UGS

Transforming the process of innovation

On Machine Probing in NX

Bob Sammut
Directors Product Development

Topics

- Probing Roadmap
- NX 5 On Machine Probing
- NX6 CMM Programming
- New Inspection Technology
- eM-Measure

Probing in NX Road Map

- eM-ProbeCAD NX: Utilize ISV Simulation capabilities to simulate DMIS Programs

- CAM: Support probing cycles to measure tool lengths and machine offsets. Add probes to tool libraries.

- CMM NX: Fully integrated into NX using CAM Framework and PMI for CMM off-line programming

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NX 5 On Machine Probing Project

Teamcenter Manufacturing

Probe CAD NX

NX On Machine Probing

UI

Inspect Features

Processor

Tool paths Generation for Machine tools & Inspection

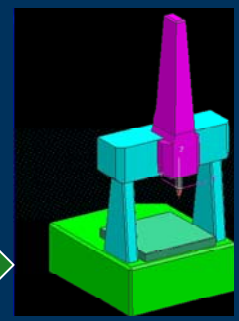
Post process Toolpath for CNC, CMM others

Simulation (ISV)

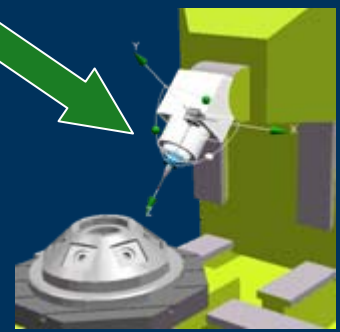
Probes Cutting & Non Cutting Tools Machines Library

User defined templates

Machine Kit



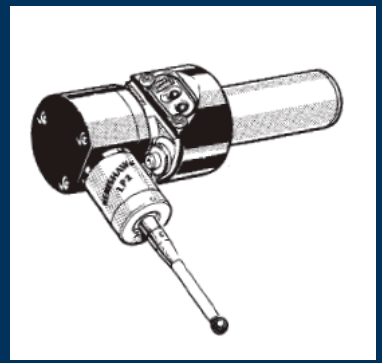
Toolpath & online Inspection

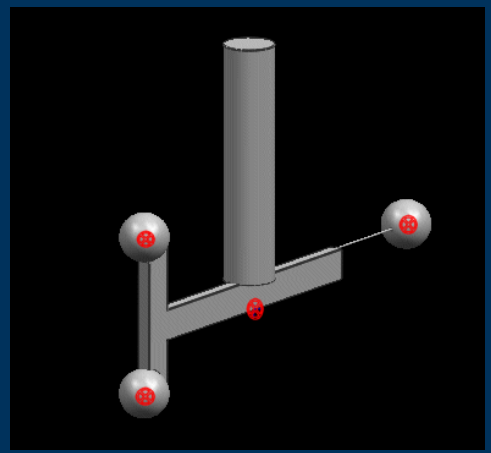


Toolpath & online probing

Probes as Tools

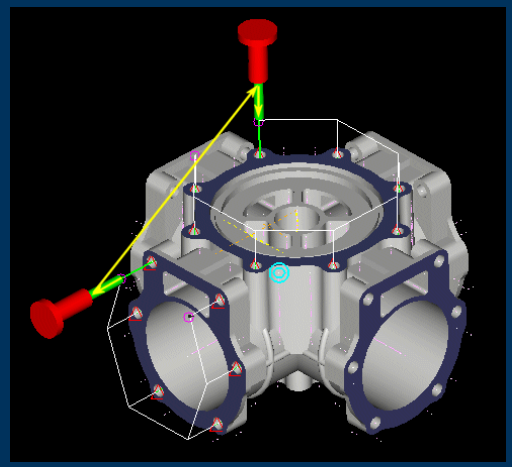
- Solid Model
- Contact Probes
- Non Contact Probes
- Non –Cutting Tools
- User Defined Tools
- Use of Tracking Points
- Supported in Resource Manager





Probing on Machine Tools

- Motion without a Machine tool



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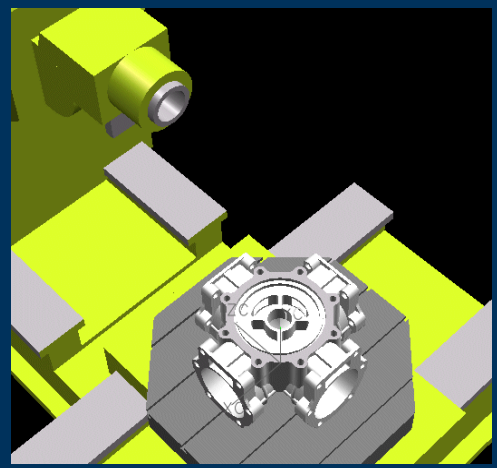
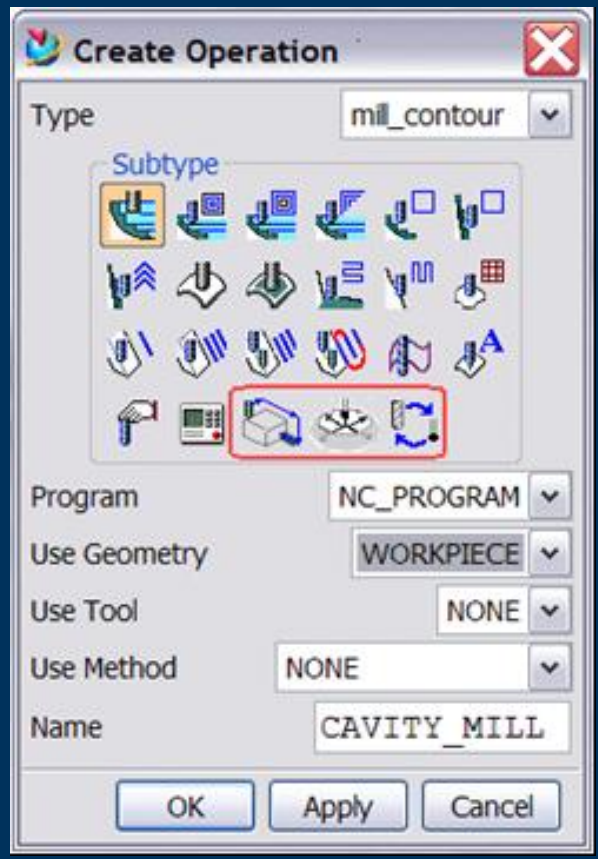


