Creating the Value Add

The Great Differentiatorator

People

Process

Platform
People

- Metrology Expertise
- Engineering Design
- Physics
- Software Expertise
• Metrology
• Reverse Engineering
• Engineering design assist
• Print development
• GD&T consulting
• Datum structuring
• Fixture design
Process

The entire system is accredited.

Establishes:

- Competency of skill
- Adequacy of equipment
- Reliability of business process/quality management system
- Contract review & final inspection
- Proven measurement uncertainty
The Value-Add Customer Experience

• Rely on high-level engagements with top-tier engineering support
• Improve product quality, manufacturability, & production processes
• Access immediate online assist
• Changes/edits can occur on the fly
• Make informed decisions
Platform

Zeiss Metrotom 1500

Zeiss Metrotom 800
MAIN COMPONENTS OF INDUSTRIAL CT

- X-ray source
- X-ray detector
- Cone of radiation
- Rotary table
- Inspected object
- Positioning axis X for magnification
- Additional positioning axis Y
Resolution dictates the smallest feature you can see.

At a lower resolution, sharp edges may be rounded.

It’s a trade off between the amount of part that can be scanned in one scan vs. higher resolution.
RESOLUTION: WHY IS IT IMPORTANT?

• Pixel size on the detector is fixed. To achieve higher resolutions, the object can be moved closer to the x-ray source. This will spread the same feature across more pixels, therefore increasing resolution.

• The trade-off with increasing resolution is limiting field of view.

• NPC takes a consultative approach to help the customer find the proper balance for their unique project.
Deliverables

- STL
- Reverse Engineering
- Layout
- Color Map
- Porosity Analysis
- Wall Thickness Analysis
- Assembly/Failure Analysis
Deliverables

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- STL
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ABC Company, Inc.
123 Street
Naperville, IL 60565

Attn: Ron Smith

Technician: Wm. Aldridge
NPC File ID: 11026
Part Name: CASE ASM
Part #: 28480000
Print rev.: 002
# of Parts: 3

Set Up: The parts were set up on a Brown & Sharpe Xcel 9-15-9 CMM. Parts were held in customer-supplied holding fixture.

Alignment: Parts were leveled on the appropriate datum structure using features measured per the Metrology Plan. The JBC datum structure was the default alignment used if an explicit alignment was not specified or implied.

Comments:
- Parts are numbered 1-3 with blue marker.
- Basic dimensions were numbered on the print, but were only reported with their associated true positions.
- Dimensions that went to the centerline of the suppressor were reported to both the suppressor and the plastic sleeve, as noted.
- The angled features in dimensions 26-28 were present but exhibited poor form and were not reliably measurable.
### Inspection Report

**Sample Test Report**

**CUSTOMER:** ABC Company, Inc.  
**PART NAME:** CASE ASM  
**CONTACT:** Ron Smith  
**DATE RECEIVED:** 4/26/2016  
**DATE COMPLETED:** 5/3/2016  
**PROCEDURE:** Proc-03  
**CONDITION:** NEW  
**LAB TEMPERATURE:** 68 ± 1°F  
**LAB HUMIDITY:** < 50%  
**INSPECTED BY:** Wm. Aldridge

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**Material:** Plastic  
**Material:** Plastic  
**Measurement results relate only to the items inspected or tested**

- **Estimated Uncertainty**
  - CMM1 - Brown & Sharpe Xcel 9-15-9 ± (22 + (33.0 * L)) ± (6.8 + (4.5 / A))
  - CMM2 - Mycrona Altera S/L 4-4-3 ± (3.5 + (32.9 * L)) ± (6.6 + (0.7 / A))
  - CMM3 - Brown & Sharpe Global Image 7-10-7 ± (9.2 + (34.0 * L)) ± (7.0 + (1.9 / A))
  - CMM4 - Brown & Sharpe Micro Xcel 7-10-5 ± (15 + (30.0 * L)) ± (6.1 + (3.1 / A))
  - VIDEO1 - ROI Omis III ± (14 + (20.0 * L)) ± (4.2 + (3.0 / A))
  - VIDEO2 - ROI Omis II ± (14 + (20.0 * L)) ± (4.2 + (3.0 / A))
  - VIDEO3 - MicroVu ± (100 + (5.3 * L)) ± (1.1 + (21 / A))
  - CT1 - Zeiss Metrotom 888 CT Scanner ± (0.7 + (15 * L)) ± (0.9 + (2.6 / A))
  - CAL1, 2, 3 - Caliper ± 1.56 N/A
  - PM - Pin Gage ± 0.54 N/A
  - MC - Micrometer ± 0.254 N/A
  - RAD - Radius Gage ± 0.500 N/A
  - VISUAL - Visual

**Measurements performed by:** Wm. Aldridge  
**Reviewed by:** Greg Nelson

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**Title:** Project Engineer  
**Title:** Operations Manager

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<th>Part Name: CASE ASM</th>
<th>Part Number: 28480000</th>
<th>INSPECTION REPORT</th>
<th>FILE ID#: 11026</th>
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### Blueprint dimensions and descriptions

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**Measured Angle of Track**

**TO TOOLING ALIGNMENT**

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Major Consumer Product Company:
Multiple high-level cavitation molds for high-volume production & global distribution

**Problem:** Struggling to develop, approve, & launch new tooling

- 16 weeks: produce, run, evaluate & test, modify as needed
- 3 months: product inspection using traditional measuring tools to approve mold for production
Major Consumer Product Company:

Multiple high-level cavitation molds for high-volume production & global distribution

Solution:

- **CT Scanning**
  - Quicker & easier analysis of process & mold steel conditions
  - Inspection reports in 3 days instead of 3 months

  - Change decisions made instantly not in days/weeks
  - Finish measurement programming ahead of final production tool

  Inspection reports in 3 days instead of 3 months
Major Consumer Product Company:

Multiple high-level cavitation molds for high-volume production & global distribution

Solution:

CT Scanning → Reduce overall inspection requirements → Digital data lives on forever
No need to re-sample parts or redo setup → Revisit of 3D data set confirmed problem & provided solution
Major Consumer Product Company:
Multiple high-level cavitation molds for high-volume production & global distribution

Results:
Client saves $1 million in direct cost!

$60 million in cash flow 4 months sooner!
Major/Global OEM Medical Device Company:
Product development & launch capabilities
Drug delivery pumps

20 molded components of the device
- Engineering product design
- Metrology
- Fixturing
- Assist with design prints
- Establish datum schemes & proper GD&T
- Design production test fixtures
Major/Global OEM Medical Device Company:
Product development & launch capabilities
Drug delivery pumps

- CT scans & inspection data: quick mold evaluation & final production approval
- Design & certify production measurement & test fixtures
- Installation of fixtures at manufacturing plant
- Provide all necessary use & certification documentation
Major/Global OEM Medical Device Company:
Product development & launch capabilities
Drug delivery pumps

Results:
- Competitive advantage
- 20 new tools in 20 weeks