CAD Data Migration & Management for Legacy Programs

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Legacy Data

• Legacy programs = legacy data
  – C130 (1950’s)
  – C5 (1960’s)
  – F16 (1970’s)
  – F22 (1980’s)
  – F35 (1990’s -> 21st Century)
  – Advanced Development Programs (19?? – 20??)

• Data in many forms
  – Vellum, physical media, etc
  – 2D CAD (CADAM, CATIA V2/V3/V4/V5)
  – 3D Surface data (CATIA V2/V3/V4/V5)
  – 3D solids (CATIA V3/V4/V5)
  – Full 3D definition

• Supplier data
  – Another story for another time
CAD/CAM Technology Evolution

Past
• Minimal Data Re-use
• Manual Validation
• Limited to No Collaboration

Today
• Digital Data Re-use
• Digital Validation
• Simulation
• Global Collaboration
• Automation for Design
• Downstream Data Flow/Use
Legacy Data Management Systems

- **Physical Media** – Vaults, locked rooms, cabinets, environmentally controlled atmospheres
  - Drawings and BOM’s
- **2D CAD**
  - File structure based release and storage mechanisms
  - Later -> promotion to database solutions (some software required to “connect the dots”)
- **Early 3D CAD**
  - File structure based release and storage mechanisms
  - Later -> CAD Data managers (in-house, COTS)
- **PDM**
  - Mainframe based
  - Face of drawing
Data Management Systems

• PDM & CAD “de-linked”
  – Release coordination done procedurally
  – Limited intelligence
  – “Connection” made via humans

• Newer programs
  – PDM system handles CAD/PDM data management
  – PDM/CAD releases in sync
  – Downstream integration easier
  – Still some gaps

• Modification and Follow-on programs
  – Legacy data, new systems and ideas
  – How do we get from here to there?
Legacy CAD Data Manager Purpose

- Provide shared access and configuration management of inwork and released CAD data (Engineering, Planning, Tooling, ...)

- Consolidate multiple CAD data types into a single database and release system (CATIA V5, CATIA V4, CCD)

- Insure data integrity (naming convention, uniqueness, format, & links)

- Provide drawing access to non-CAD users in the life-cycle (Management, Check, Specialty Engineering, Planning, ....)

- Provide a central repository and distribution capability for Standard Part models
CAD Data Management Scope

- Management of CATIA V5, CATIA V4, CCD, and related data
- DataSet configuration management & release
- Revision and ownership control
- Model formatting and validation
- Model introspection and data extraction
- Digital Mockup
  - Large scale visualization
  - Data presentation
  - Volumetric and Type Version Effectivity query
- Standard part model management & distribution
- BOM development support
- Downstream integration with doc mgmt systems
- Data recovery and backup
CAD Data Management Interfaces

- CATIA V5
  - Design Release Functions
  - Part request, problem reporting, & remote Program access

- CATIA V4
  - Standard Parts Database

- Standard Part Manager (Web)

- CCD

- 3dxml

- Drawing Images

- Non-CAD Access

- DataSet Manager (Web)
  - Program Design Data
  - Standard Parts Database
CAD Data Manager Program Integration

- BTP Check
- BTP Release
- Non-CAD Access
- User Account Management
- Engineering
- Tool Design
- Planning
- Numerical Control
- Flight Test
- Support Equip
- ...
Data Migration and Promotion Strategies

• When to Migrate?
  – Decision tree (is there a valid business case for data migration/promotion)
  – Downstream Function impacts?
  – Customer requirements
  – Supply Chain impacts?

• Hybrid Raster

• 2D to 3D?
  – Follow on contracts may facilitate
  – Automation?

• Hybrid Assembly Models
  – CATIA V5 CATProduct with V4/V5 Detail Part model files
  – Only used on F-35 (Right Now)

• CATIA Dataset Ratings
  – Level 1 through 5

• Best Modeling Practices (CATIA V4)
  – Organized by Part Types (NC machined versus Composite laminate)
Data Migration and Promotion Strategies

– CATIA V5 Methods
  • Similar in intent to V4 Best Modeling Practices
  • Organized loosely with V5 workbenches
  • Promotion of common modeling practices

– CATIA Customizations
  • LM Aero developed code to “enhance” the CATIA driver’s experience
  • Established and “locked” down environment settings (V4 & V5)
  • Some customizations tailored for data management activities

– CAD System Version Upgrades
  • New version introduced while program still viable
  • Similar strategies still apply – there needs to be a business case to migrate
How do you sell data migration to Management?

- Existence of legacy and newer programs may limit methods to produce similar commodities (including engineering)
- Technology Obsolescence
  - Hardware and Software support
  - IT Staff knowledge base
  - Security risks
- Potential for improved product quality and reduced program cost
- Knowledge base for legacy systems and methods waning
  - Recent Engineering Graduates not interested in learning V4 or CCD
There are some Risks/Costs

• Updated documentation required
  – Update Procedures
  – Update Contracts as applicable
• Training on target systems
• Hardware/Software Costs
• Data migration issues
  – Mitigated with translators, healers and quality checkers
  – Some touch labor on destination system may be required
• How long does the legacy system coexist with the new system?
  – Batch Migrate versus “As Touched”
Summary

• Data migration is not a perfect science
• Goal is to achieve technology and productivity gains
• Risk and Cost involved
• Personnel impacts
• Don’t forget to check your contracts!
• Coordination with Supply Chain critical