

# Leaning out Company Standards after Mergers

Sr. Project Manager  
Product Standards Office  
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# Abstract

- **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

- **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



*A heritage that mirrors the history of flight*

# The “One Boeing” Approach to Business

- **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. – CEO*

# Definition of a Boeing Product Standard

## ■ 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

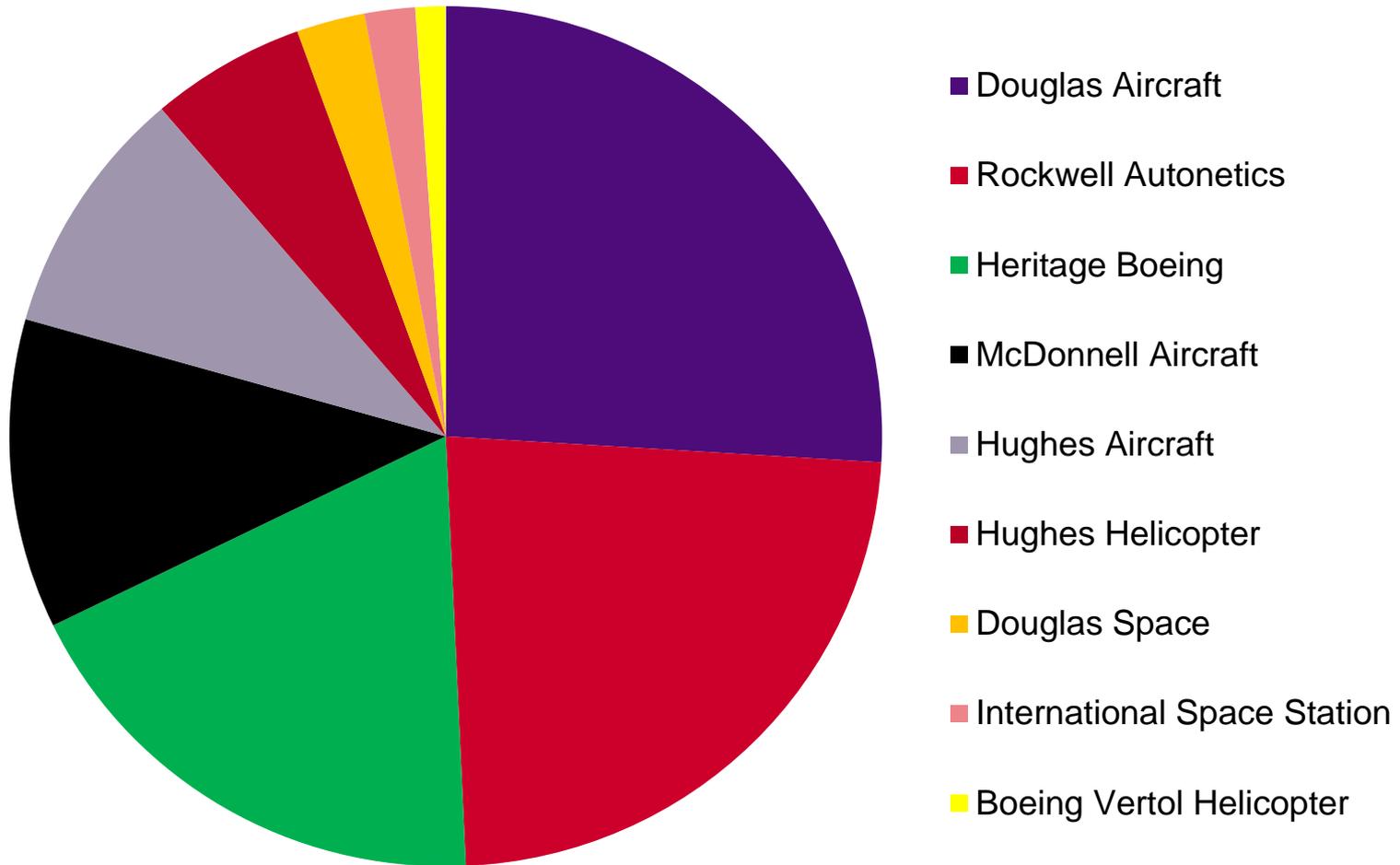
- Part
- Material
- Process
- Finish
- Design
- Packaging
- Distribution
- Tool Engineering
- Tool Services



