# Welcome to Manufacturing and Quality Systems at GPDIS 2014

GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2014

ELYSIUM Parker NORTHROP GRUMMAN BOEING

~~Joe Posicka~~
~~Senior Manager,~~
~~BCA Manufacturing~~
~~Execution Systems~~
(Author)

Grady Ford
Technical Fellow,
Product Systems
Boeing

# AGENDA

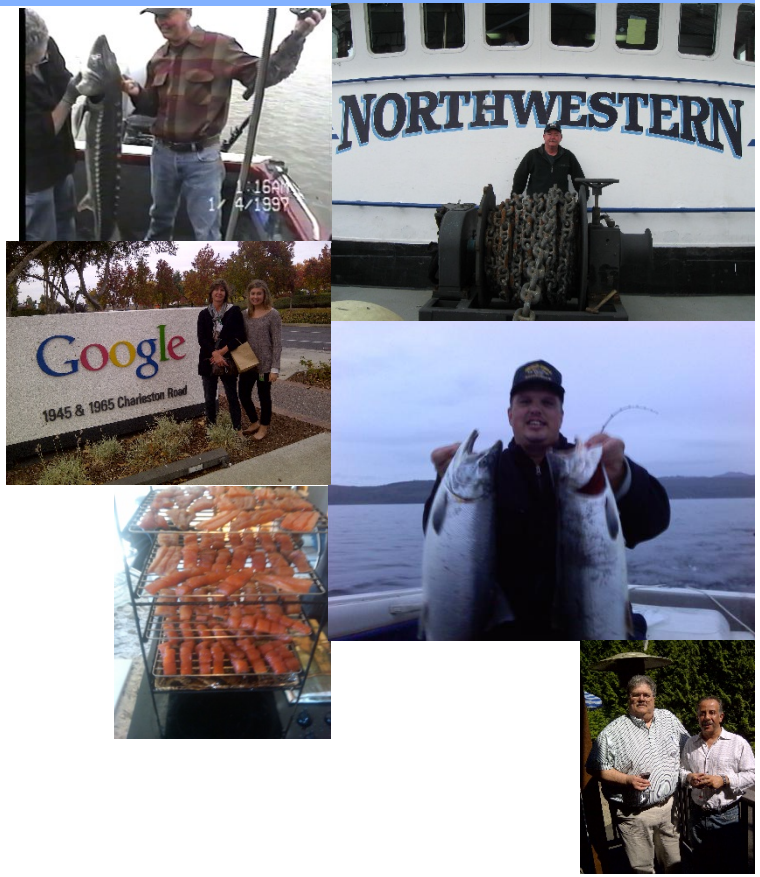


- A little about me
- Why is GPDIS important to Manufacturing and Quality
- Where does Manufacturing and Quality fit in?
- Key Challenges for Manufacturing and Quality
- Track introduction and a few highlights
- How do M&Q participants leverage GPDIS
- Open discussion

