

Leaning out Company Standards after Mergers

Boeing
Product Standards Office
22 April 2013



Abstract

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- **The Boeing Company has grown by merger & acquisition**
- **As a result, the number of company standards for parts, materials, and manufacturing processes has grown from 20,000 to over 100,000 during the last 15 years**
- **The company has committed to a “One Boeing” approach to managing standards and controlling the proliferation of standard parts**
- **This presentation will share:**
 - Industry best practices learned from a 2011 benchmarking of other large US companies and government agencies
 - Boeing’s roadmap to an enterprise common collection of product standards

About Boeing

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- **World's leading aerospace company**
- **Largest combined designer/manufacturer of**
 - Commercial jetliners
 - Military aircraft
 - Rotorcraft
 - Electronic and defense systems
 - Missiles
- **NASA's prime contractor for the International Space Station**
- **Provider of numerous military/commercial airline support services**
- **One of the largest U.S. exporters – customers in 150 countries**



Standing on the Shoulders of Giants

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A heritage that mirrors the history of flight

The “One Boeing” Approach to Business

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- **Starts with the customer...ends with the customer**
- **“One Boeing” to our customers, our suppliers, and internally**
- **Design Anywhere / Build Anywhere**
- **Enterprise Technical Services**
 - Product Standards
 - Materials, Manufacturing, Structures, and Support
 - Test and Evaluation
 - Research and Technology

At Boeing, we aim to be the world's strongest, best, and best-integrated aerospace company for today--and tomorrow. – J. McNerney, CEO

Definition of a Boeing Product Standard

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■ Product Standard

- A set of technical requirements, procedures, or methods documented for common and repeated use, and which are used directly in the design, development, production, or support of a Boeing product.

■ The primary types of Product Standards are

- Part
- Material
- Process
- Finish
- Design
- Packaging
- Distribution
- Tool Engineering
- Tool Services



Product Standards are Serious Business

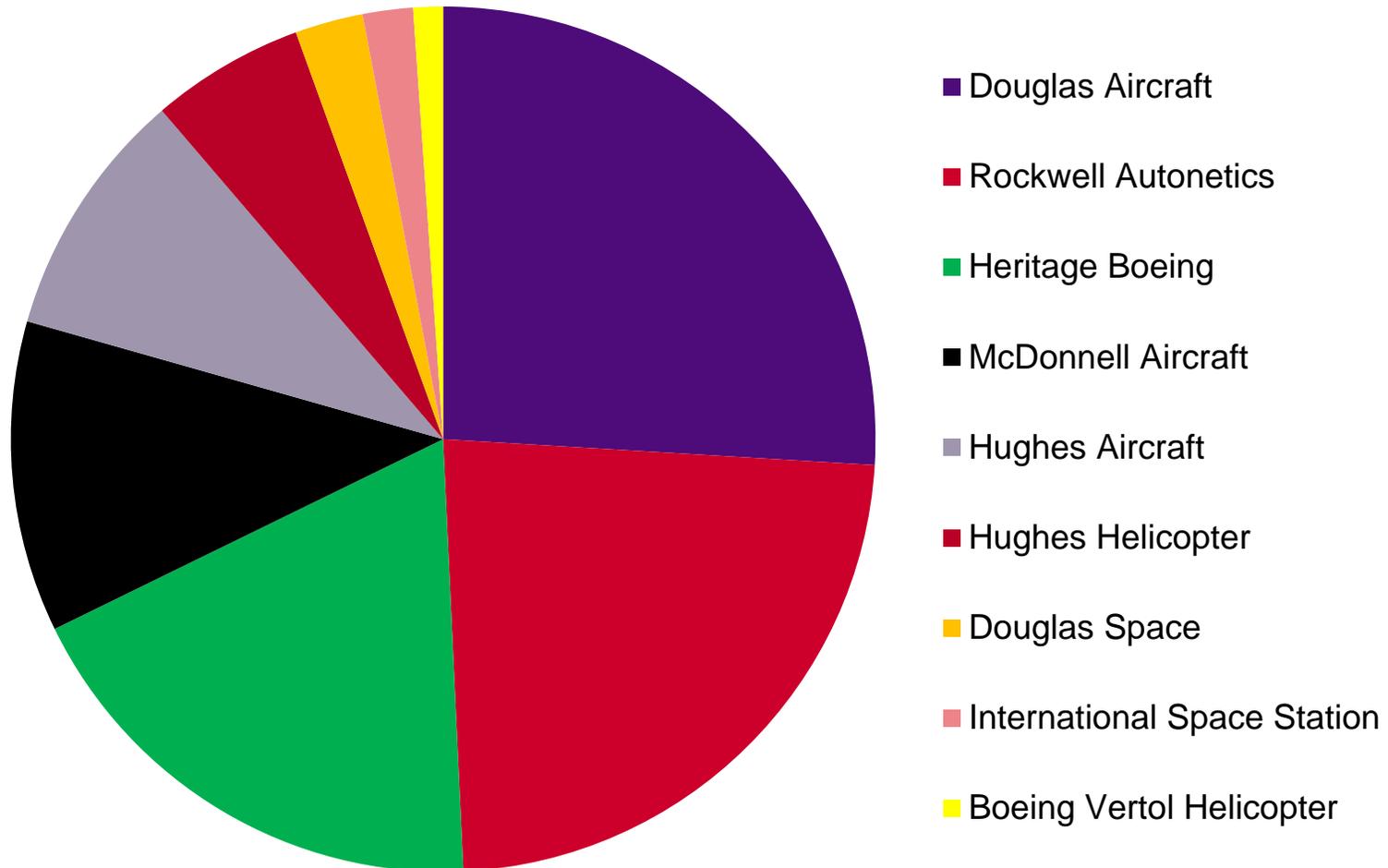
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- **The single largest source of product data in the company**
 - Nearly 40% of the data used in Engineering and Operations on all programs.
- **Product Standards are used by practically every partner, supplier and customer**
- **\$ billions spent annually for standard parts, materials, tools, and employee certification to process standards**
- **The largest private collection of standards in the world**
 - 100,000 documents over 10,000,000,000 valid part numbers
 - 160 employees in Product Standards Office
- **Boeing is one of the largest users of industry standards**
 - 7000 Military and Federal
 - 4500 Industry
 - 600 participants on 400 committees