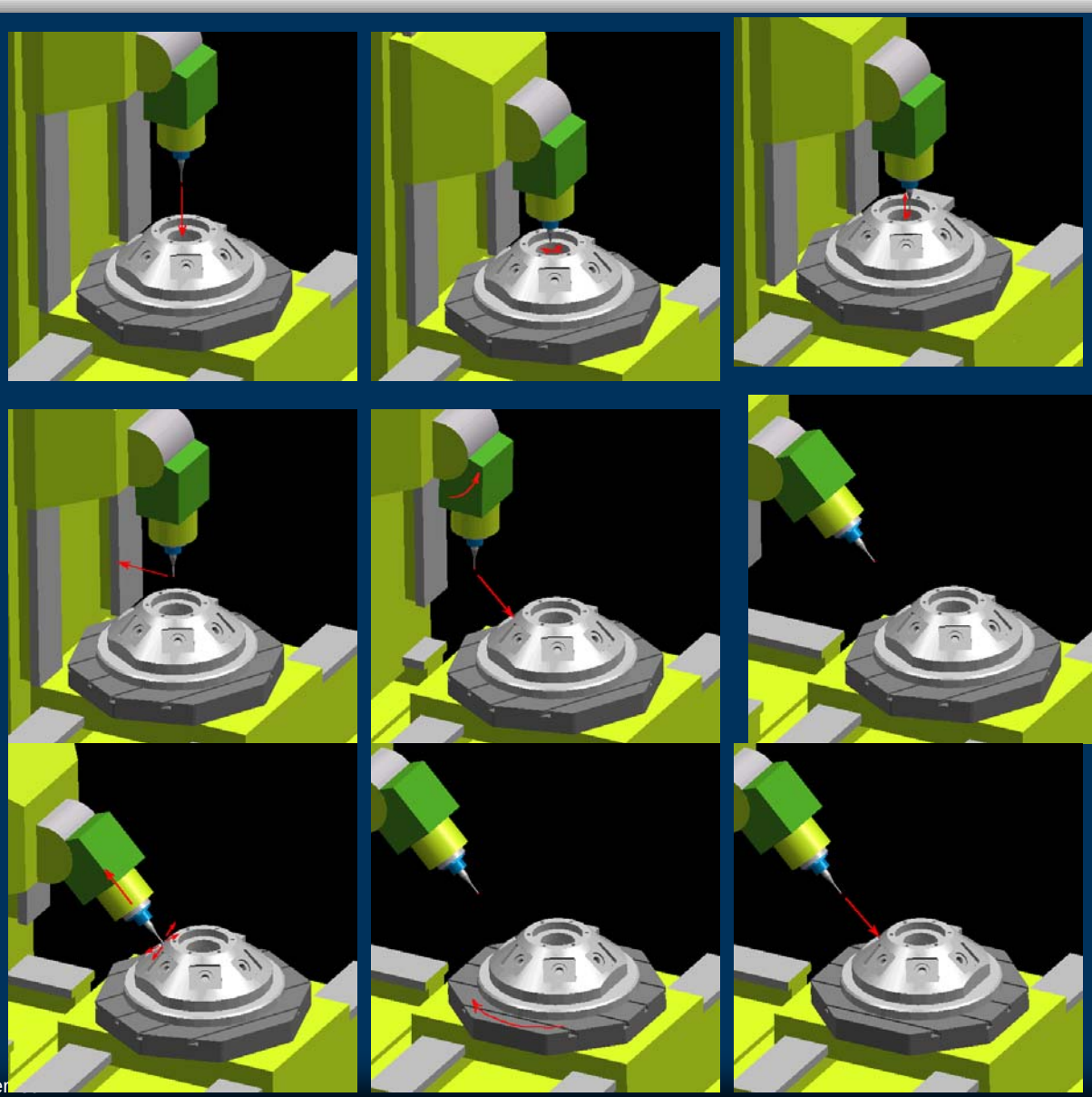
Templates

- User defined motion control operations.
- Tools for higher automation



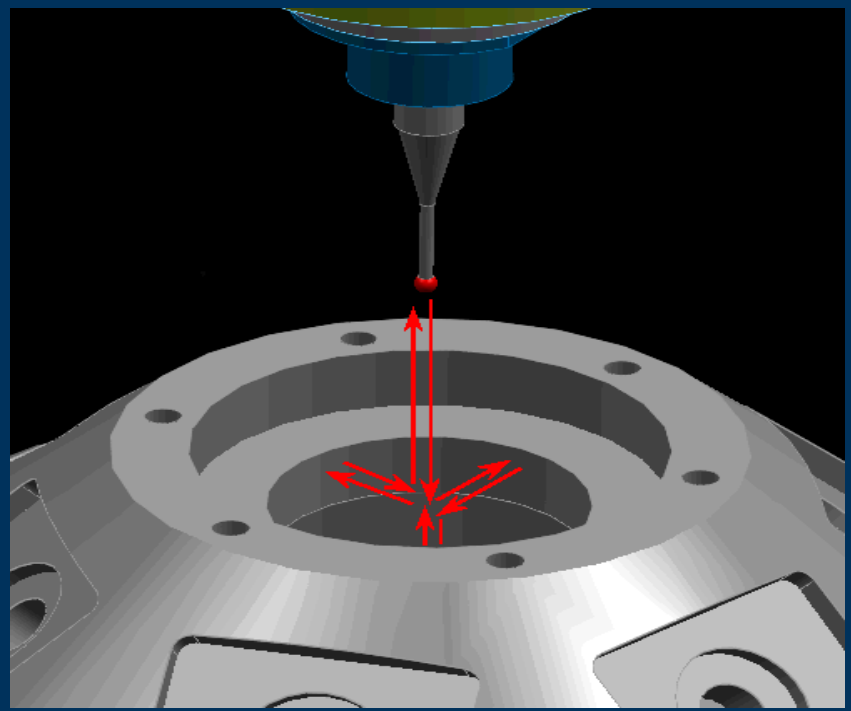
Sample Motion

- Support the Kinematic motion of the machine tool
- Collision Detection
- Dynamic Motion



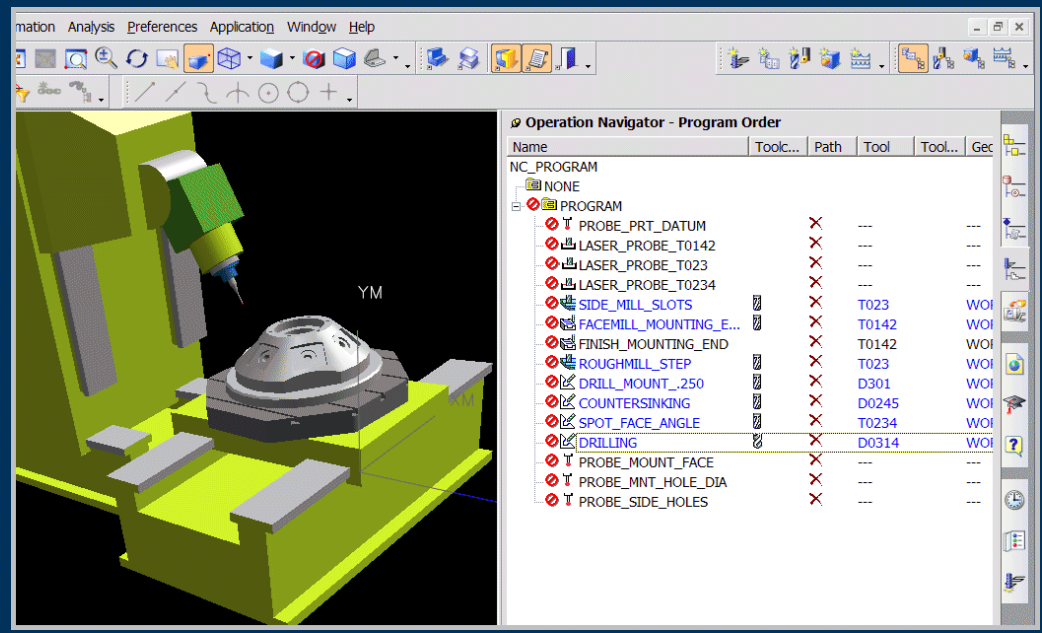
Probing as a Standard Operation

- Support of operation and sub operations for reuse
- Support for Renishaw Probing Cycles
- Output in standard NC format in Post-processors



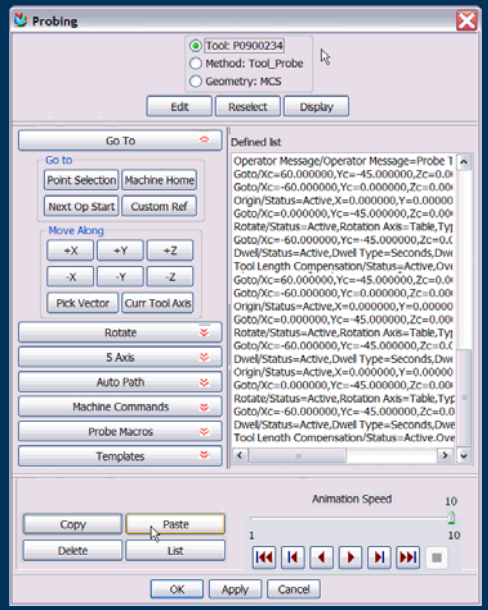
Operation Management

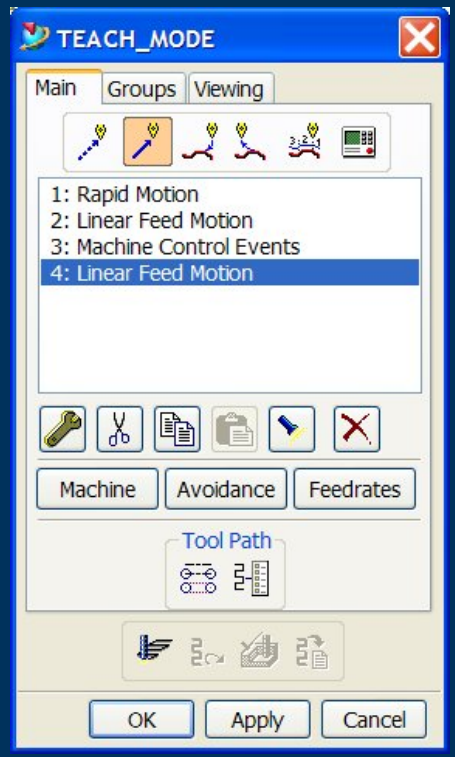
- Management of operations through a navigator