# 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



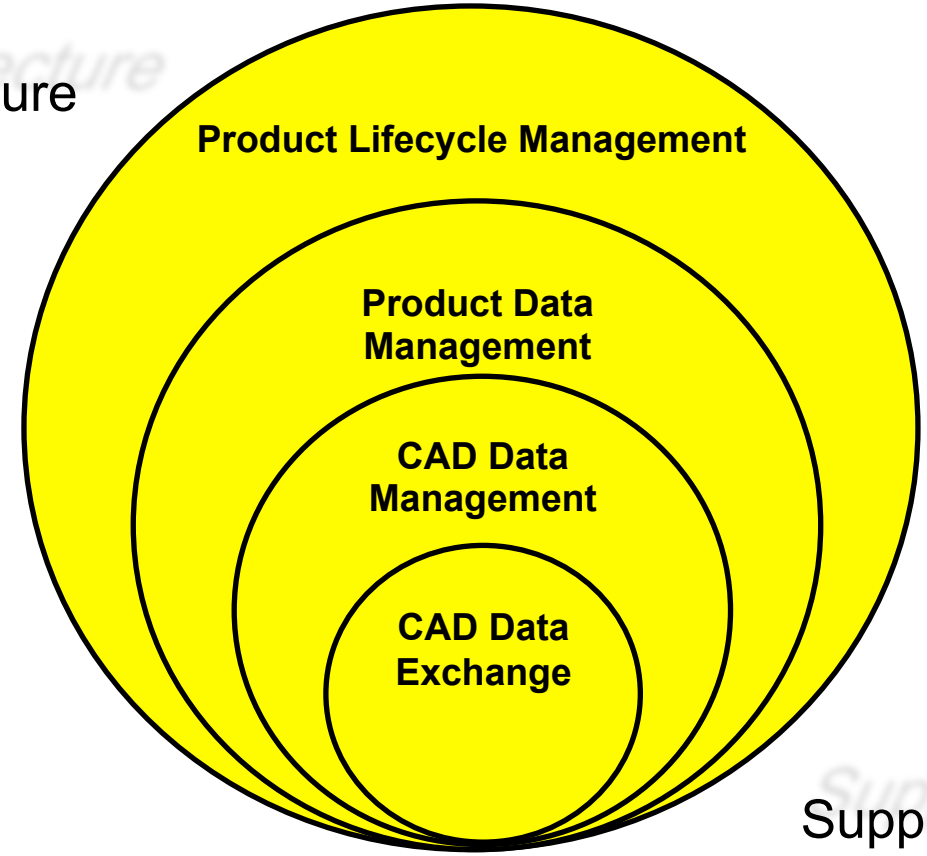
Visualization

Supply Chain

Architecture

LOTAR

Security




**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

Support

# 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*

# Industry Analysis – Airbus

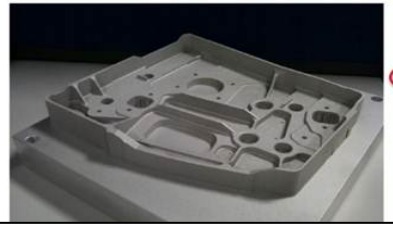


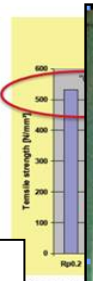
## Additive Manufacturing

**ALM Processes: Metals Technologies, Aluminium**

**Proprietary Material – ScalmalloyRP**

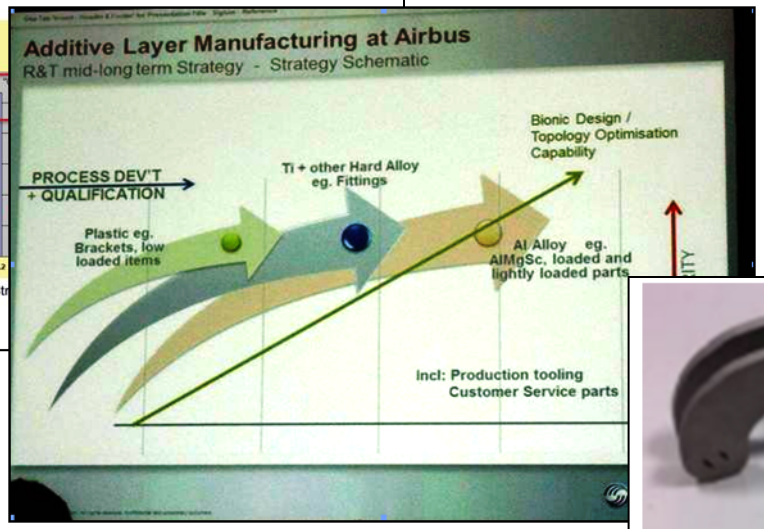
- ALM processed Aluminium Alloy with excellent mechanical properties
- Static & Fatigue properties are improved compared to 7050 plate material
- Lower density than traditional aerospace Aluminium alloys
- Significant weight benefit when compared to aerospace Aluminium alloys used in castings





3D PRINTING & ADDITIVE MANUFACTURING
INDUSTRIAL APPLICATIONS GLOBAL SUMMIT 2013
19-20 November, 2013 | London | UK
REAL INDUSTRY APPLICATIONS OF 3D PRINTING AND ADDITIVE MANUFACTURING

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




*Airbus ALM Strategy*

TEDGlobal 2013 · Filmed June 2013 · 5:58
Bastian Schaefer: A 3D-printed jumbo jet?

