mindsmechanical

DPD/MBD/CMS
D6-51991

Services, Compliance and Training

Company Overview

Minds Mechanical is a metrology company specializing in metrology consulting, supplier compliance, equipment, custom software, and final part verification and analysis.

We are an experienced team of engineers and inspectors providing metrology consulting, GD&T inspection, CAD/CMS oversight and quality services, specializing in D6-51991 requirements and compliance training.

Minds Mechanical CAD/CMS measurement capability with a vast network with major measurement software technical support allows to obtain solutions for Customer requirements and problem solving.

Here are some of the Minds Mechanical services utilized by our Customers today

Metrology Consulting	Metrology Services	Oversight Services	Training Services	Software Services
• Provide Customer suppliers & representatives CAD/CMS application answer & solutions to Customer & Industry requirements.	• Provide Virtual or On-Site CAD/CMS measurement processes or problem solving for effective application to Customer & Industry requirements	• Provide inspection & quality services that includes effective audits and corrective action to Customer requirements	Utilize Customer DPD/MBD/CMS requirements train suppliers, & representatives ensuring consistent competency.	• Provide software solutions to Customer DPD/MBD/CMS statistical needs and desires for effective monitoring & reporting

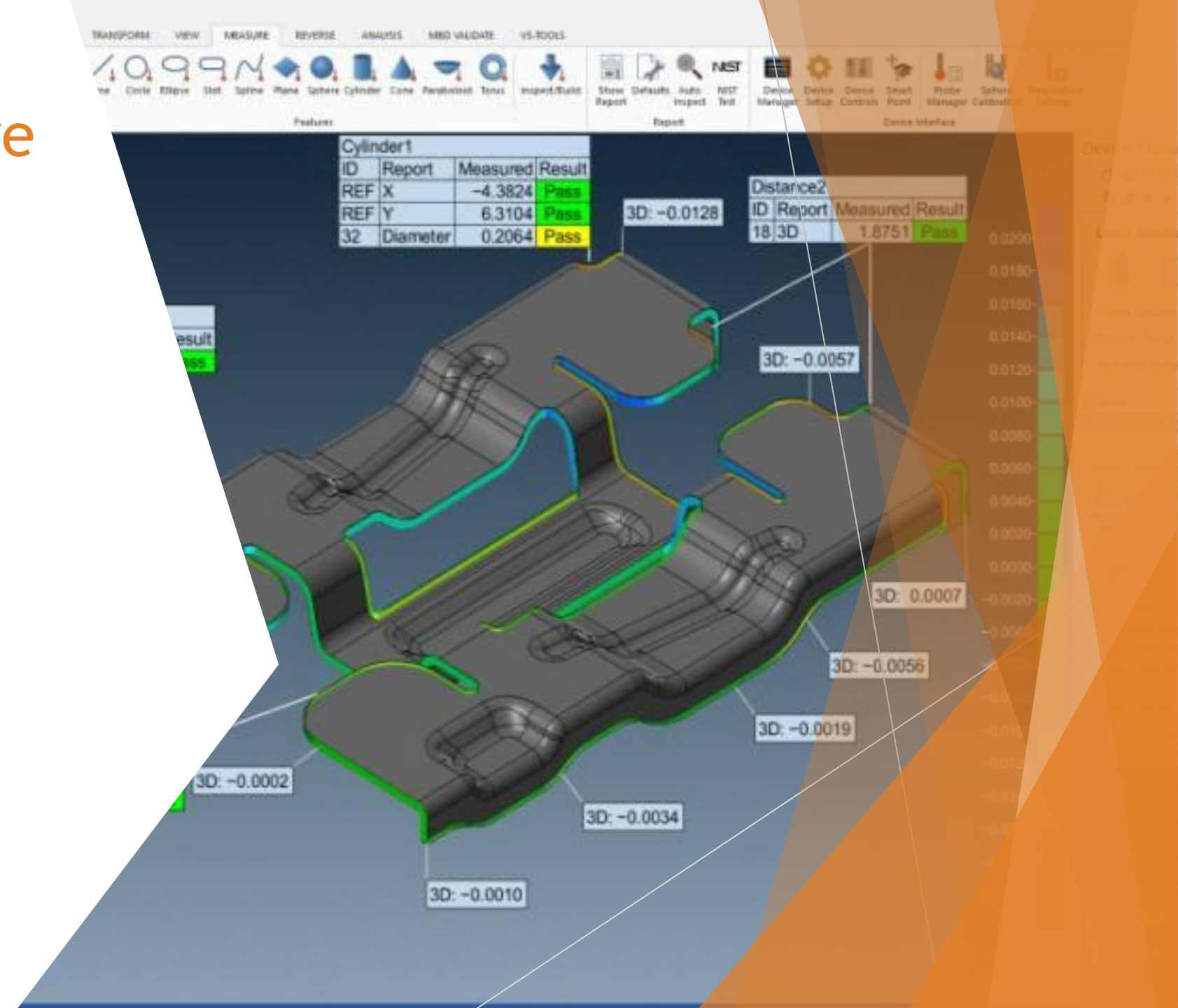
The following slides highlight our turn-key capabilities and services to meet your objectives