Over 100,000 Active Product Standards

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One Boeing Product Standards



Boeing has the world's largest private collection of company standards

Holding on Too Tightly to the Past?

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One Boeing Product Standards

- **Local site and program-level control of product standards creates**
 - Proliferation, duplication, & waste at the enterprise level
 - Increased costs for common commodities
 - Small communities of expertise
 - Disparate and confused supply chain
 - Barrier to Strategic Work Placement
 - Frustrated customers with mixed Boeing fleets to support



Our Customers Need Just One Boeing

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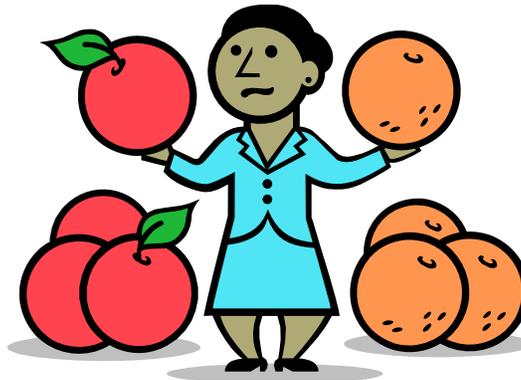


At least 10 different standards collections inherited by the Boeing Company are used on U.S. Defense products

Industry Benchmark Study Purpose

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- **Why benchmarking?**
 - The need to understand if others face the same issues we do
 - The need to discover if others have best practices for common standards that we don't have
- **Focus: How other large and diverse organizations:**
 - Designed and implemented their enterprise standards system
 - Manage the on-going effort to govern enterprise standards



Benchmark Participants Were Like Boeing

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- **Criteria to select participants**
 - Large company, diverse manufacturer of engineered products
 - Recent mergers & acquisitions
- **Participants**
 - Intel
 - Northrop Grumman
 - NASA
 - Michelin
 - John Deere
 - Rockwell Collins
- **3rd party benchmarking facilitator: APQC**
 - A not-for-profit whose mission is to help member organizations like Boeing improve productivity & quality

Key Benchmark Areas

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- **Standards Operations Methodology**
- **Critical Success Factors**
- **Management Process**
- **Implementation Strategy**
- **Business Value**



Industry Benchmarking Best Practices

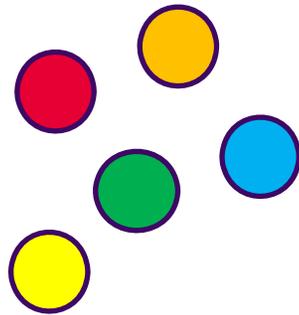
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- **Leverage communities of experts at the enterprise level**
- **Clear guidelines for quality and maturity of Standards**
- **Standards as digital data linked to knowledge content**
- **Two-tier mixed-model governance was most common**
- **Legacy standards are removed through attrition—not a concerted effort**
- **Technical content boards are comprised of stakeholders from all parts of the value chain including procurement**