*A320 hinge made via the ALM process (TWI/GKN/EADS)*

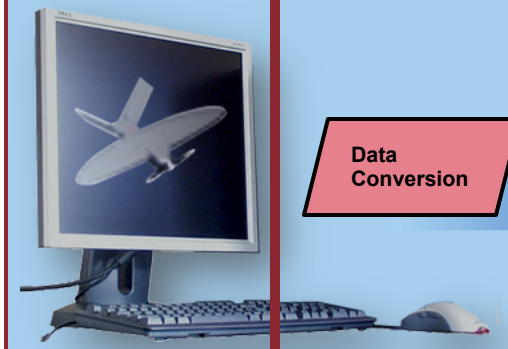
# Where Does AM touch IT?



## Information Technology challenge points

AD&S, Vericode, CM, SWE, ESATS

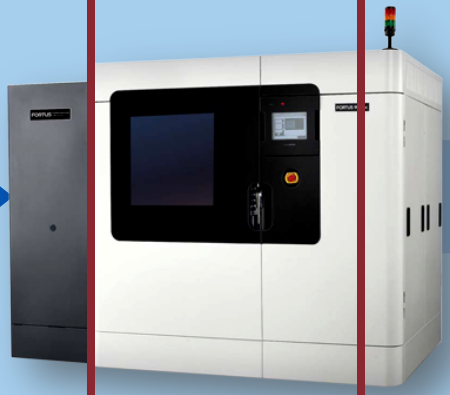
| Tool Applications | Data Conversion | Vendor Specific Preparation SW | 3D Printer Machine Specific Drivers |
|---|---|---|---|
| •Geometry Refine<br>•Pre-Process PDQ<br>•Watertight | •CATIA to STL(native)<br>•NX to STL(native)<br>•ProE to STL(native)<br>•3rd Party to AMF<br>•AMF integration | •FDM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



CAD Model

Data Conversion

Data Spec:
STL
AMF (new)



Fabrication Machine

**Manufacturing**

•Metrology
•QA

# GPDIS M&QS Track – new topics introduced

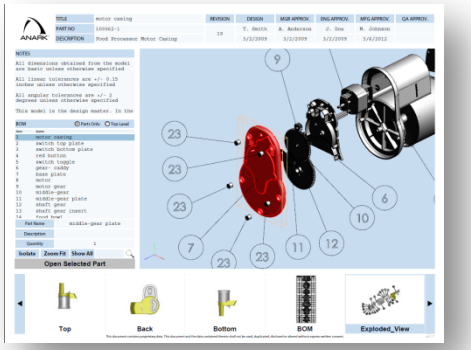


| Topic | Contact |
|---|---|
| Opening and Welcome to M&QS track | Joe Pesicka –Boeing |
| Improved Decisions through integrated Manufacturing and Business Systems | Dave Pimblett – 3ds |
| Building a Real-time "Transparent" Factory to Ensure Quality Manufacturing at High Speed | Christopher Steel and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

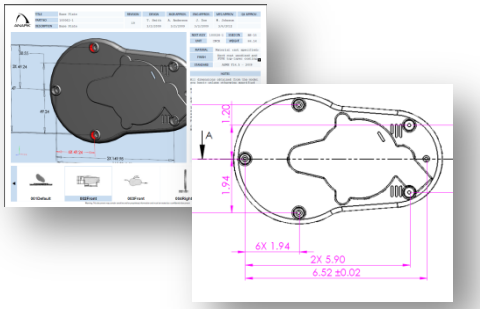
# Preview for Wednesday at 1:30 Chris Garcia - Anark Corporation
# "Deploying a Common Model Based Enterprise in an Uncommon CAD & PLM World"



