DEFENSE ARCHIVING ISSUES AND INITIATIVES

Naval Surface Warfare Center, Carderock Division
Code 2230-Design Tools Branch

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OVERVIEW

• Background
• Issues
• Initiatives
Why Product Model Data?

Torpedo retrieval claw test

Would you rather cut metal using:
- the paper drawing or
- by tracing a tool path around the CAD model on a CAM system?

Which one is more likely to be correct?

And the winner was . . .
BACKGROUND
Industry Focus - they want it all but . . .
Problems

Can’t query paper or raster drawings
Missing data
Does not support automated down-stream processes
Unreadable legacy data
Training required for 2-D drawing interpretation
Top-down break-down information
Data rights
Data entry errors on indexing
Technical data errors
Management of common parts/libraries/catalogs
ISO 10303, STandard for the Exchange of Product model data (STEP)

TC 184/SC 4/WG 3/T 23 (Ship Team) Standards

AP 214:2001, Core data for automotive mechanical design processes

AP 215:2004, Ship arrangement

AP 216:2003, Ship moulded forms

AP 218:2004, Ship structures


AP 233, Systems engineering data representation

AP 239, Product lifecycle support

ISO 13584 (Parts Library Exchange)

ISO 15926 (Oil and Gas)

ISO 15926 (Parts Library Exchange)
ISO 10303, SStandard for the Exchange of Product model data (STEP)
Aerospace Product Model Data Exchange Standards

Cross Process Utility
AP203:1994, Configuration controlled 3D designs of mechanical parts and assemblies

AP209:2001, Composite and metal structural analysis and related design
AP212:2001, Electrotechnical design and installation
AP219, Dimensional inspection
AP230, Computer numerical controllers

Requirements/Concept
Analysis
Detailed Design/BoM
Manufacturing
Lifecycle Support

Physical architecture and synthesis
AP233, Systems engineering data representation

US Product Data Association - https://www.uspro.org/
PDES, Inc. - http://pdesinc.aticorp.org/
Product Lifecycle Support, Inc. - http://www.plcsinc.org/
BACKGROUND
Technical Data Guidance Referencing
ISO 10303
STandard for the Exchange of Product model data (STEP)

DoD

• DoD Information Technology Standards Registry (http://disronline.disa.mil/VJTA/index.jsp)
• DoD Acquisition Guidebook, Section 4.2.3.7. Data Management (http://akss.dau.mil/dag)
• DLA ISO 10303 STEP Application Handbook 2.0, 21 December 2001 (https://www.uspro.org)
• MIL-DTL-31000C, Technical Data Packages, 9 July 2004
• MIL-STD-1840C, Automated Interchange of Technical Information, 26 June 1997
• Joint Aeronautical Commanders Group, Strategy for Product Data Throughout the Life Cycle, 8 May 2002 (https://www.uspro.org)

DON

ISSUES - Policy

- Identify which ISO 10303 STEP Application Protocols (APs) and their Conformance Classes (CCs) will support DoD life cycle business processes for mechanical parts - DLA.
- Identify and analyze STEP mechanical viewers - DLA.
- Develop a Request For Interest (RFI) for OEM, suppliers, and software vendors to provide certified STEP data and viewers that will enable personnel to examine the digital technical data for mechanical AP CCs that are of DoD interest - DLA.
- MIL-DTL-31000C (Technical Data Packages, General Specification for) update to include digital product model data in TDPs - JEDMICS funded comments by Navy.
- Develop test data for ISO 10303 AP products so that software tools can be certified by USPRO for creation, editing and viewing of STEP conforming data - NSRP.
- Evaluate how to index and process 3-D data for large systems - DLA/JEDMICS PMO/NARA.
- Develop product model Data Item Description (DIDs) for APs chosen for use on contracts need to be forwarded for DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), to ensure that new digital product data TDP DID’s can be referenced in MIL-DTL-31000D and cited on the DD Form 1423. [http://assist.daps.dia.mil/online/start/](http://assist.daps.dia.mil/online/start/)
- Performance specs for ISO 10303 similar to MIL-PERF 28000B Digital Representation for Communication of Product Data: IGES Application Subsets and IGES Application Protocols.
- Develop DFAR contract clause words for acquisition efforts.
- Identify who will create and certify data (ISEA/CFA) for legacy systems.
- Ensure compatibility with future processes (NMCI, Task Force Web, JEDMICS, ICP tools, etc.)
- Incorporate stakeholder input on the viewer requirements into an RFP for site licenses for Inventory Control Point (ICP) users and others.
- Identify demonstration system/parts we can and should acquire 3-D STEP data for.
- Provide tools and training to logisticians to view 3-D data.
- Acquire parts and do cost analysis of savings/quality of 3-D procurement processes.
- How do we buy access to data using web based tools for new systems.
- Digital Signatures
# ISSUES - Acquisition Documentation