# Product Standards are Serious Business

- **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



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

# Holding on Too Tightly to the Past?

- **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

Engineering, Operations & Technology | Boeing Research & Technology



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

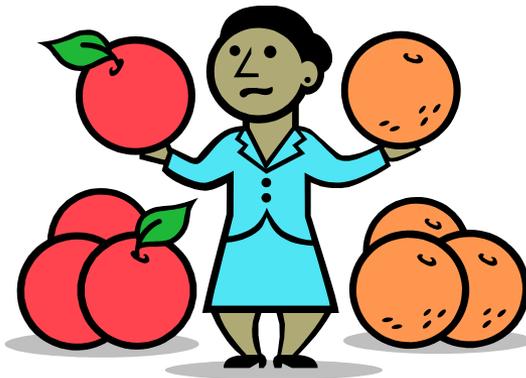
# Industry Benchmark Study Purpose

- **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

## ■ **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

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

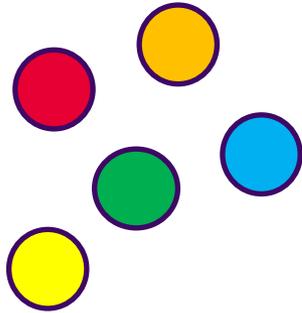


# Industry Benchmarking Best Practices

- **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**

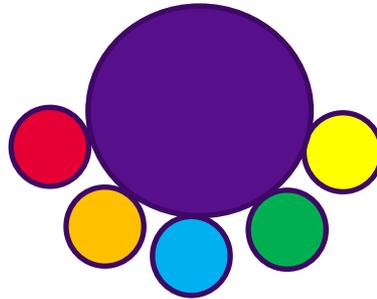
*Standards Reflect the Culture of the Company*

# Standards Reflect The Company Culture



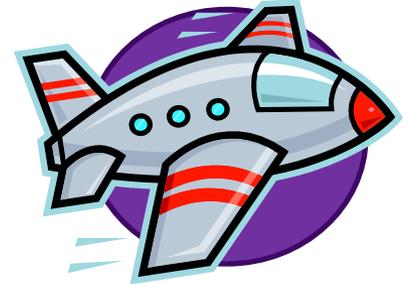
***Separated***  
**Local**  
**Collections**

