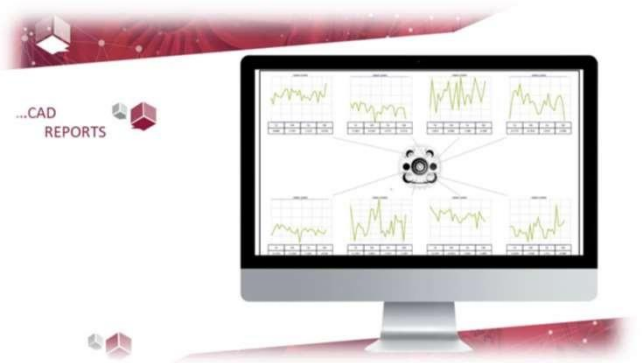
Statistical Evaluation in Metrology Gate

ARCO can be extended with the **Add-in METROLOGY GATE**, this module make possible the statistical **Process Control analysis** with the creation of different chart:

- ☐ **XR**
- ☐ **XS**
- ☐ **Cp, CpK**
- ☐ **Pp, PpK**
- ☐ **Quadsum**
- ☐ **Pareto**
- ☐ **Normal Distribution**



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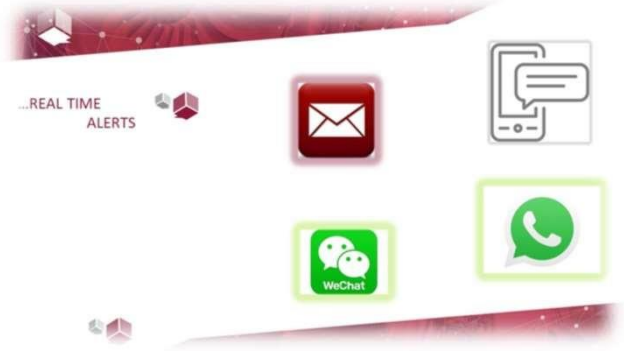
Statistical Evaluation in Metrology Gate

With **METROLOGY GATE**, the **Industry 4.0** come in action!

Real Time
Machine Monitor and
Environmental control



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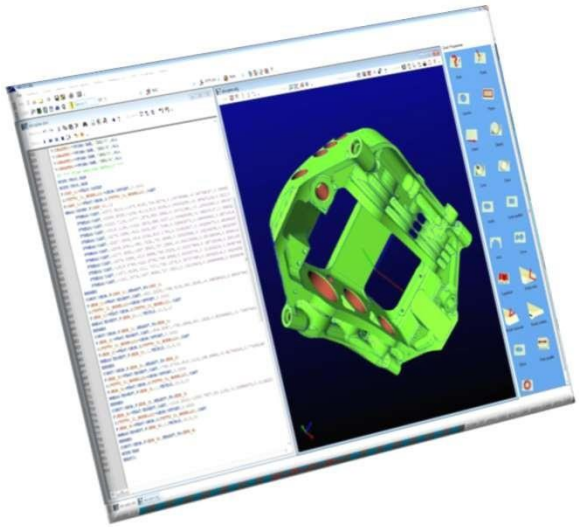

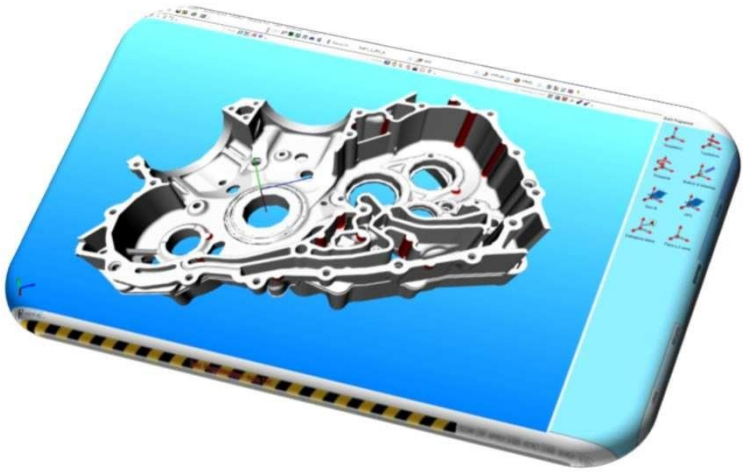

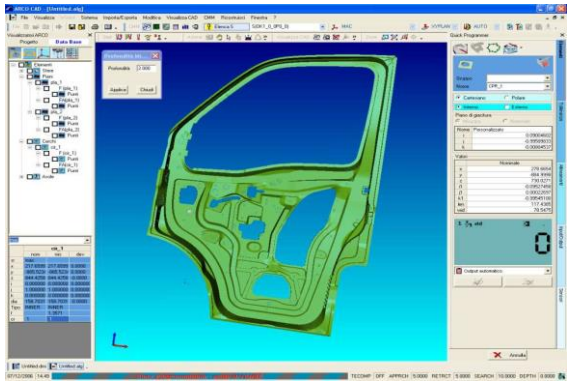

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