



**AeroSpace and Defence**  
Industries Association of Europe

## **AIA / ASD Coordination**

### **January 30, 2019**

**JWG 16 – formats for  
visualization and other derived  
forms of product data  
at ISO/TC 184/SC 4 Industrial  
Data**

**Jean BRANGE**  
**AFNeT**

facilitate capture of the **understanding** of the **object**, for **visual information sharing with users**

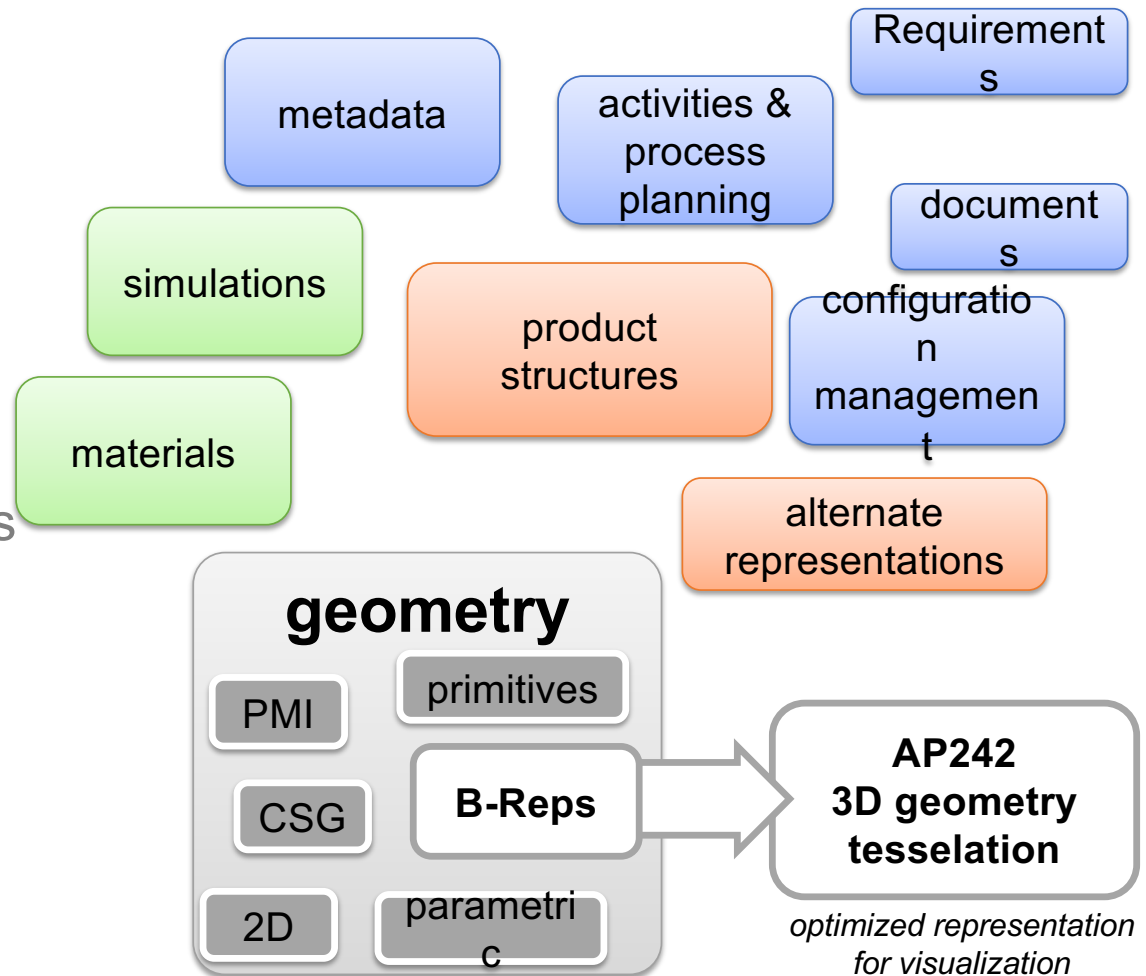
and sometimes to promote **decision** process by a **human** looking at the data visualized in a medium



STEP provides a data model which integrates the whole data landscape for the product development, manufacturing operations and maintenance.

The concept of multiple representations of the product, including **multiple geometrical representations** allows us to define an **optimized visualization model** with **links** to the rest of the data model.

The model based STEP framework allow us to ensure **consistency** of the integrated **information model** and the corresponding **implementation forms**.





