JWG16 - Formats for visualization and other derived forms of product data

https://isotc.iso.org/livelink/livelink?func=ll&objId=19599172&action=browse&viewType=1

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Contents

- SC4 and JWG 16
- Standard projects
- Liaison
- JWG 16 members
- Long term projects
- Chicago meeting Nov. 2018
Scope of industrial data

Product Quality – ISO 8000

- Oil and Gas – ISO 15926

Product Definition data (STEP) – ISO 10303

Product characteristics from ISO 22745

- Visualisation – ISO 14306, 17506

Industrial terminology using ISO 22745

- Factory Interfaces
  - ISO 15531
  - ISO 18629
  - ISO 18876
  - ISO 18828

- Product parts Libraries – ISO 13584

- Product Classification using ISO 22745

Published ISO Standards: 752

ISO Standards under development: 216

Direct Working Groups: 9

Joint Working Groups: 3

Internal Committees: 3

Participating members: 15

Observing members: 15
Resolution:
SC 4 requests its Secretariat to create WG 16 with the following title and scope

Title: *Formats for Visualization and other derived forms of product data*

Scope:

- Develop and maintain format and interface standards for 3D visualization of product models, including visualization of different classes of derived information such as geometry, product structure and others.
- Develop and maintain standards for consumption of data derived from and associated with product models.
- Develop and maintain standards for interfaces from SC 4 product definition standards.
- Establish liaison with other standards activities working on information models for 3D visualization.

SC 4 requests its Secretariat to assign any NP within scope to WG 16. SC 4 appoints Soonhun Han as Convenor and Christophe Mouton as Deputy Convenor each for a three year term, with appreciation for this offer to serve in that capacity.
JWG16 Work scope
from SC4 resolution 2017-11

- Develop and maintain format and interface standards for 3D visualization of product models, including visualization of different classes of derived information such as geometry, product structure and others.
- Develop and maintain standards for consumption of data derived from and associated with product models.
- Develop and maintain standards for interfaces from SC 4 product definition standards.
- Establish liaison with other standards activities working on information models for 3D visualization.
ISO/TC 184/SC 4 /JWG 16

Summary:
- Visualization of product models including factories and plants

Scope:
- Consumption of product models with ISO/AWI 23301 STEP Geometry Services
- Joint WG with other 3D viz. standards:
  - ISO/IEC JTC1/SC24 (X3D)
  - ISO/TC171/SC2 (3D PDF)
  - Format for 3D viz. of product models with ISO 14306 (JT)

Active work:
- NWI of STEP geometry Services
- Connection to smart manufacturing: Digital twin visualization
Standard projects

- **ISO/AWI 23301 STEP geometry Services**
  - Started in March, 9 2018

- **New project: Update and publish the 'Industrial requirements for product data visualisation” (Oscar Rocha, 2008)' document as a Technical Report**
  - Product data visualization use cases from industries
  - Review of ISO10303 STEP parts related to visualization
Role of STEP in a Product Data visualization framework

"Technology Trend Report on 3D Printing and Scanning" JAG report to JTC-1 describes numerous standards group, notes many opportunities for cooperation, and recommends JTC-1 leadership through creating a Study Group for collaborating standards.

Is there an opportunity of a JWG on visualization along ISO TC?

ISO 23301 concentrates on the red arrows and rectangles of this diagram:

June 13: Use Case gathering for geometry consumption is the role of WG16 in general.
## Visualisation requirements

### Status of Document

| Reference: | Visualisation ad-hoc group report  
Industrial requirements for product data visualisation |
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Joint 3 Technical committees

Initiated and hosted by ISO/TC 184/SC 4 industrial data

Officially joint by:

- ISO/IEC JTC 1/SC 24 - Computer graphics, image processing and environmental data representation
  - Co-convenor: Christophe MOUTON
  - WG 6 - Augmented reality continuum presentation and interchange

- ISO/TC 171/SC 2 - Document file formats, EDMS systems and authenticity of information
  - WG 8 – PDF specification
Liaisons of JWG 16 ....

- **Web3D consortium: VRML and X3D**
  - Web3D conference (June 2018 in Poland)
  - Design Printing and Scanning WG

- **3D PDF Consortium**
  - PDF-STEP integration (Liaison report to ISO/TC 171/SC 2)

- **Chronos Group: Collada, glTF**

- **ISO TC 261 Additive Manufacturing**
  - Scan > Modify(CAD) > 3D Print ?
  - Joint with JTC 1/WG 12 ?
ISO/IEC JTC 1/SC 24 & Web3D consortium liaison report
75th ISO/TC 184/SC 4 plenary
1 The STEP Ad Hoc

During the December 2018 ISO/TC171/SC2 meetings in San Jose, WG8 resolved to form an Ad Hoc Group with TC184/SC4 to draft a proposal for including ISO 10303 (STEP) as a valid 3D stream. Members of the ad hoc are:

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Phil Spreier</td>
<td>TC 171 SC 2 US TAG Chairperson / STEP Ad Hoc Chairperson</td>
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<td>Leonard Rosenthal</td>
<td>TC 171 SC 2 Chairperson</td>
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<td>Stuart Galt</td>
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<td>Peter Noyes</td>
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<tr>
<td>Kenneth Swope</td>
<td>TC 184 SC 4 Chairperson</td>
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<tr>
<td>Soonhung Han</td>
<td>TC 184 SC 4 WG 16 Convener</td>
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<tr>
<td>Christophe Mounton</td>
<td>TC 184 SC 4 WG 16 Deputy Convener</td>
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<tr>
<td>Jean Brange</td>
<td>TC 184 SC 4 SME</td>
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2 STEP: ISO 10303
COLLADA and glTF Ecosystem

- OpenCOLLADA Importer/Exporter and COLLADA Conformance Tests On GitHub
- Web-based Tools (e.g., Google, Autodesk Maya, Blender)
- Pervasive WebGL deployment
- Tool Interop
- COLLADA2glTF Translator
- Other authoring formats
- glTF
- WebGL
- Three.js glTF Importer. Rest3D initiative

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<table>
<thead>
<tr>
<th>ISO/IEC JTC 1/JAG</th>
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<td>ISO/IEC JTC 1/SC 22</td>
<td>Programming languages, their environments and system software interfaces</td>
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<tr>
<td>ISO/IEC JTC 1/SC 23</td>
<td>Digitally Recorded Media for Information Interchange and Storage</td>
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<tr>
<td>ISO/IEC JTC 1/SC 24</td>
<td>Computer graphics, image processing and environmental data representation</td>
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Possible projects

JT ed.3
- ISO 14306:2017 - JT file format specification for 3D visualization

ISO/PAS 17506:2012 - COLLADA digital asset schema specification for 3D visualization of industrial data; glTF
Viz. of big data

- BIM, IFC, ISO/TC 59/SC 13/JWG 12
- IOGP (international oil & gas producer)
  - www.iogp.org
- ISO 15926-3 Reference data for geometry and topology
JWG16 members
Additional viz. items

- Digital twin
- Viz. requirements from industry
- PMI product manufacturing information, annotation
- Massive but less detailed geometry: Building (IFC Industry Foundation Class liaison), plant
- Liaison with BIM viz.
- 3D printing, scanning
Smart manufacturing

- Digital twin visualization
- Mapping between physical and digital
- Digital twin needs more engineering simulation
- ISO 10303 STEP standards are candidates to support the digital twin design.
Digital twins
Chicago meeting
4-8 Nov. 2018
New project: Resolutions

- Establish Ballot Duration for NP ISO 14306 ed3 JT
  - GM, GE Aviation, Siemens
  - Teleconference schedule

- Establish PWI for “Industrial Requirements for Product Data Visualization”
  - EDF, Elysium
Resolution: "J"

Title: Establish Ballot Duration of a future New Work Item Proposal for 14306ed3
From:
JWG 16

Introduction:
None

Objective:
To establish reduced ballot period for New Proposal

Resolution:
SC 4 requests its Secretariat to apply the 8 week ballot duration to the future NP for 14306ed3, JT file format specification for 3D visualization following a successful review by JWG 16 for scope per action item 195 from the Secretariat.

Attached documents:   Yes ☐   None ✗

Voting –
Resolution: "L"

Title: Establish PWI for “Industrial Requirements for Product Data Visualization”
From: JWG 16

Introduction:
The original report outlining visualization requirements for industrial data was published in 2008 and there have since been developments in visualization technology and formats. The report was published as an SC 4 numbered document only.

Objective:
To update the original report and publish as a Technical Report

Resolution:
SC 4 launches a PWI to update its requirements for visualization and to create a Technical Report on “Industrial Requirements for Product Data Visualization”. SC 4 requests its Secretariat to invite member bodies to nominate experts to JWG 16 to undertake this preliminary work.
Rapid Manufacturing Parts For MRO
When Speed, Quality and Often, Design Improvement are Requirements

1. Reverse Engineering
   Measure – Mesh – 3D CAD Model
   Aircraft temporarily taken off line for part measurement*

2. Design Validation
   CAD Design Modification as Necessary

3. Part Realization
   3D Print – Inspect Prototype to STL File – Assembly

4. Customer Review
   Approval of Prototype as Nominal Design
   Aircraft temporarily taken off line for form and fit check*

5. Manufacturing
   CNC Process – Inspection of Part to CAD Model - Assembly

6. Installation
   Aircraft temporarily taken off line for new part installation*

*For non critical parts the aircraft can remain in service for much of the process.

https://www.additivemanufacturing.media/blog/post/reverse-engineering-and-3d-printing-a-practical-solution
Design Process

1. Define the Problem
2. Brainstorm
3. Research and Generate Ideas
4. Identify Criteria and Constraints
5. Explore Possibilities
6. Select an Approach
7. Develop a Design Proposal
8. Model or Prototype
9. Test and Evaluate
10. Refine
11. Create or Make
12. Communicate Results