- 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

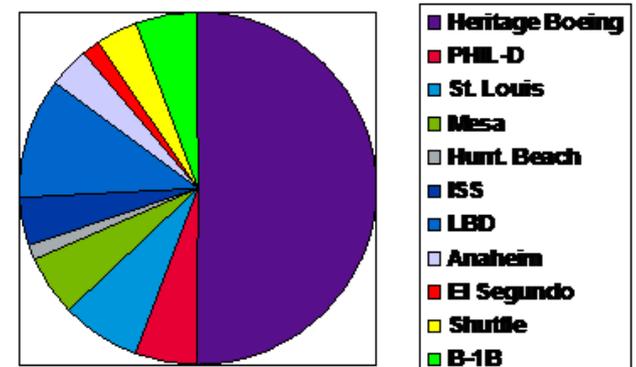


***Common***  
**Shared**  
**Collection**

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

# Boeing's Approach to Common Standards

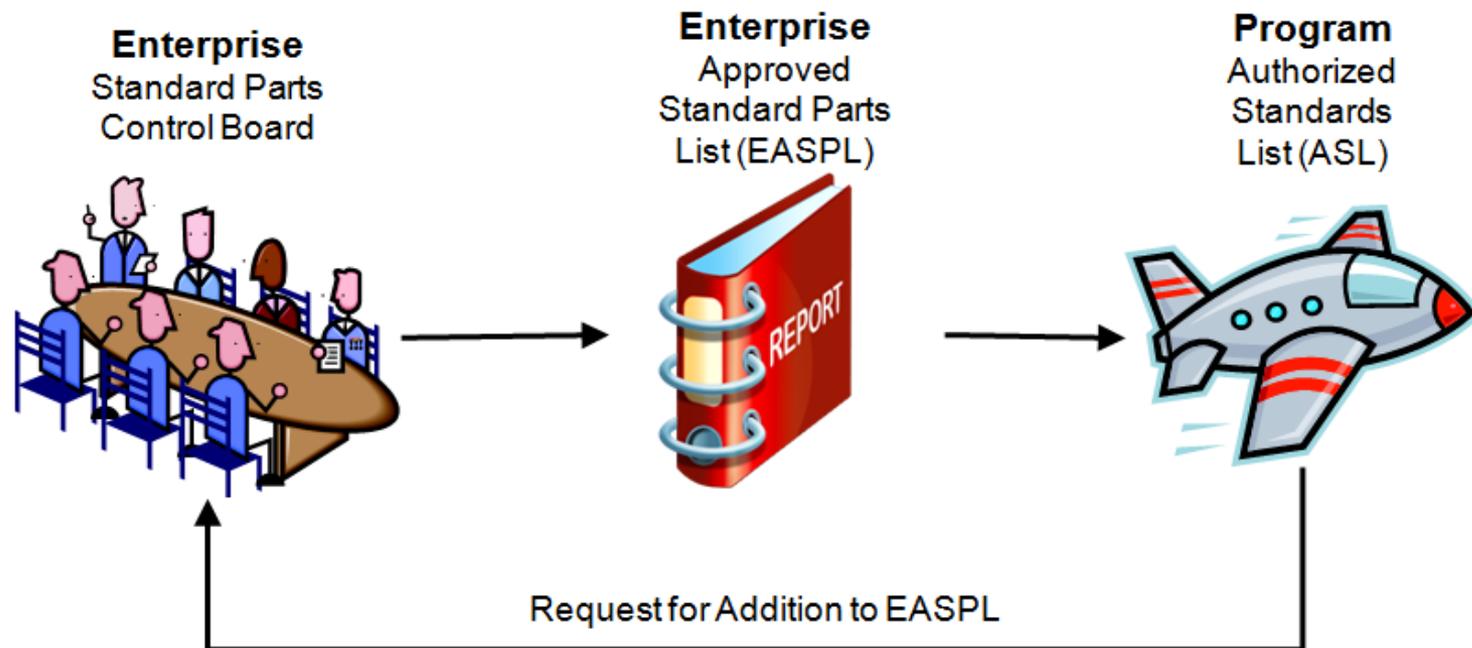
- **Enterprise baseline is the heritage Boeing collection of standards already in use on commercial aircraft & military derivatives and other systems**
  - Commercial/derivatives: 737, 747, 777, 787, AWACS, P-8, & KC-46
  - Defense rotorcraft: CH-47 & V-22
  - Certain military tactical aircraft, satellites, & 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*

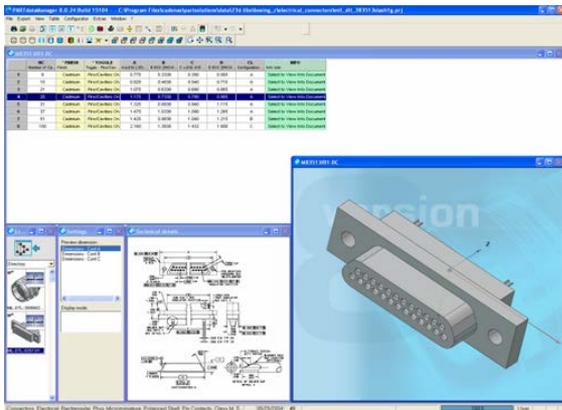
# Leveraging Enterprise Technical Expertise

- **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

- **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*

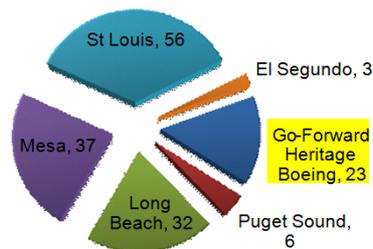
# What Are the Challenges?

- 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

- 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)



# Summary

- **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