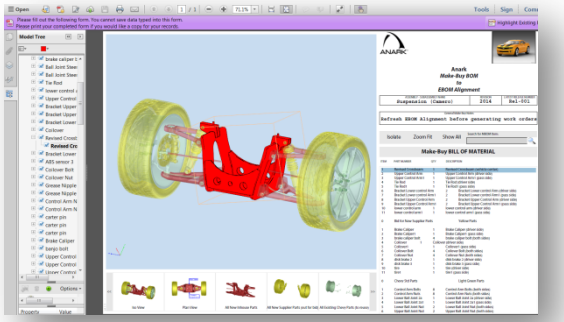
## *For these Typical Engineering and Manufacturing Process Use cases*



***Engr. Rel 3D PDF Assembly Technical Data Packages***

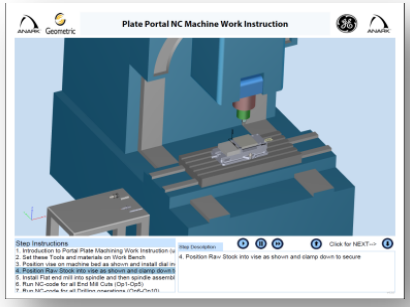


***Engr. Rel 3D PDF and 2D PDF Part Level TDPs***

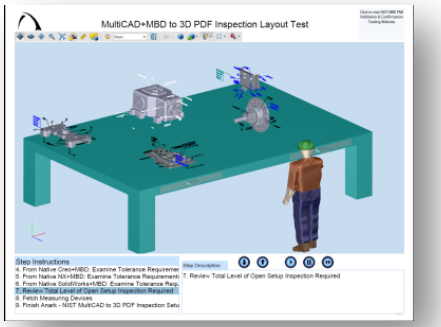


***MBOM-EBOM Alignment Make-Buy Bill of Materials***


***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

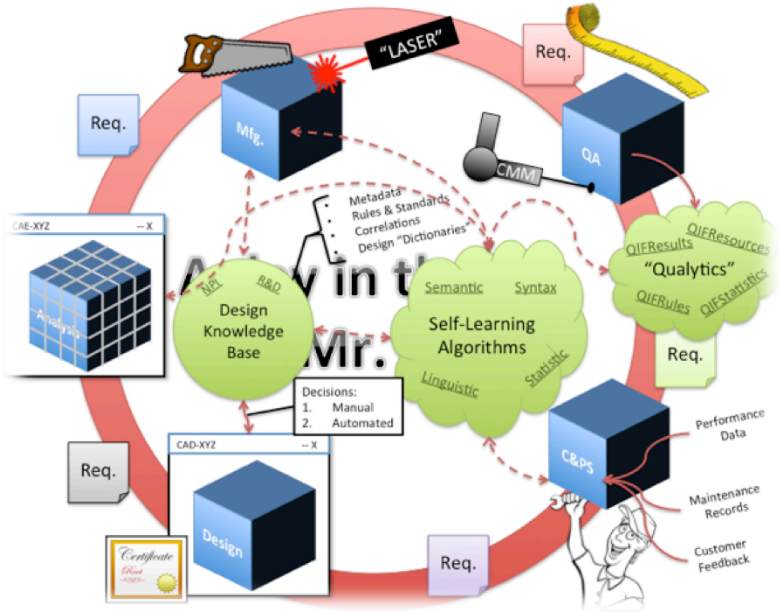
While a lot of work has been done on PMI used in 3D product definition data, equivalent work is needed for process and quality PMI.

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 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

(Couse-Baker, R., 2009, "Angry mob of four.jpg," Wikimedia Commons.

# 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!