<table>
<thead>
<tr>
<th>CONTRACT</th>
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<td>A contract contains a Statement of Work</td>
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<th>STATEMENT OF WORK (SOW)</th>
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<tbody>
<tr>
<td>MIL-HDBK-245 Preparation of Statement of Work</td>
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<tr>
<td>MIL-HDBK-59 DoD CALS Implementation Guide</td>
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<tr>
<th>CONTRACT DATA REQUIREMENTS LIST (CDRL)</th>
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<tr>
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<tr>
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<td>Block 5 (Contract Reference) identifies a SOW paragraph</td>
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<tr>
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<tr>
<td>Block 7 (Application) identifies a paragraph in MIL SPEC</td>
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<tr>
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<tr>
<td>MIL-DTL-31000C Technical Data Packages</td>
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<td>Identifies an option worksheet</td>
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<tr>
<th>TECHNICAL DATA PACKAGES (TDP) OPTION SELECTION WORKSHEET</th>
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<tr>
<td>DD Form 254</td>
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<td>Provides format choices for delivery, drawings, and lists</td>
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ISSUES – Overlapping Standards

- GEIA-927 Common Data Schema for Complex Systems
- ISO/PAS 16739 Industry Foundation Classes (IFCs)
INITIATIVES - Technology

Look at the requirements and issues involved with the:

- transition to 3-D product model data,
- aggregation of product models and related data from individual components to complete weapons systems, and
- long-term accessibility and interpretability of the archived digital data by future generations.
  - Leading Edge Architecture for Prototyping Systems (LEAPS-NAVSEA)
  - Joint Engineering Data Management Information Control System (JEDMICS-Navy and DLA)
  - Product Life Cycle Support (PLCS-Services and DLA)
  - Long Term Data Retention of Weapon System Information (National Archive and Records Administration, NAVSEA, NAVAIR, DLA)
Product Model Data Solutions

Can query product model data
Automated QA of incoming data for missing or out-of-range data
Supports automated down-stream processes
Training not required for 3-D models
Top-down break-down information contained in assemblies
Data entry errors on indexing eliminated
Product Model Data Does Not Solve

Unreadable legacy data
Data rights
Technical data errors
Management of common parts/libraries/catalogs
Product Model Data Creates New Issues

Policy on how and what to buy
Transmission and storage of many large data files
Storage of redundant data (3-D product model data, 2-D drawings, native CAD, pictures, video, manuals)
Reintegration of separate domain files for complete system descriptions
Bad CAD data created in conversion processes
Rich data lost data during conversion to neutral data formats that support core industry data exchange/archiving requirements
Future interpretation of native file formats
Implementation agreements (will pump be exchanged in piping, electrical, or structural connection files, must be accessible through all views in the integrated model)
Data availability on shop floor (portable viewing hardware/software or paper drawing generation on the fly)
Viewers are needed for logisticians and others
For Additional Information

SC 4 On-Line Information Service for STEP ISO 10303 and PLIB ISO 13584
http://www.tc184-sc4.com/

US PRO Product Model Data Standards
https://www.uspro.org/

ISO TC 184/SC 4/WG 3/T 23 Ship team
http://www.nsrp.org/t23/

National Shipbuilding Research Program
http://www.nsrp.org/

PDES, Inc.
http://pdesinc.aticorp.org

American National Standards Institute
http://web.ansi.org/

International Organization for Standardization (ISO)
http://www.iso.ch/

International Electrotechnical Commission (IEC)
http://www.iec.ch/