Standards Reflect the Culture of the Company

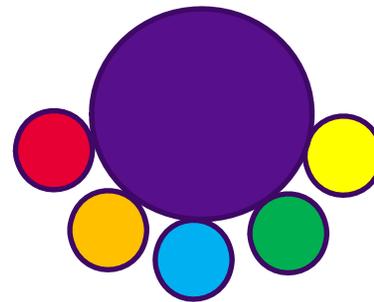
Standards Reflect The Company Culture

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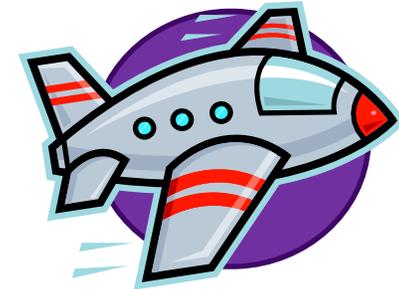
Separated
Local
Collections

- Portfolio of separate businesses
- Individual Profit and Loss Centers
- No corporate oversight or procurement



Mixed
Two-tier
Shared and Local

- Portfolio of similar businesses
- Profit and Loss Centers cooperating for mutual interest
- Some corporate leverage



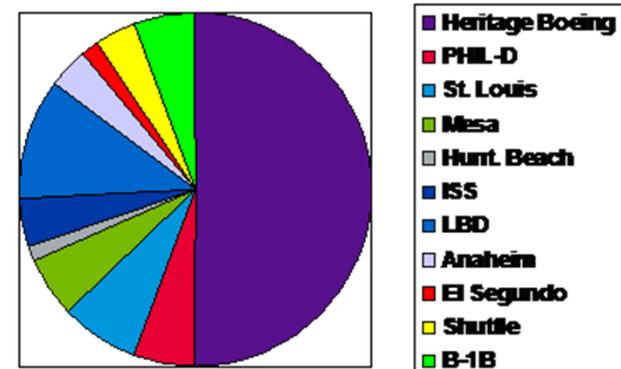
Common
Shared
Collection

- Common Customers
- Design/Build Anywhere
- Manufacturing Centers of Excellence
- Enterprise oversight and procurement

Boeing's Approach to Common Standards

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- **Enterprise baseline is the heritage Boeing collection of standards already in use on commercial aircraft & military derivatives and other systems**
 - Commercial/derivatives: 737, 747, 777, 787, AWACS, P-8, & KC-46
 - Defense rotorcraft: CH-47 & V-22
 - Certain military tactical aircraft, satellites, & avionics equipment
- **Usage policy: Restrict use of other legacy Product Standards**
 - INACTIVE for new programs
 - special access required
 - ACTIVE for existing/older programs
 - Including modifications & derivatives