Metrology Device Familiarity

- Device Familiarity
  - Laser Trackers
  - CMMs
  - PCMM Arms
  - Laser Scanners
  - Photogrammetry
  - All Standard Metrology Equipment

Metrology Software Familiarity

- Software Familiarity
  - Verisurf
  - PC-DMIS
  - Spatial Analyzer
  - Calypso
  - Polyworks
  - PowerInspect



Metrology Experience

- Team members have experience measuring and conforming to Boeing DPD and D6-51991 standards for tooling and parts.
- Team members have experience with AS9100 quality management system for aviation as well as space and defense.
- Inspection team has experience with MBD CAD translation and validation.
- Team members have training in GD&T and application to model based definition.
- Knowledge of ASME Y15.5 including theoretical datum feature simulators.

DPD Audit Process

- Section A: Digital Product Definition
- Section B: Model Based Definition (MBD)
- Section C: Coordinate Measuring Systems

Section A: Digital Product Definition

Focus Areas:

- DPD Documented Processes
- Data Management, Exchange, and Security
- Revision Level Processes
- Change Control Process
  - Control of non-current authority datasets and derivatives.
- Internal Quality Audits
  - Review internal audit procedures for compliance.

Section A: DPD (cont.)

Corrective Action Procedure Review

Sub-tier Contractor Compliance Procedure Review

Inspection Media Creation and Traceability

Hardware and Software Documentation

Tooling

Section B: Model Based Definition (MBD)

- Supplier CAD System DPD Compliance
  - Ability to view Boeing site-specific annotation
- 3D MBD Model Inspection Media Creation Process Documentation
  - Ensure measurement values of all product features from the Authority Model
- FAI Documentation and Compliance
- Sub-tier Supplier Process Documentation
  - Supplier has documented process to assure sub-tier suppliers' ability to work with MBD information
- MBD Training Requirements Documentation and Review

Section C: Coordinate Measuring Systems

- CMS Equipment for Tooling and Product Acceptance
  - Purpose/Scope
  - Calibration
  - Product Acceptance Software
  - Field Checks / Set Up
  - Drift Points / Stability
  - Temperature Compensation / Scale Factors
  - Establishing Coordinate System
  - Multiple Station Set-up Criteria
  - Data Collection Parameters
  - Data Analysis
  - Reports
  - Record Retention
  - Training

Section C: CMS (cont.)

- Calibration Documentation
  - CMS Equipment
  - NC Equipment
  - OLT's
  - Ply Cutters
  - Any additional equipment used to accept part attributes
- Product Acceptance Software (PAS) Validation
  - Procedure independent of the software developer
- Supplier 'Product Acceptance Software' Development
  - All requirements properly documented.
- Supplier Defined Trainer Requirements
  - Assure competence and maintain training records for all CMS system users.