Editing

- Editing
- Teach Mode





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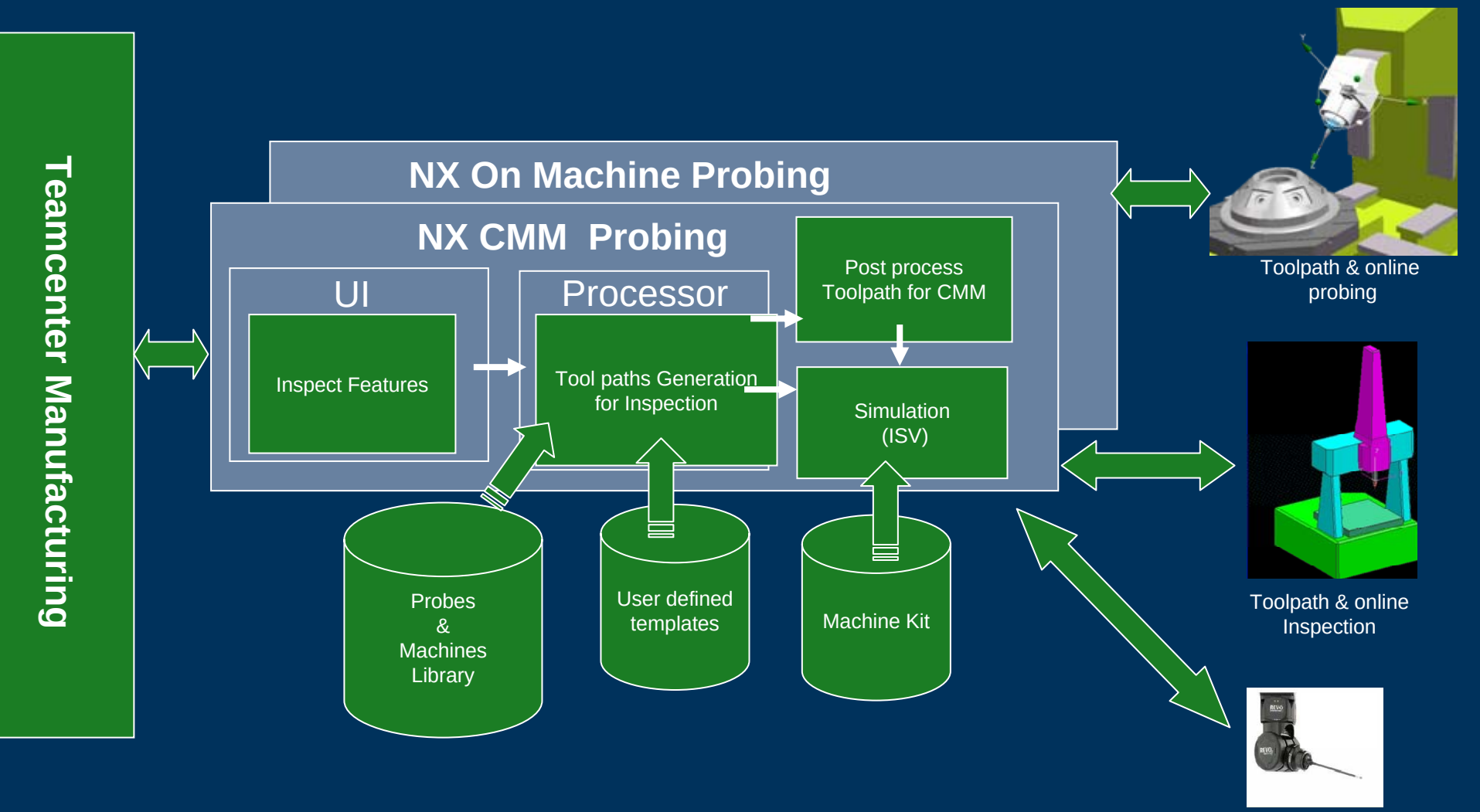
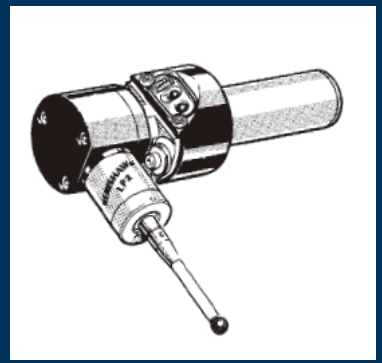
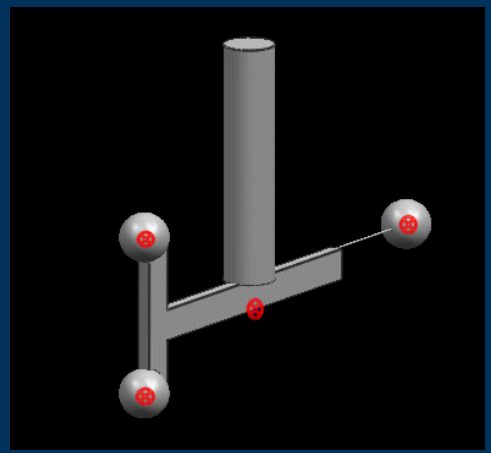
NX 6 CMM Project



Probes

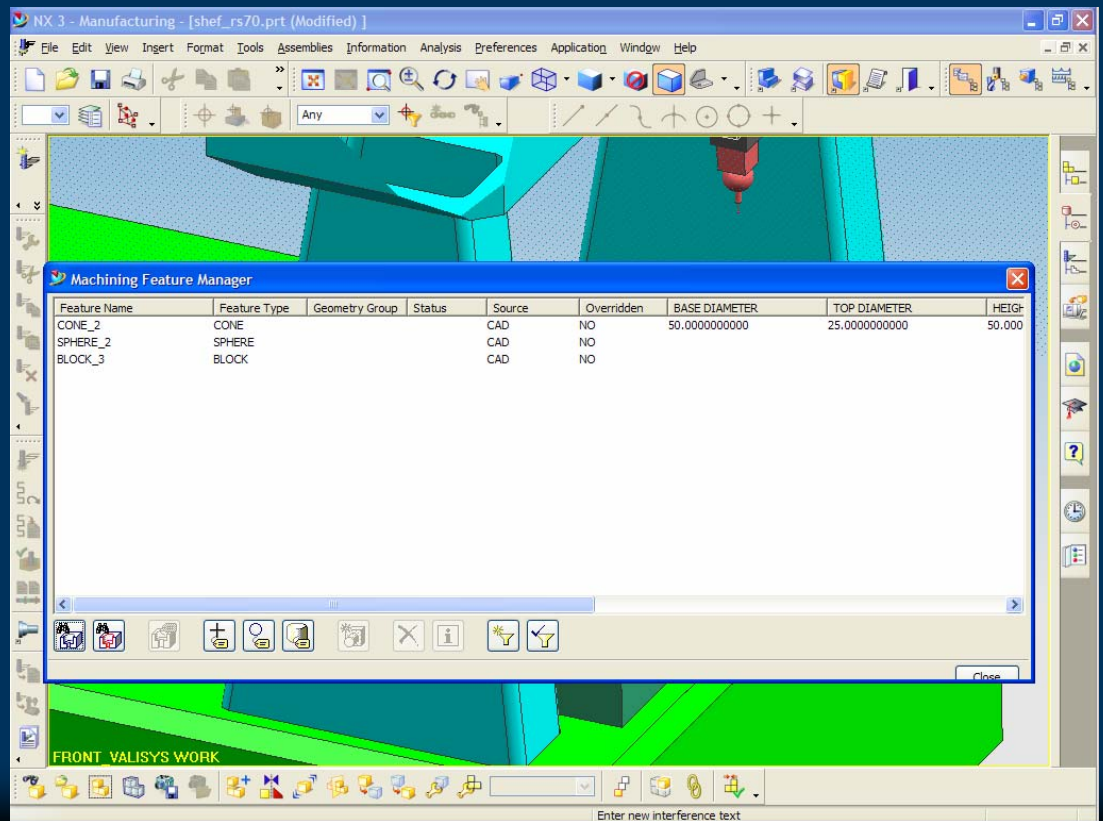
- Solid Model
- Contact Probes
- Non Contact Probes
- Use of Tracking Points
- Supported in Resource Manager