## Analysis



Promoting the re-use of the rich integrated STEP data model in the enterprise processes has great value

There is a confirmed opportunity for industry to have a structured approach on 3D product visualisation and to enable integration of product data in visualization application across the life cycle of the product in all the activities of the enterprise.

Use cases exist related with the visualization of product data other than geometry (meta data, production data, financial data ...)

Need for STEP interfaces for geometry and other STEP data access (OSLC ? MOSSEC approach? )

There is also a need for a simple STEP geometry schema and associated API , with and without PMI (integration with STEP New Architecture ? )

- Requirements for a STEP AP242 geometry conformance classes using the STEP New Architecture



## JWG16 birth certificate : Jeju Resolution

### **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.

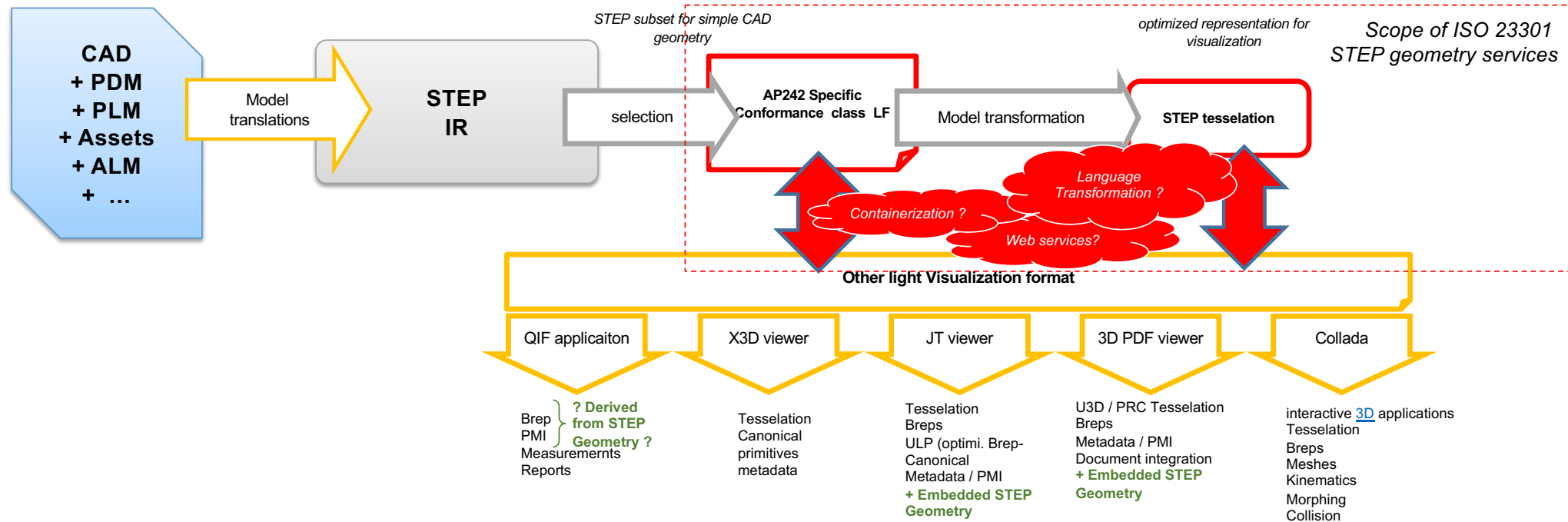
SC 4 requests its Secretariat to assign any NP within scope to WG 16. SC 4 appoints Soonhung Han as Convenor and Christophe Mouton as Deputy Convenor each for a three year term, with appreciation for this offer to serve in that capacity.



# Role of STEP in a Product Data visualization framework



*Gathered by JWG16 from other standards and industry project*





## JWG 16 Work Program



Reviewing and refining WG16 scope

ISO 23301 STEP Geometry Services

Integration of STEP into 3D PDF (see adhoc report)

Update and publish the 'SC4 Viz requirement' 2008 Document as TR

- Product data visualization Use Cases from industry
- Review of STEP components related to visualisation

ISO/PAS 17506:2012 COLLADA digital asset schema specification for 3D visualization of industrial data

NWI for ISO 14306ed3 (JT)



## ISO 14306



Edition 2 is published with November 2017 date.

Prostep JT IAP v2 = (ISO 14306ed1:2012 + JTV10 specs from Siemens + prostep ivip complementary specifications from JT-IF ) has been referenced in a DIN PAS in Germany.