D6-51991 Section 6 Audit Process In Work (Qarbon)

- Contact Supplier
  - Initial meeting to review requirements, answer any questions relating to hardware or software capabilities
  - Establish efficient way for supplier to include required D6 information.
- Review Documents
  - Initial Inspection Plan and CMS Report Review
- Provide Detailed Feedback
  - Highlight any missing information and assist supplier in obtaining/adding to plans and reports.
- Initial Approval – Cleared for NetInspect
- Continued auditing for all FAIs.

Supplier Engagement

- We go into each engagement expecting resistance as part of the job.
- Our team always maintains friendly, professional, fact-based relationship with suppliers.
- Our first introduction is framed in a way that clearly expresses that we are here as a resource and our main priority is to help get them shipping parts asap, while finding an efficient way to include all required D6 information.
- Solution-focused relationship with suppliers.

DPD Compliance Course Overview

The purpose of this course is to provide comprehensive supplier buyoff training to increase personnel competence and provide guidance to suppliers on satisfying DPD requirements.

Completion and application of this training course will increase the quality of your end deliverable, reducing waste and error.

Course 01 – Device Familiarity

Subjects Covered:

1) Hands on device demonstrations
   - Arm and Laser Tracker
   - Build real world understanding

2) Device Accessories
   - Probes, SMRs

3) Metrology Devices Presentation
   - Comprehensive device presentation
   - Laser trackers, contact/scanning arms, CMMs, laser radar, photogrammetry

4) Scale Bar Measurements

5) Drift Checks

6) Datum Alignments

7) Realignments

8) Device Health Checks
   - Maximize machine uptime

9) Calibration Certifications
   - Metrology arms, laser trackers, CMMs

Course 02 – GD&T and Specifications

Subjects Covered:

1) Global Dimensioning and Tolerance
   - Definition
   - Use-case Examples

2) 2009 and 2018 ASME Y14.5 M
   - Standards Training

3) Specifications
   - Reading and understanding specifications
   - Drawings, matching balloons, etc.

Course 03 – Inspection Planning Process

Subjects Covered:

1) Creating an inspection process

- Planning Process
- Inspection Methodology

2) Verifying Inspection Process

- Confirm standards based on specifications

3) Device Tolerance Verification

- Learn to verify specific device tolerances

Course 04 – Reporting Packages

Subjects Covered:

1) Reporting Expectations

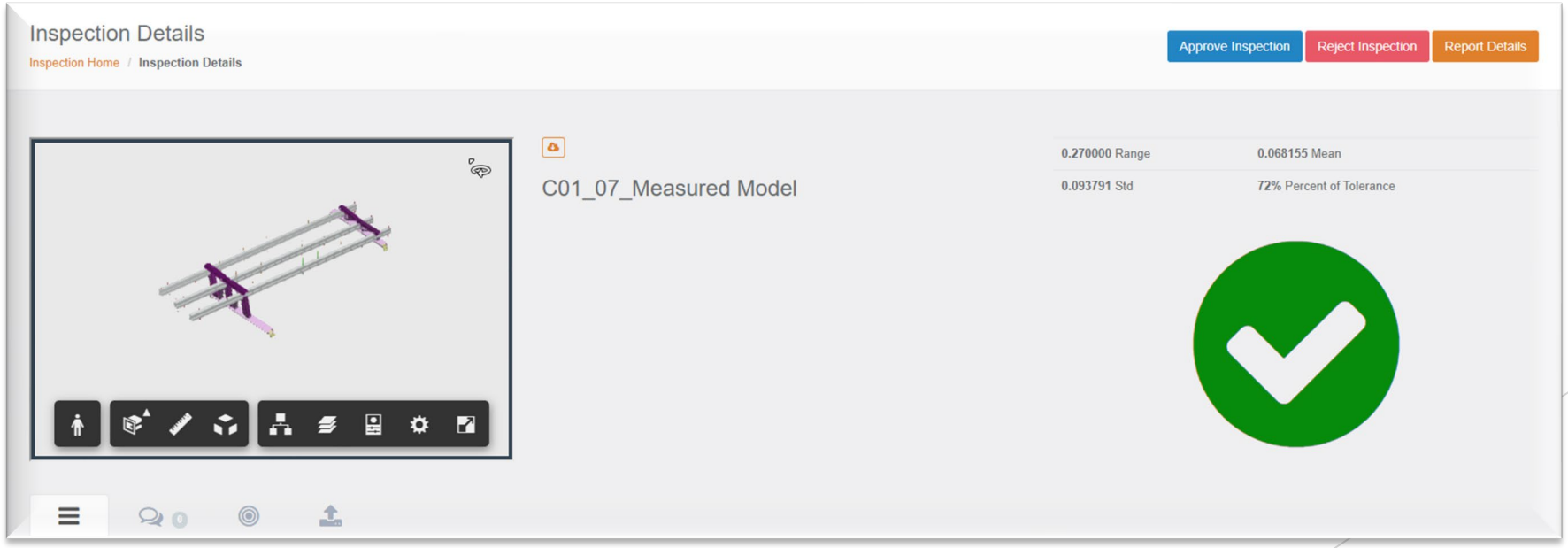
- Device specific expectations
- Arms, laser trackers, CMMs
- Standards and requirements

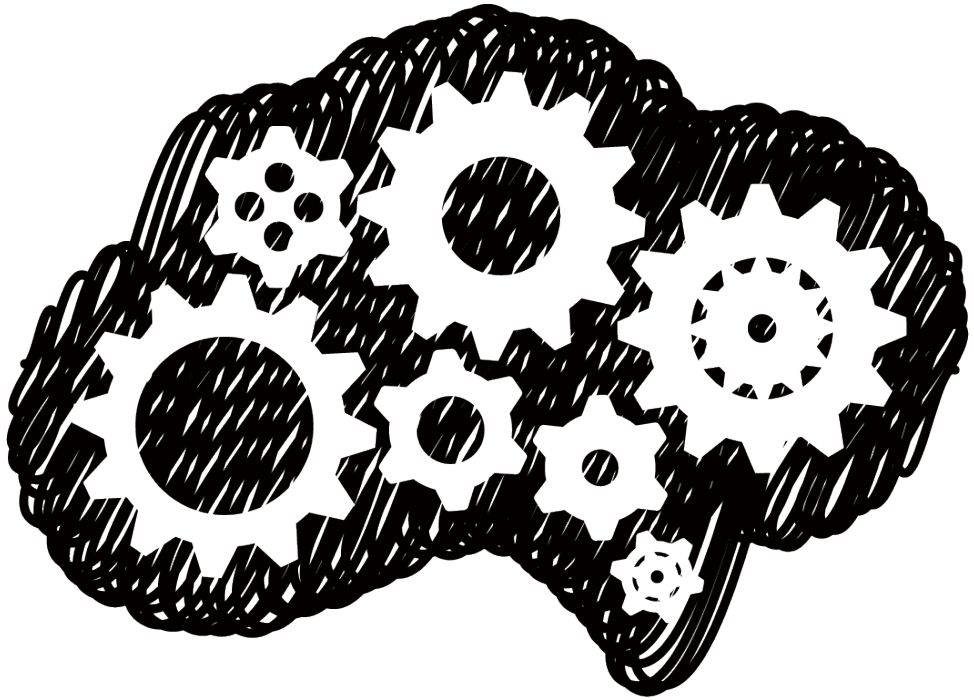
2) Tertiary Supporting Information

- Calibration certifications
- Scale bar, ball bar, pins, SMRs, etc.
- Hardware, Software, Software version

3) Exporting Points

- Exporting to a standard format
- Aircraft or world coordinate frames





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