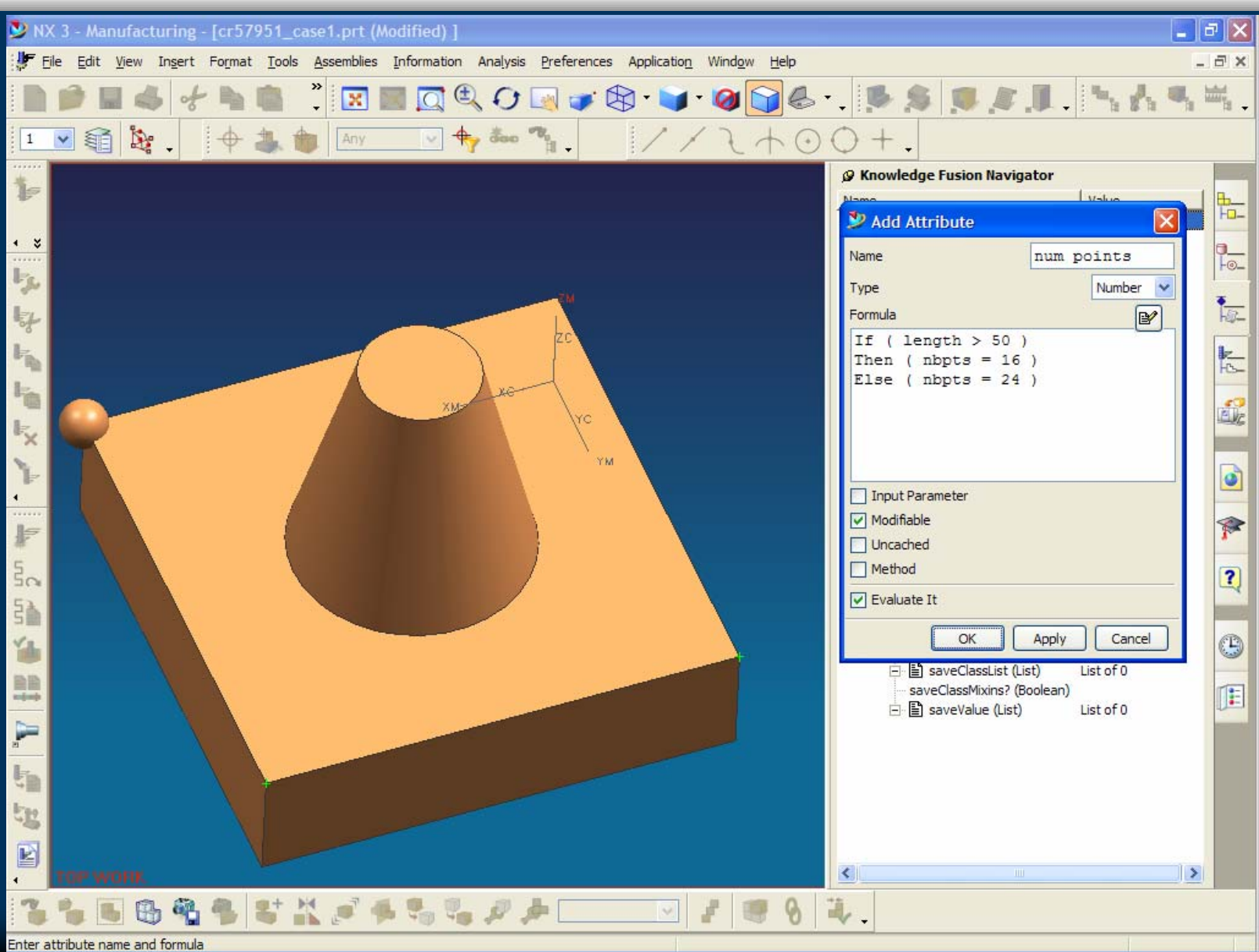


Inspection Features Integrated with CAM Features

- Use CAM features directly
- Import Modeling features
- Support for constructed features
- Import PMI

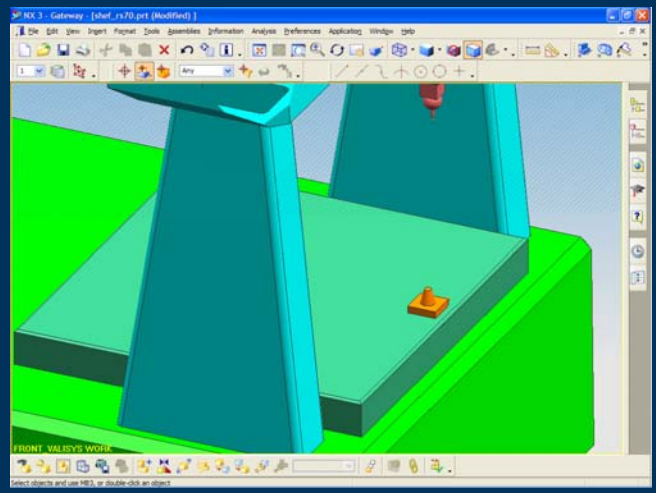


Integrated with Knowledge Fusion



CMMs

- Motion with a CMM



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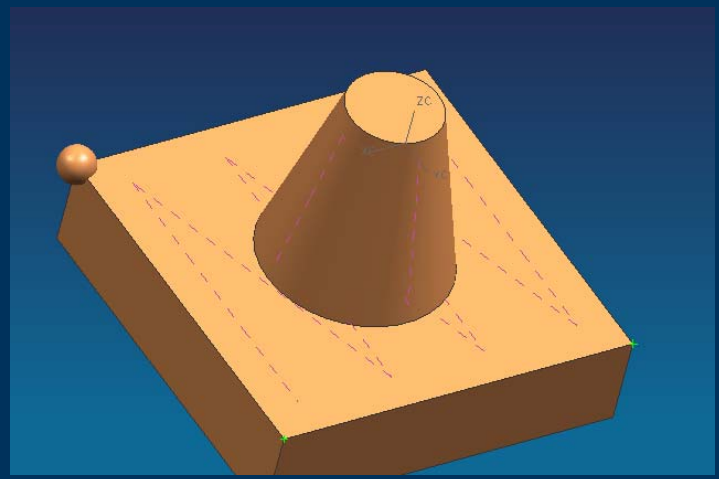