- It is not upward compatible with the ISO 14306ed1-2012 nor ISO 14306ed2-2017

Preliminary Work Item for edition 3 has been circulating since May 2018

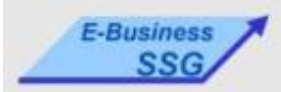
US TAG has proposed a NWI for ISO 14306 ed3 for review at JWG16 (webconf on Jan 23, 2019)

We are expecting an update on the NWI in a near future, based on 14306 ed2 with JTV10 update





# JWG 16 Liaisons to 3D PDF **STANDARDS PROJECT STATUS** *PDF Standards*



## PDF/A-4(19005-4)

- Current draft includes conformance class for 3D.
- Working through digital signature issues

## • PRC(14739-1)

- Stuart Galt (Boeing) is project leader
- Dated Revision underway

## • PDF/UA-2(14289-2)

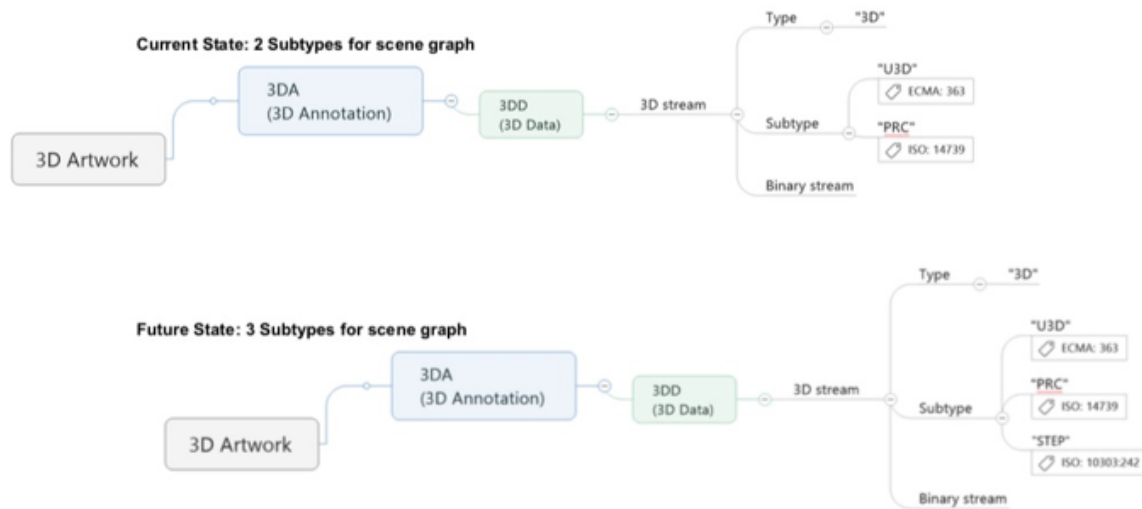
- Enhanced tagging requirements for better formed file
- Revision underway

## • PDF-2(32000-2)

## Other standards under development:

- File Format Selection Guidance
- ECM Implementation Guidance
- Checklist
- Digital Transformation Maturity Model
- Digital Transformation Framework

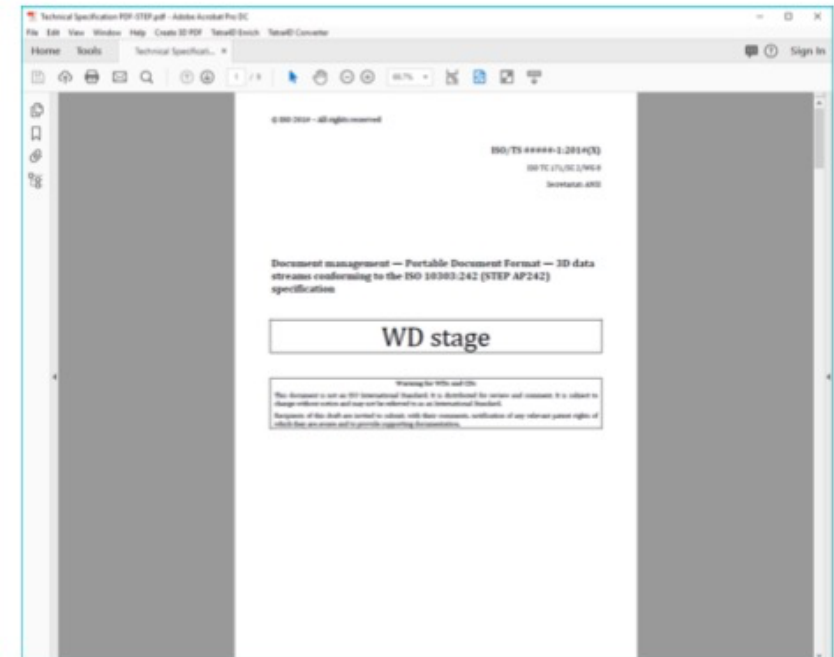
# 3D IN PDF – CURRENT STATE TO FUTURE STATE