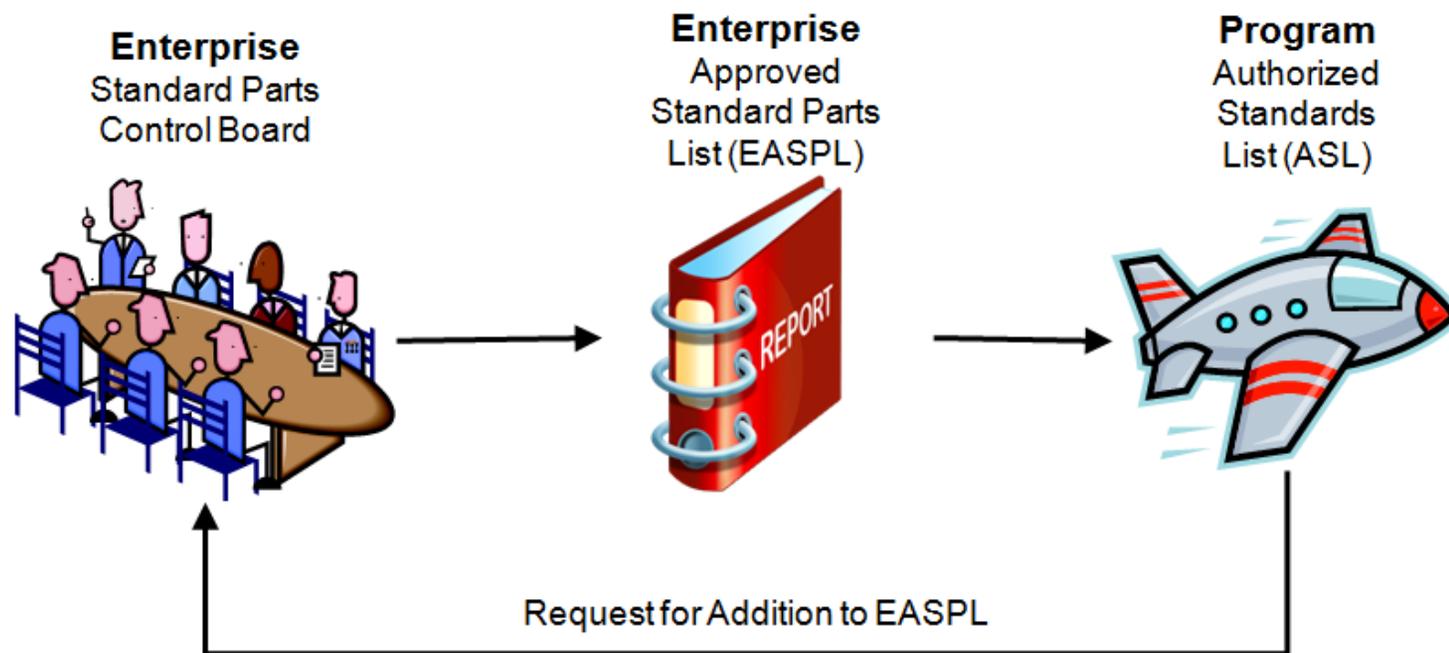


Half of Boeing employees work on programs using these standards

Leveraging Enterprise Technical Expertise

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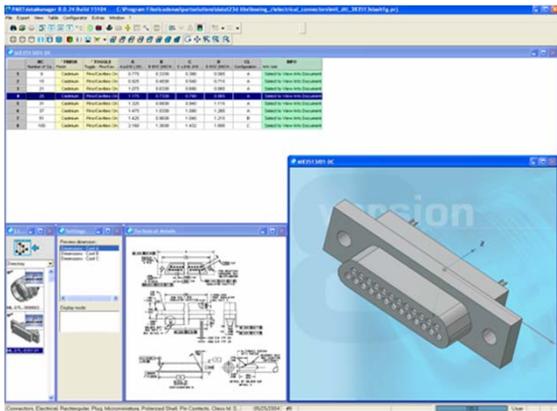
- **Teams of technical and business experts form Enterprise Standards Control Boards**
 - Representing all major product types and functional stakeholders
 - The boards will publish Enterprise Approved Standards Lists
 - All new programs must comply with the lists or request changes



Product Standards as Digital Data

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- **Boeing already has the industry lead on maintaining product standards as digital data**
 - In 2011 Manufacturing Automation magazine recognized Boeing as the Progressive Manufacturing High Achiever for Innovation Mastery based on our transformation to digital standards data
- **All Enterprise Approved Standard Parts will be available to all programs in databases and multiple CAD formats**



Making it easy to use the right standards in the right ways

What Are the Challenges?

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- **A culture change is necessary to see the big picture**
- **Aerospace products are long lived**
- **Standards are embedded in local workflow practices & info systems**
- **Local differences in qualified sources to the same industry standards**
- **Local business rules & terminology are different**
- **Generating enterprise approved lists labor intensive**
- **Enterprise boards need to be nimble to support new programs**
- **Future needs can be unpredictable**



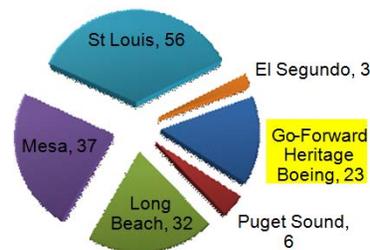
We Have Started the Journey

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- The plan is supported by the highest levels of Engineering and Operations management in all divisions of the company
- The baseline collection standards is decided and policies to implement the plan are in place
- Adopting stakeholders have identified barriers to implementation and plans to mitigate barriers are in place
- Enterprise Fastener and Electrical Connector boards in place
- Two emerging space programs are committed to apply the enterprise parts collection
- Enterprise Approved Lists for Hex Drive fasteners and 12-point bolts are published (85% reduction)



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Summary

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- **Maintaining multiple collections of Product Standards is inefficient, expensive, a barrier to enterprise knowledge transfer, and a burden to our customers**
- **An industry benchmark study provided guidance on best practices in how to manage standards in a post-merger enterprise**
- **The One Boeing plan for product standards includes:**
 - A single collection of product standards for new programs - 80% reduced from current levels
 - Enterprise technical boards and product-level standardization control to constrain proliferation of standards parts and materials
 - Full digital data to support selection and application of standards