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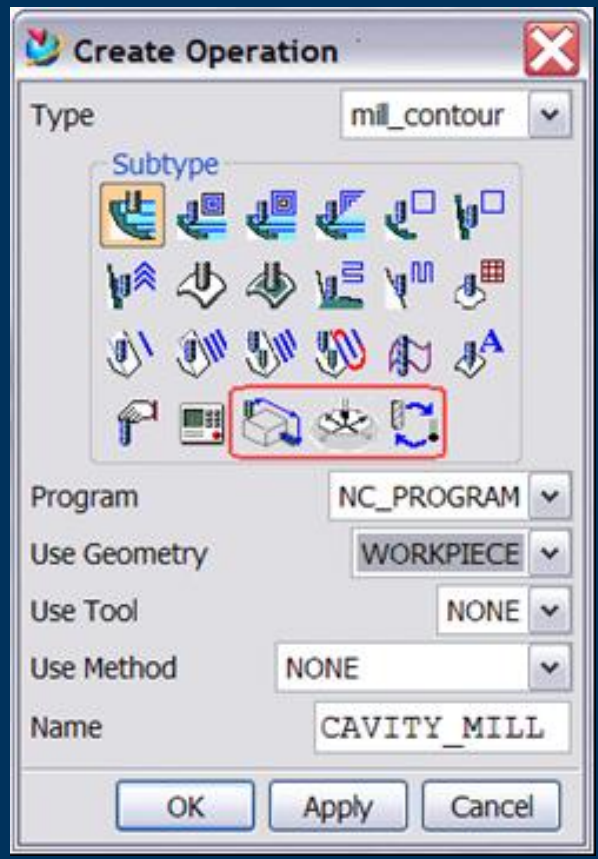
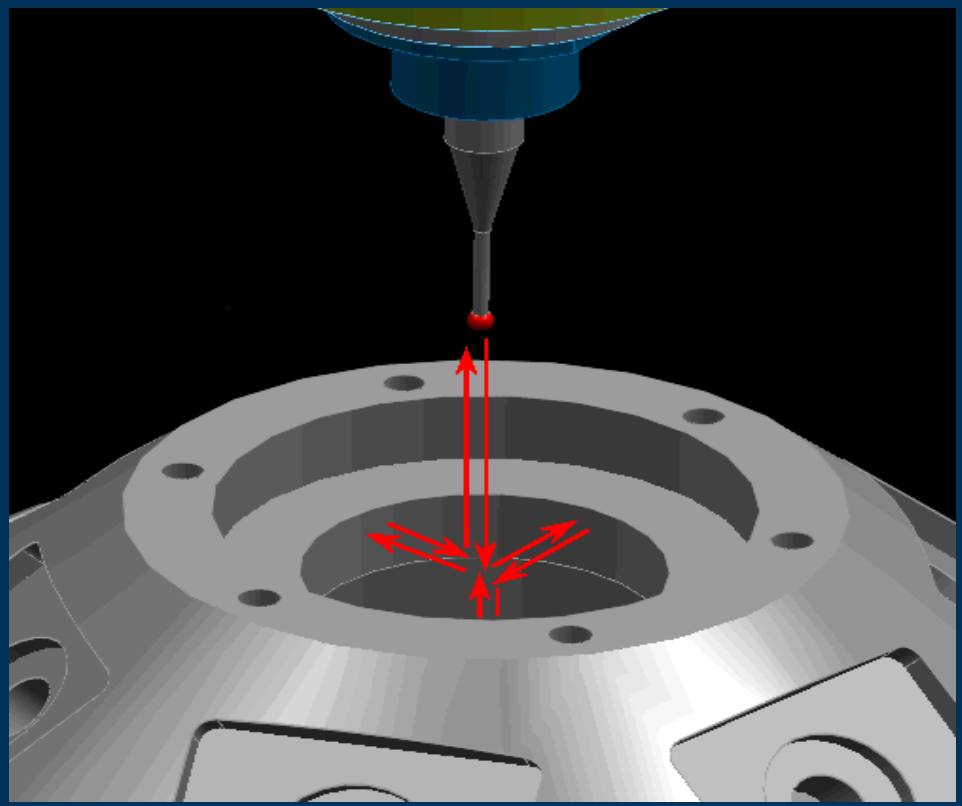


CMM Probing

- Support of operation and sub operations for reuse
- Output in standard DMIS format
- Other formats supported by post-processors



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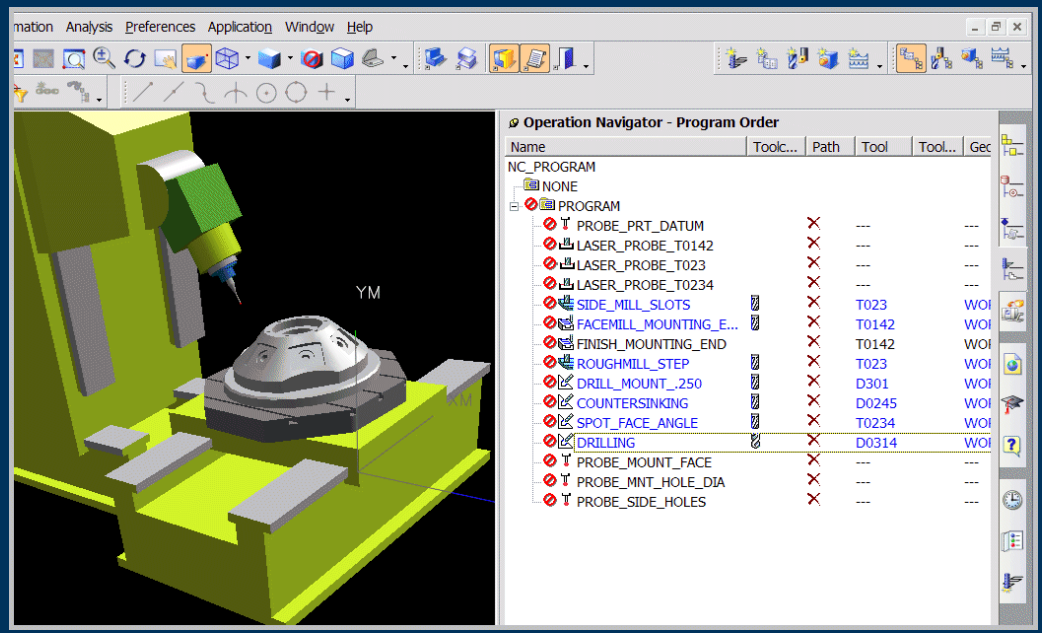

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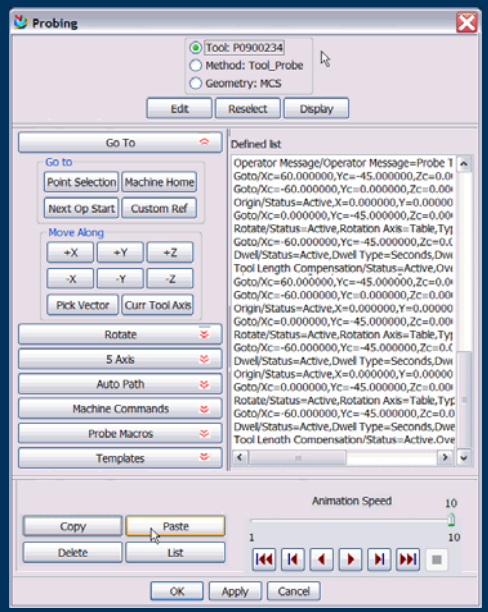

