Welcome to Manufacturing and Quality Systems at GPDIS 2014

Joe Pesicka
Senior Manager, BCA Manufacturing Execution Systems (Author)

Grady Ford
Technical Fellow, Product Systems Boeing
AGENDA

- A little about me
- Why is GPDIS important to Manufacturing and Quality
- Where does Manufacturing and Quality fit in?
- Key Challenges for Manufacturing and Quality
- Track introduction and a few highlights
- How do M&Q participants leverage GPDIS
- Open discussion
Biography

- Married to Sherry 34 years
- The Ohio State University
- Nicole and Justin
- Interests
  - Boating/Fishing
  - Skiing (both snow & water)
  - Winery hopping with Sherry
- 34 years at Boeing
  - Worked at most IT disciplines
  - Extensive large-scale applications
  - Business knowledge mostly engineering
Product Lifecycle Management

Product life cycle management (PLM) is a philosophy, process and discipline supported by software for managing products through the stages of their life cycles, from concept through retirement. As a discipline, it has grown from a mechanical design and engineering focus to being applied to many different vertical-industry product development challenges.
How/Where M&QS Fits at GPDIS

Global Product Data Interoperability Summit | 2014

Product Lifecycle Management

Visualization

Supply Chain

Architecture

LOTAR

Security

Support

Product Data Management

CAD Data Management

CAD Data Exchange

Manufacturing & Quality Systems

• Manufacturing Planning
• Manufacturing Execution
• Quality
• DW/BI/Analytics
• Automated Identification Technologies (RFID, UID, etc)
• BOM integration
• Parts management (supply chain/shop floor)
• Additive Manufacturing

BOEING is a trademark of Boeing Management Company
Copyright © 2014 Boeing. All rights reserved.
Copyright © 2014 Northrop Grumman Corporation. All rights reserved.
Key Challenges

1. Enabling Interoperability in the Value Stream
2. Preserving Data Quality Through the Value Stream
3. Limiting manual intervention of data
4. Reconciliation of reporting/processing (one source of truth)
5. Disruptive Technologies such as Additive Manufacturing
   a) Strong digital rights management
   b) Integrating vendor proprietary protocols
   c) Physical requirements
What Is Additive MFG and 3D Printing?

Additive Manufacturing (AM) Definition

The process of joining materials to make objects from 3D model data, usually layer upon layer - ASTM F42
## Additive Manufacturing

### ALM Processes: Metals Technologies, Aluminium

**Proprietary Material – ScalmalloyRP**
- ALM processed Aluminium Alloy with excellent mechanical properties
- Static & Fatigue properties are improved compared to 7050 plate material
- Lower density than traditional aerospace Aluminium alloys
- Significant weight benefit when compared to aerospace Aluminium alloys used in castings

---

**Airbus CTO - Dr. Rainer Rauh, EADS Innovation Works V-P Chief Technology Officer**

**Airbus ALM Strategy**

---

A320 hinge made via the ALM process (TWI/GKN/EADS)
### Where Does AM touch IT?

#### Information Technology challenge points

<table>
<thead>
<tr>
<th>Tool Applications</th>
<th>Data Conversion</th>
<th>Vendor Specific Preparation SW</th>
<th>3D Printer Machine Specific Drivers</th>
<th>Manufacturing</th>
</tr>
</thead>
</table>
| Geometry Refine   | CATIA to STL
(native) | FDM                          | Stand Alone                       | Metrology     |
| Pre-Process PDQ   | NX to STL
(native) | STL                          | Networked                         | QA            |
| Watertight        | ProE to STL
(native) | SLS                          |                                   |               |
|                   | 3rd Party to AMF |                              |                                   |               |
|                   | AMF integration |                              |                                   |               |

**Data Spec:**
- STL
- AMF (new)

**3D Printer**
- FDM
- STL
- SLS

**Vendor Specific 3D Printer Drivers**
- Stand Alone
- Networked

**AD&S, Vericode, CM, SWE, ESATS**

**CAD Model**

**Fabrication Machine**

---

*BOEING is a trademark of Boeing Management Company. Copyright © 2014 Boeing. All rights reserved.*

