Geometry
Compare and
Validation For QA

Introducing MagicCheck
Craig Dennis & Larry Kuehn
About TransMagic

• Founded in 2001
• Developers of 3D interoperability, repair, validation & reporting software
• Focus on function, quality, ease-of-use
• Unique toolkit\API approach vs. reverse engineering approach
• Based in Denver, Colorado
• Most administration is done in Denver
• Development is done in multiple locations
Based in Denver, Colorado

- Originally three separate towns. In 1859, the other names were dropped in return for a barrel of whiskey from Denver to be shared by all.
- 300 days of annual sunshine.
- Footballs, baseballs, golf balls, etc. travel 10% farther in the thin air.
TransMagic Technology

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TransMagic: Data, Translation, Repair & Visualization

- Solve A Very Difficult Problem Very Easily For The End User
- No Expertise Required
- High Level Interfaces With Ability To “Drill Down” For Technical Users
- Facilitate The Transition To Model Based Definition
TransMagic: Geometry Compare and Validation

- TransMagic has built its reputation on high quality CAD translation, repair & visualization in a very high-level easy to use interface.
- Q: So what does this have to do with “Geometry Compare and Validation For QA”?
- A: Many:
  - Our specialty: It’s another difficult problem in need of a simple approach
  - The required expertise is in our wheelhouse
  - The required technology is in our wheelhouse
A: Our customers…

….have asked for it!
Introducing MagicCheck

- Full featured QA, Validation, & Revision Management
MagicCheck: Point-to-Part

- Compare measured points from manufactured part against the original CAD data
- Point Browser To Customize Your Point Set
- Cached Point Analysis – Run once and refine many times in many ways without having to re-analyze data
- Remove Noise Points
- Clarify Specific Regions
- Review Inside Only\Outside Only\In Tol Only Points
MagicCheck: Validation

- Multiple formats are used throughout a product lifecycle including in-house and vendors
- Translations are needed to exchange 3D CAD data to and from different software applications
- Validation proves or disproves that the “target” translated data is “within spec” to the original “source” data
- If model deviations are induced during translations, there could be potential for non-conforming parts manufactured and many other quality problems
- Many Quality Programs require it already
MagicCheck: Revision Management

• Graphically scroll through multiple revisions using slider control
• Automatically find & zoom through “Change Regions”
• Pre-defined “Change Region” views captured for report
• Capture views on the fly to include in your report
• Sort through captured views
• Add notes & dimensions to your report
MagicCheck: Revision Management

- Reporting
- Output Point-to-Part (QA), Revision Management and Validation Reports to Excel, HTML & PDF* formats.

*PDF Coming Soon…
Quality Requirements

- Meets Aerospace Quality Program requirements AS9100 Standard
- Meets Boeing DPD Spec D6-51991

9.3 When Boeing DPD data containing 3D geometry is received in translated format (e.g., IGES, STEP), the supplier must verify their translation of each dataset, in order to maintain authority status.

When translations of digital datasets occur between CAD systems or digital equipment, a process must be in place to verify data. Examples of how this can be accomplished are using IGES_CHK, point cloud method or other software validation processes.
Quality Requirements

• Why Model Translation Validation?…..
• Not everyone works in CATIA
• Translations are needed to exchange 3D CAD data to and from different software applications (CAM) or Inspection software
• Rework cost, if model deviations are induced during translations, there could be potential for non-conforming parts manufactured
• Quality Programs require it
Quality Requirements

- Model to Model Comparison
- Read all major CAD formats including CATIA, UG, NX, ProE/Creo, SolidWorks, ACIS, Parasolid, IGES, STEP and JT
- Compare geometry to highlight differences or validate data translation.
- Differences in models can quickly be identified using a color gradation map
- Create chain of custody reports on data files.
- Reports include geometric analysis, surface area, volume, center of mass & topology checks
Quality Requirements

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- Inspection Points from a CMM Nominal DMIS or Measured Profile
- Points created on the Translated CAD file & then imported to Authority CAD file
- Points scanned from Portable devices like Faro Arms or Laser Trackers
Point To Model Compare

• Inspection Points are colored according to specified tolerances and reported to PDF, HTML or Excel formats
Quality Processes Where Validation Is Required

- Example: translations from CATIA or NX on the Original Engineering model to IGES or STEP. This derivative data is then used by Quality Inspection departments for Inspection Equipment, CMM’s or Portable Devices.
Quality Processes Where Validation Is Required

- Example: translations from CATIA or NX on the Original Engineering model to IGES or STEP. This derivative data is then is used by MFG departments to Machine parts. Parts can be scrapped if the translation of data was incorrect.
Thank You!