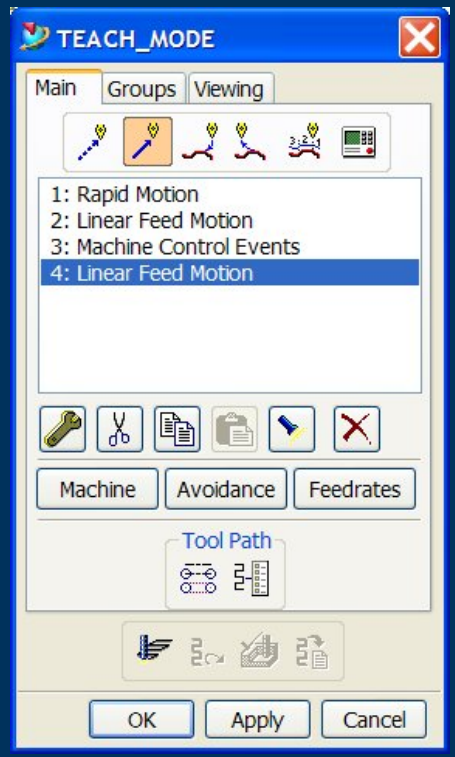

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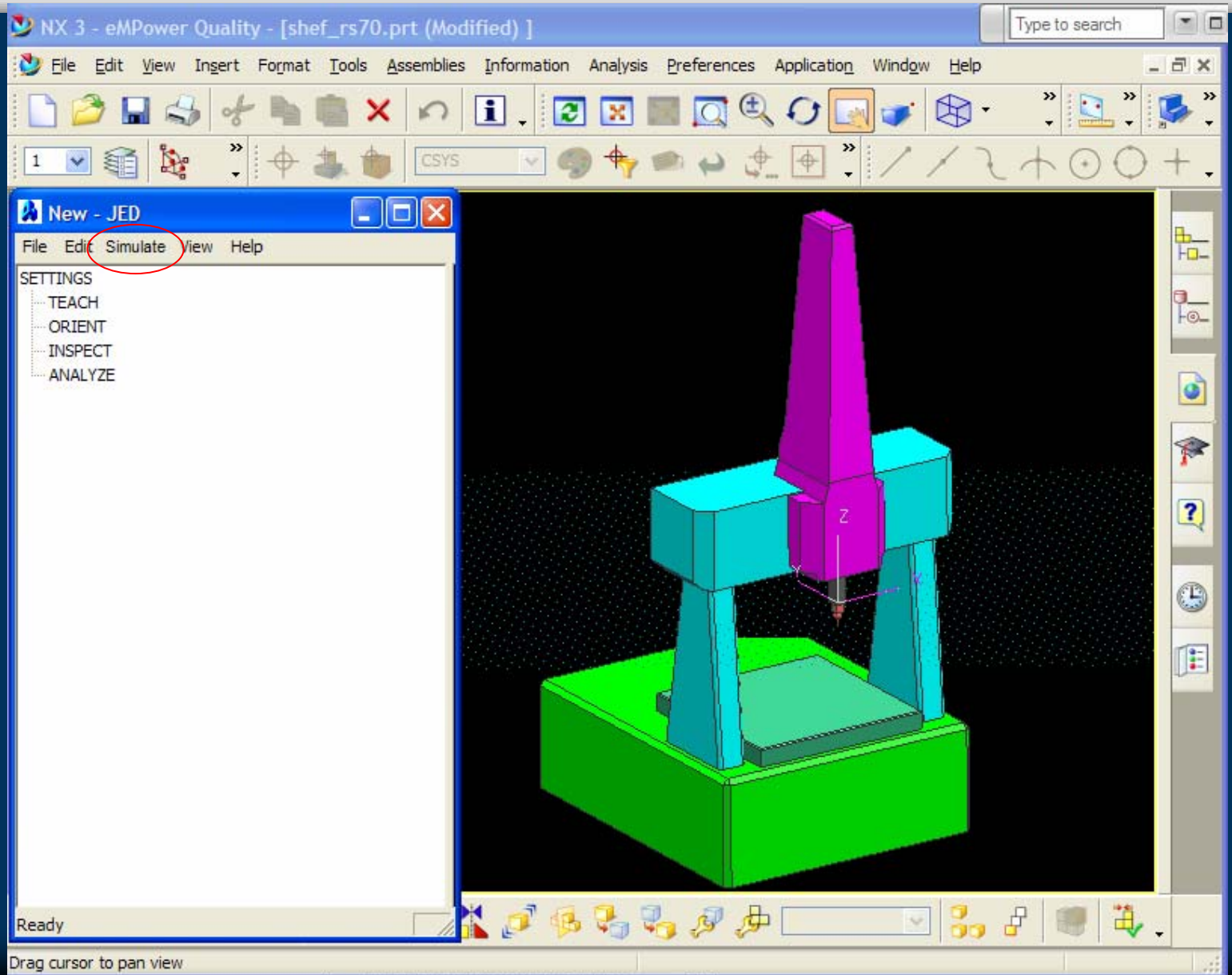
Machine Simulation



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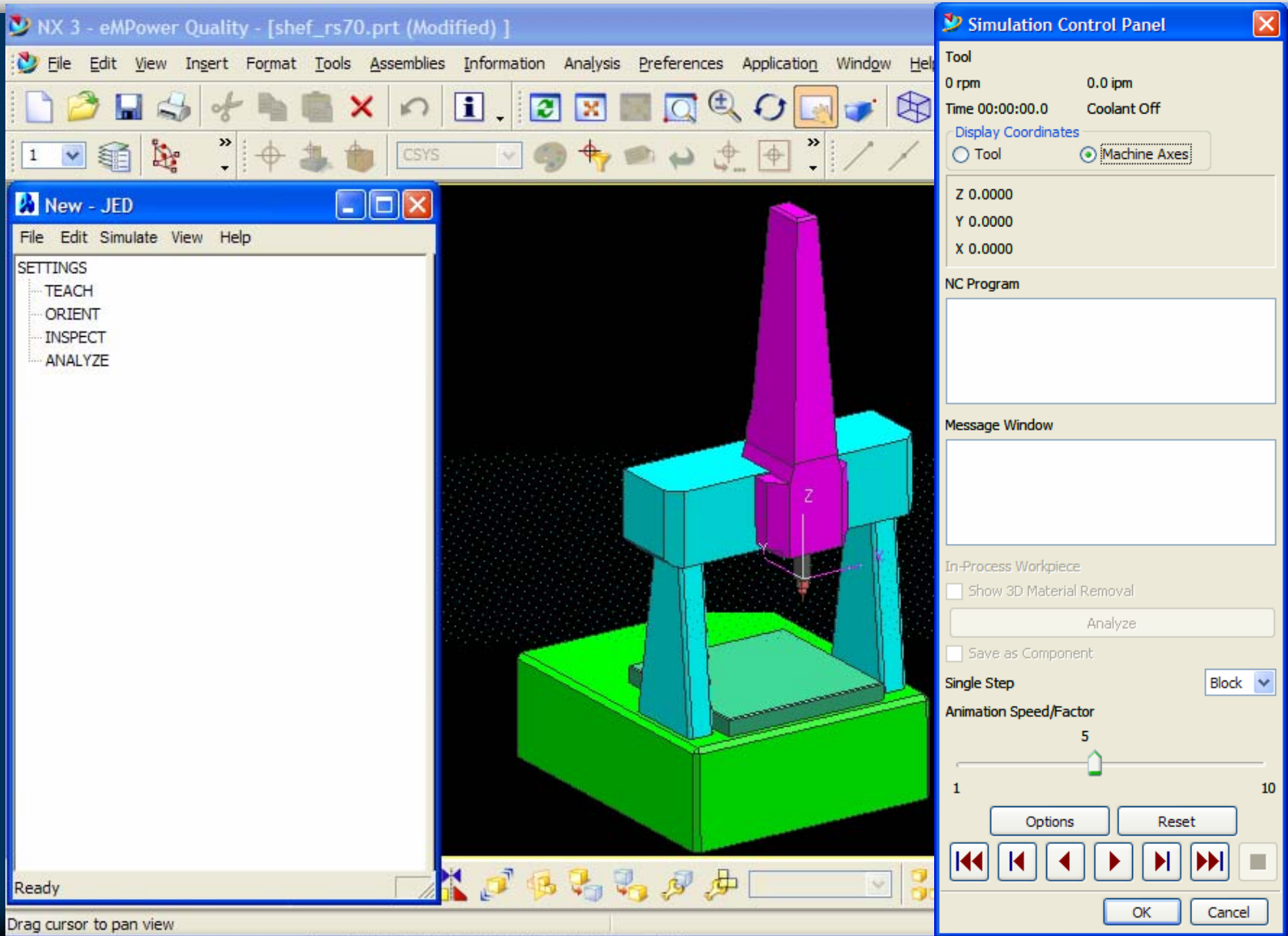


