The Future of 3D Standardization in the Digital Age

Tim Thomas
tim.thomas@partsolutions.com
March 21, 2019
Helping Manufacturers Grow

DRIVE REVENUE GROWTH

SALES

CUSTOMER EXPERIENCE

COMPONENT MANUFACTURERS

Top Line Revenue

DRIVE SAVINGS

COSTS

LEAN ENGINEERING

ORIGINAL EQUIPMENT MANUFACTURERS

Cost Avoidance
Reinheitsgebot:
“German Beer Purity Law”

According to the 1516 Bavarian law, the only ingredients that could be used in the production of beer were water, barley and hops.

The 1516 Bavarian law set the price of beer (depending on the time of year and type of beer), limited the profits made by innkeepers, and made confiscation the penalty for making impure beer.
2 Main Categories:

Varieties of Beer

Ale
- Porter
- English Bitter
- Belgian
- Pale Ale
- Wheat
- Stout

Lager
- Munich dunkel
- Schwarzbier
- Munich helles
- Dortmunder
- Traditional bock

European Lager
- Doppelbock
- Eisenbok
- Helles bok

American Lager
- Bohemian pilsner
- German pilsner

American Premium
- American pilsner

American India Pale Ale
- American Amber
- American Pale
- American Wheat
- Weizenbock
- Weizenbier
- Berliner weisse
- Belgian White
2 Main “Core Geometry Kernels” in use today

CAD Purity:

ACIS (enhanced)

PARASOLID

AUTODESK® INVENTOR®

creo®

NX

SOLID EDGE

SOLIDWORKS®
Industry terms used today

PDM – Product Data Management
PLM – Product Lifecycle Management
MBD – Model Based Definition
MBE – Model Based Enterprise
ERP – Enterprise Resource Planning
SCM – Supply Chain Management
IiOT – Industrial Internet of Things
Digital Twin
Industry terms used today (cont.)

**CAD** - Computer Aided Design

“**Full Fidelity**” Native File - CAD Specific file

**STEP** - Standard for the Exchange of Product Model Data (Neutral Format) (LOTAR)

**BREP** - Boundary Representation
(same claim, no fidelity)

**IP** - Intellectual Property

**Form, Fit and Function** model = Derivative work
1984 – My “Purity” quest
45% of engineering time is wasted searching for or redrawing parts that’s non-value added time

- Aberdeen Group
Childhood LEGO:
Engineer’s LEGO:
A Typical LEGO Design Problem:

90% of these parts are “off-the-shelf”
Cost to introduce a new part

- Clamping device: $200
- Packaging: $700 + $100/year
- Automotive supplier: $1,000
- Construction machines: $1,200
- Truck & Bus: $3,000 to $4,000
- Defense Systems: $27,500
The MBD Inventory

- COMMERCIAL STANDARD PARTS
- INDUSTRY STANDARD PARTS
- COMPANY STANDARD PARTS
The MBE Value Streams

How MBE Powers Your Whole Organization

- CAD / DESIGN
- SUPPLIER
- DOC CONTROL
- ANALYSIS
- PROCUREMENT
- QUALITY
- MANUFACTURING
- SYSTEMS
The MBD Inventory
The MBD Inventory

Geometry:
The 3D shape of a product.

Annotations:
Visible dimensions, tolerances or notes about a design. Priority on machine readable geometric tolerances is preferred, over human-only readable basic dimensions.

Attributes:
The “hidden information” such as metadata, e.g. part number, description, and revision. This information is not visible (or displayed), but is available upon interrogation of the annotated model.

Presentation:
A combination of saved views (snapshot of orientation and zoom) of the model and groupings of selected annotations (displayed tolerances and notes).
MBD/MBE Inventory Summarized

<table>
<thead>
<tr>
<th></th>
<th>COMMERCIAL STANDARD PARTS</th>
<th>INDUSTRY STANDARD PARTS</th>
<th>COMPANY STANDARD PARTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOMETRY</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ANNOTATIONS</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ATTRIBUTES</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PRESENTATION</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
PARTsolutions Integration with SIEMENS Mechatronics Concept Designer using ACE CADENAS eCATALOG
Call to Action!

- Focus on “Value-Added” Activities
- Analyze the 3 part types for “process centric” requirements
- Require vendors to support your “Digital Twin” requirements
- The landscape of requirements for “Full Fidelity” Native data is constantly changing, follow it