*Copyright © 2014 Northrop Grumman Corporation. All rights reserved.*

*GPDIS_2014.ppt | 9*
## GPDIS M&QS Track – new topics introduced

<table>
<thead>
<tr>
<th>Topic</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening and Welcome to M&amp;QS track</td>
<td>Joe Pesicka – Boeing</td>
</tr>
<tr>
<td>Improved Decisions through integrated Manufacturing and Business</td>
<td>Dave Pimblett – 3ds</td>
</tr>
<tr>
<td>Systems</td>
<td></td>
</tr>
<tr>
<td>Building a Real-time “Transparent” Factory to Ensure Quality</td>
<td>Christopher Steel and Christopher Borneman</td>
</tr>
<tr>
<td>Manufacturing at High Speed</td>
<td>- Software AG Government Solutions</td>
</tr>
<tr>
<td>Quality Information within a Model-Based Enterprise</td>
<td></td>
</tr>
<tr>
<td>Quality Information Framework - A New Interoperability Standard for</td>
<td></td>
</tr>
<tr>
<td>Business as Unusual: Enabling Model-Based Manufacturing and Quality</td>
<td>Tom Hedberg - NIST</td>
</tr>
<tr>
<td>Assurance</td>
<td></td>
</tr>
<tr>
<td>Optimizing 3D Process-Definition Datasets– Using 3D Product Definition</td>
<td>Bryan Fischer – MBD360 LLC</td>
</tr>
<tr>
<td>Improve and Automate Downstream Processes</td>
<td></td>
</tr>
<tr>
<td>Deploying a Common Model Based Enterprise in an Uncommon CAD &amp; PLM</td>
<td>Chris Garcia - Anark Corporation</td>
</tr>
<tr>
<td>World</td>
<td></td>
</tr>
<tr>
<td>GD&amp;T Encoding and Decoding with SpaceClaim</td>
<td>David Zwier - SpaceClaim</td>
</tr>
<tr>
<td>The Role of Configuration Management in Maintaining the Consistency</td>
<td>Rainer Romatka, Ph.D. – Boeing</td>
</tr>
<tr>
<td>of Engineering- and Product Lifecycle Data</td>
<td></td>
</tr>
</tbody>
</table>
For these Typical Engineering and Manufacturing Process Use cases

- **Engr. Rel 3D PDF Assembly Technical Data Packages**
- **Engr. Rel 3D PDF and 2D PDF Part Level TDPs**
- **MBOM-EBOM Alignment Make-Buy Bill of Materials**
- **Animated Process Plan Documents**
- **3D MBE NC Machining Animated Work Instructions**
- **3D MBE MultiCAD + MBD Inspection Layout Test**
Using 3D Product Definition to Improve and Automate Downstream Processes

While a lot of work has been done on PMI used in 3D product definition data, equivalent work is needed for process and quality PMI.

Today, most process-oriented information is still defined in 2D.

This presentation focuses on semantic process-oriented PMI, with focus on 3D process definition datasets and challenges of secondary authoring of 3D model-based data.
Preview for Wednesday at 10:40 Tom Hedberg - NIST
“Business as Unusual: Enabling Model-Based Mfg and Quality

Global Product Data Interoperability Summit | 2014 Assurance

Presentation Themes:
• Reuse and traceability of information
• Augmentation vs. Automation
• Double-loop learning and knowledge management

Where are supply chain’s pitchforks and torches?

Discussion Topics:
• Product Data Quality
• Product Lifecycle Management
• Data Exchange
• Smart Manufacturing
• Quality Information w/ Feedback
A challenge!

- Drive cross industry collaboration
- Be engaged; Network with participants
- Find and discuss common problems
- Learn about new technologies and challenges we face
- Share solutions as appropriate
- Drive innovative ideas back into your business
- Continuous improvement of M&QS track

Return Value to your Company!