eM-Measure Support for Revo

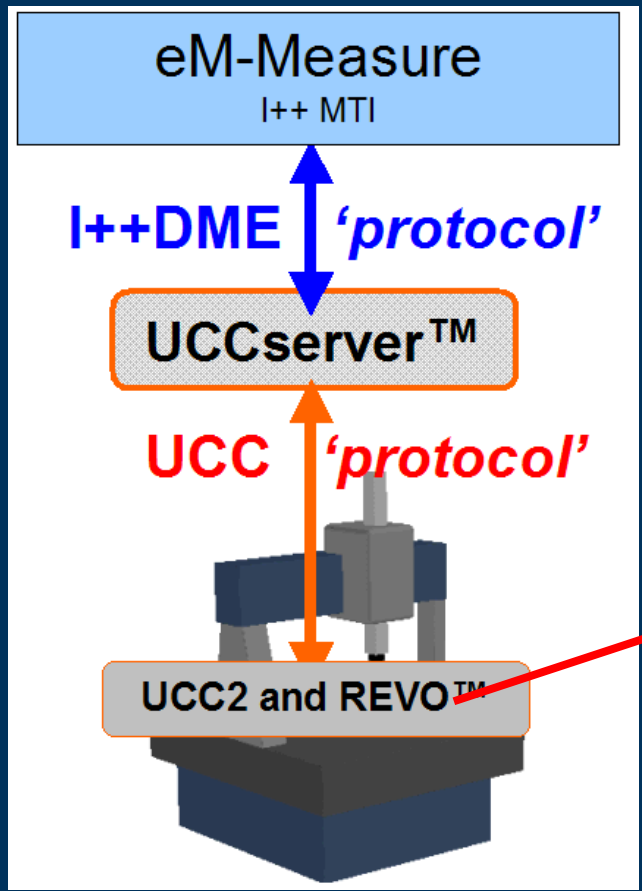
- Project underway to support the Revo head and UCC2 controller
- First implementation will support “scan on curve” functionality
- Initial testing took place at Renishaw in February
- Commercial Release in Q3

Revo Head

- Renscan5™ is only available using the Renishaw UCC2 Universal CMM Controller and forms the basis for Renishaw's future high speed scanning products. Revo™ is the first in a range of developing products and will pave the way for ultra high speed, high accuracy scanning.
- This new technology is major change to probing technology
- Benefits
  - 5-axis style scanning
  - Fast as non contact laser’s
  - High degree of accuracy
  - More Data Points

Renishaw Revo Probe

- REVO is a dynamic new measuring head and probe system from Renishaw. A revolutionary new product designed to maximize CMM throughput while maintaining high system accuracy.



