On Machine Probing in NX

Bob Sammut
Directors  Product Development
Probing in NX Road Map

- **NX 4** (Q4/2005)
  - eM-ProbeCAD NX: Utilize ISV Simulation capabilities to simulate DMIS Programs

- **NX 5** (Q1/2007)
  - CAM: Support probing cycles to measure tool lengths and machine offsets. Add probes to tool libraries.

- **NX 6** (Q1/2008)
  - CMM NX: Fully integrated into NX using CAM Framework and PMI for CMM off-line programming

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Topics

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

- Motion with a Machine tool
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
Management of operations through a navigator
Editing

- Editing
- Teach Mode
Topics

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- NX6 CMM Programming
- New Inspection Technology
- eM-Measure
NX 6 CMM Project

Teamcenter Manufacturing

NX On Machine Probing

NX CMM Probing

UI
Inspect Features

Processor
Tool paths Generation for Inspection

Post process Toolpath for CMM

Simulation (ISV)

Probes & Machines Library

User defined templates

Machine Kit

Toolpath & online probing

Toolpath & online Inspection
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

- Motion without a CMM
Templates

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

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

- Editing
- Teach Mode
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Machine Simulation
Machine Simulation
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
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
- Laser tracker
- FM laser radar
- Camera
- GPS
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
## Point Cloud Data Analysis

### Display All Features

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<tr>
<th>Feature</th>
<th>Cloud Points</th>
<th>Projected Points</th>
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</table>
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- eM-Measure
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
Thank You