Machine types – Collect large point cloud data

CMM

Arm

Camera

Laser tracker

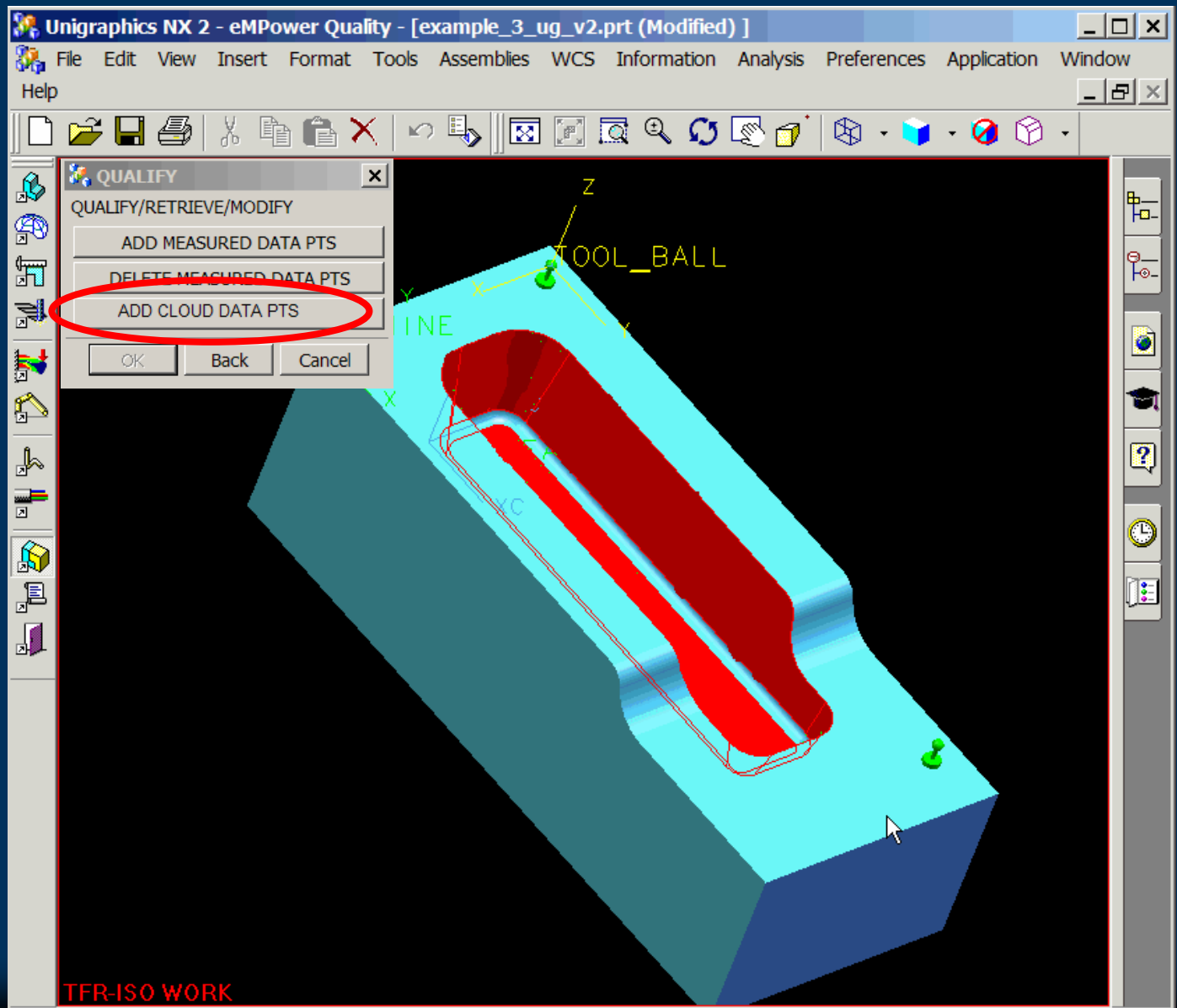
FM laser radar

GPS

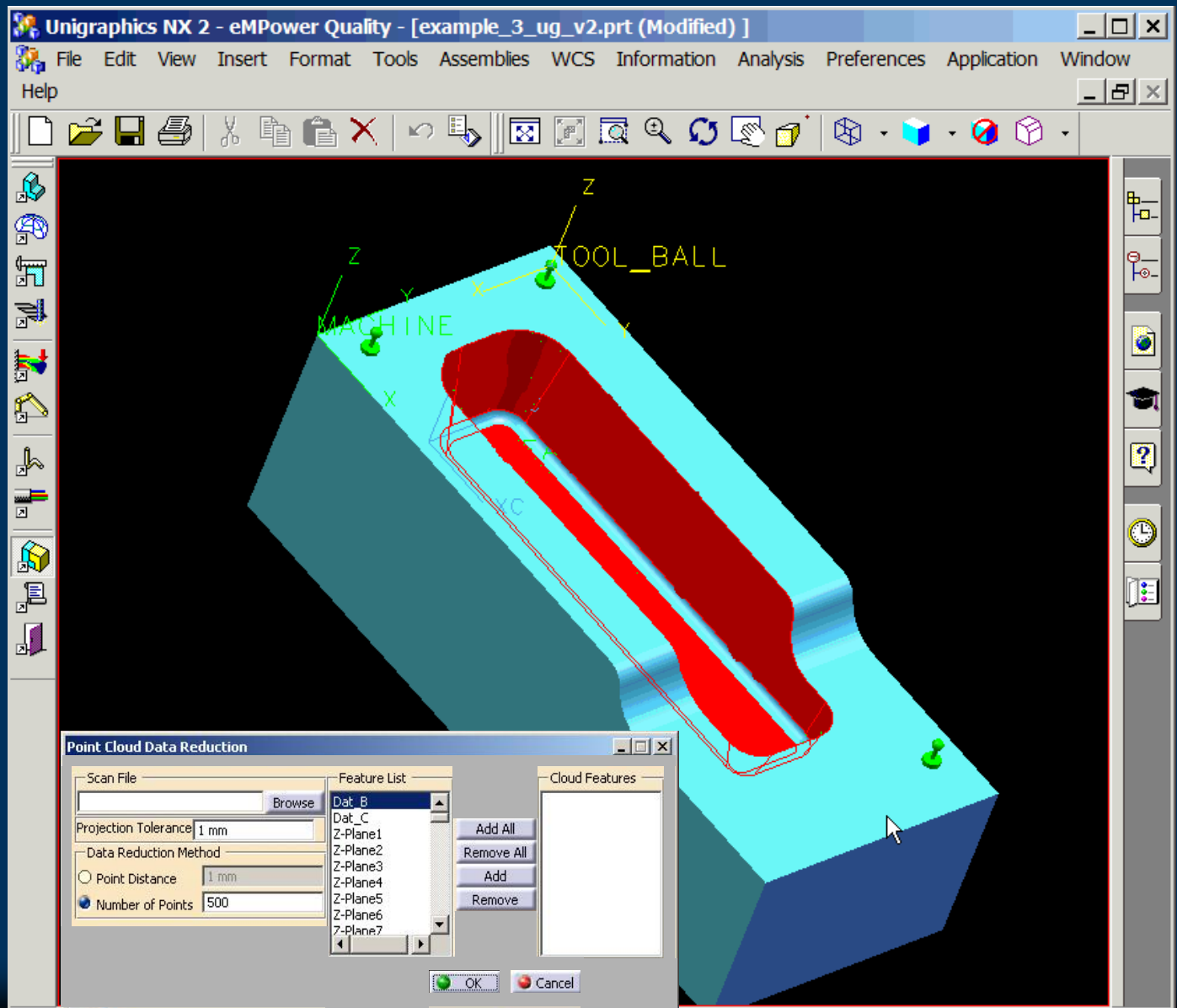
eM-Qualify Roadmap

- Integration with Imageware
  - Align LARGE clouds of points with CAD model using Imageware best fit
  - Utilize Imageware point reduction algorithms to enable Qualify analysis
  - Benefits
    - Allow manufacturers to reduce measurement speed with scanning device
    - Improve geometry representation and accuracy of physical part by collecting large point cloud data: > 1,000,000 points
    - Analyze large point cloud data with full GD&T analysis to solve manufacturing problems.

Point Cloud Data Analysis



Point Cloud Data Analysis



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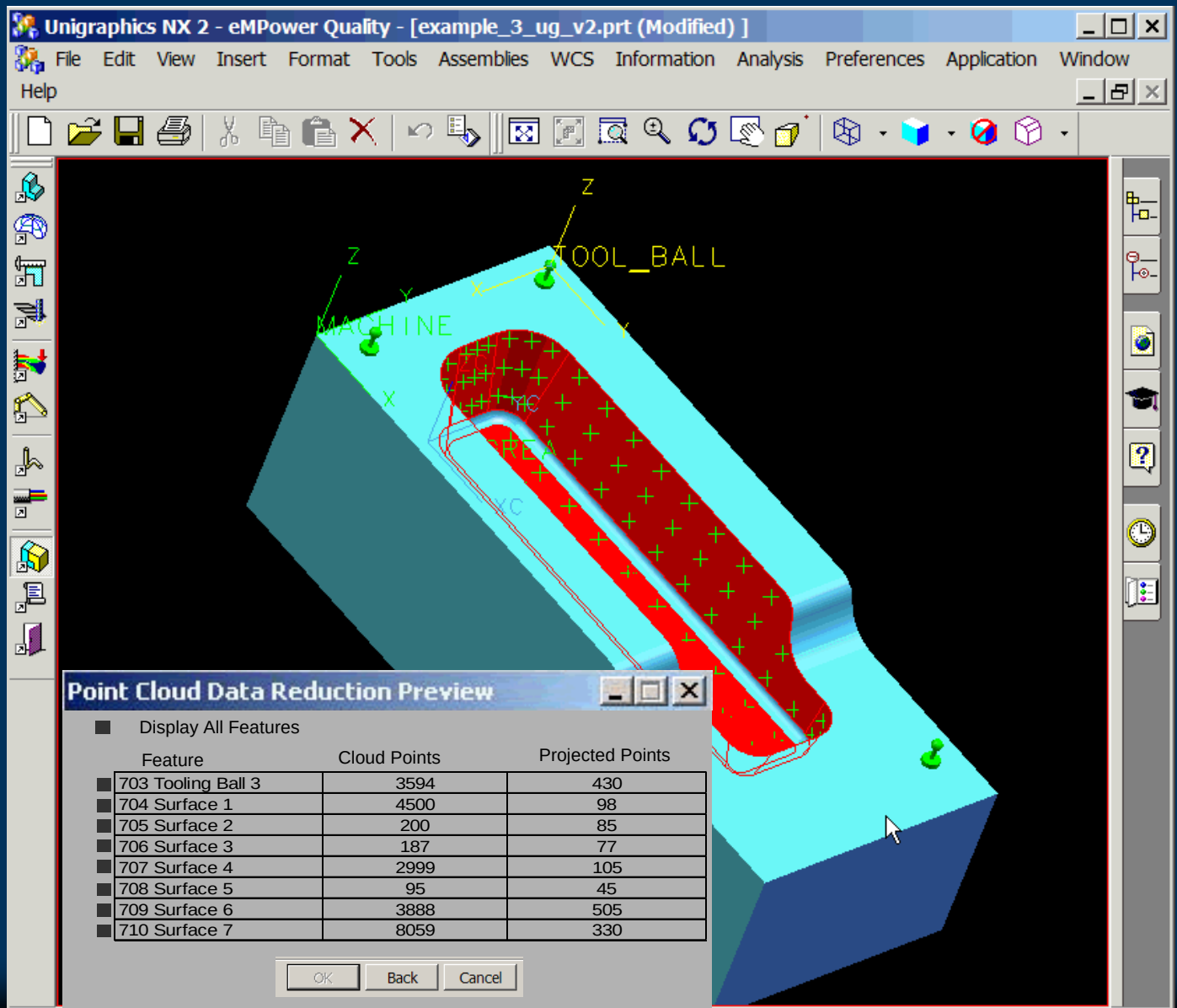

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Integrate eM-Measure with TeamCenter Engineering for “Jobs”

- A new .Job document type will be supported in TeamCenter Engineering. The Valisys programmer will then be able to upload a “package” of files as an inspection Job into TeamCenter.
- The CMM operator at the shopfloor will be able to:
  1. Launch eM-Measure from local PC
  2. Click on the “Download” button.
  3. User logs into TeamCenter Engineering
  4. User navigates inside of TeamCenter Engineering to select a .Job package.
  5. User then downloads the inspection .Job which gets automatically unpacked into the correct directories on the local PC.
  6. User then selects Job in eM-Measure and executes inspection Job on the CMM.
  7. Inspection results are viewed locally on the PC

TeamCenter integration for inspection results (DML)

- Inspection result (DML) files will be stored in TeamCenter Engineering in the same location as the .Job package.
- User will be able to view the results by clicking on the DML and then be presented with a readable and printer-friendly HTML format. This is similar to the eM-Measure HTML file today.
- User can also access the DML data from TeamCenter in eM-Qualify
- Deliver December 2006

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Thank You