11/08/18 TC 184 SC 4 Update - Public

3D PDF Consortium, 2018

Next version of ISO 32000 (-3?)  
PDF will include a container for  
STEP geometry

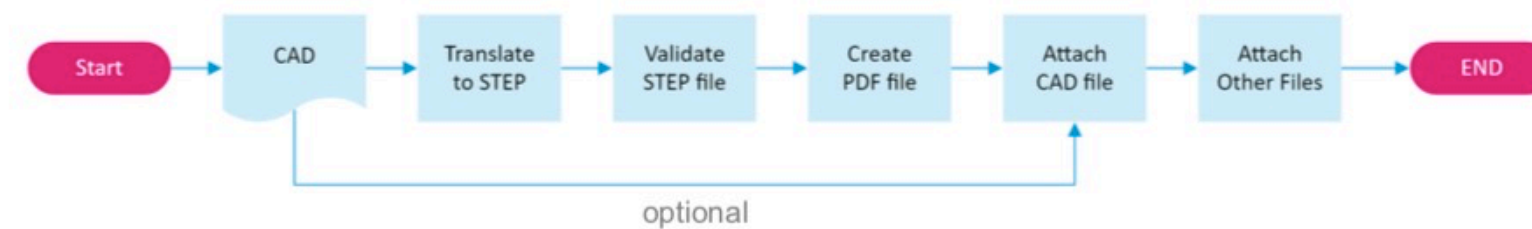




## TDP USING PDF AND STEP (FUTURE)



*Testing this might make a good joint project*





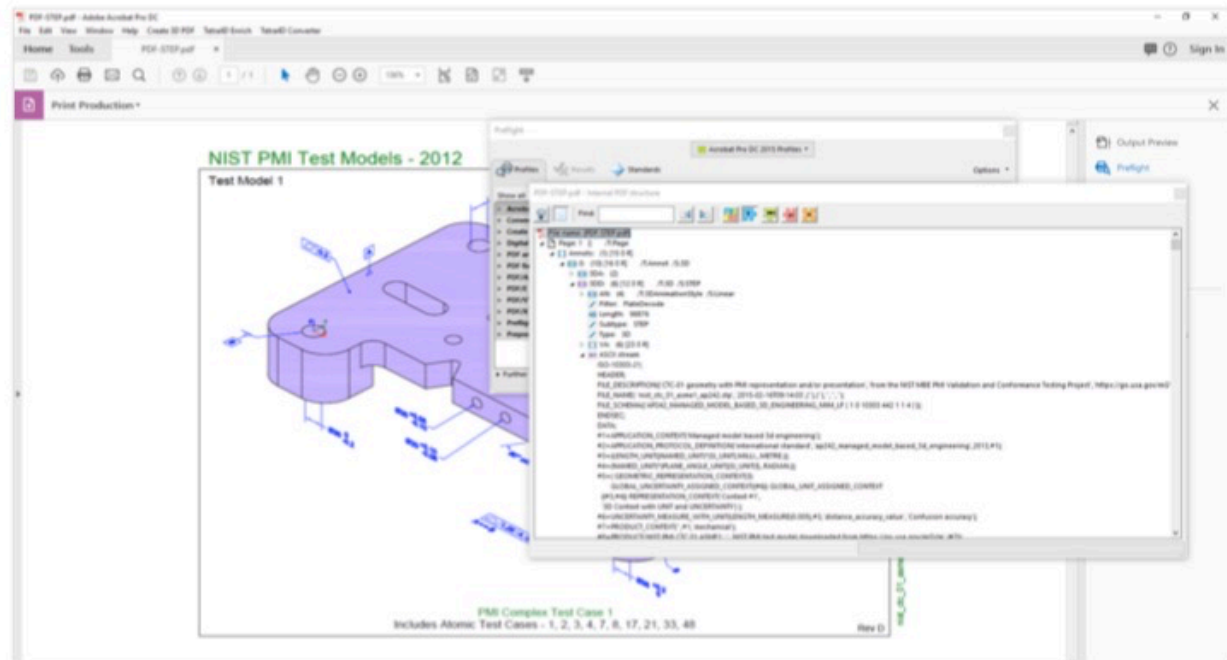
## QUALITY SYSTEMS

### *Proof of Concept (POC) - Create*



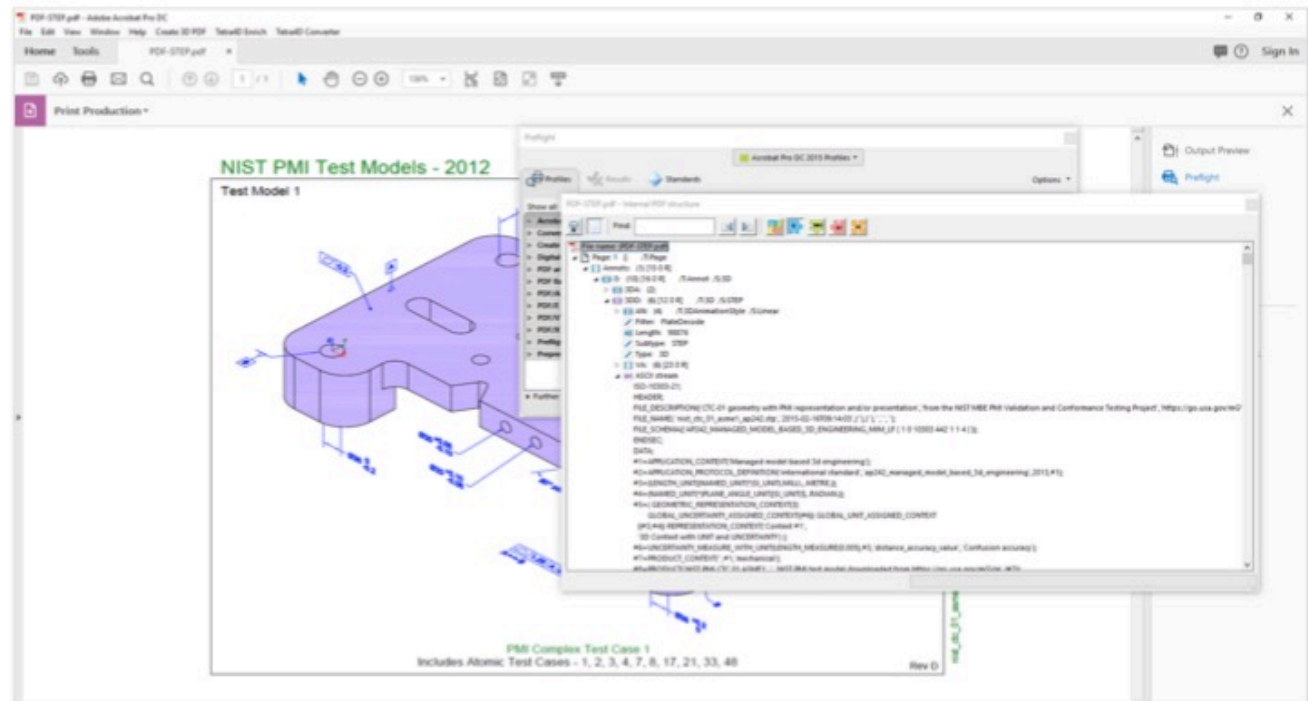
The Consortium has  
prototyped an Adobe  
Acrobat plug-in to  
create PDF files with a  
STEP 3D stream

Status - Complete





## Status – In Progress





## PDF: Blockchain Working Group



New Working Group focused on blockchain for documents – Patricia Franks, Blockchain Leader (San Jose University)

- Theme: Blockchain Technology & Trusted Information
- Themes for Use Cases
  - Digital Transformation (e.g., DAM, DRM, Identity Management)
  - Information Governance (e.g., Legal, Compliance, Records & Information Management) – Industrial Automation (e.g., Supply Chain & Provenance)





## JWG 16 Liaisons to JTC1/SC24 Web3D V2D



Open Standards for Real-Time 3D Communication

650 Castro Street Suite #120-490, Mountain View, CA 94041 USA • Phone: 248 3427662 • Fax: 248 457 8018 • [www.web3d.org](http://www.web3d.org)

Building a stronger liaison between the SC4 and the WEB 3D consortium.

This liaison will allow to speed up the integration of X3D and STEP in the industrial processes.

Presentations at WEB3D June2018 conference in Poznan

Joint meeting SC24 / JWG16 in Toulouse Aug 2018

May 5, 2017

Dear Sirs,

Web3D Consortium is a Class A Liaison organization to ISO/IEC JTC1/SC 24 Computer graphics, image processing and environmental data representation. ISO/IEC JTC1/SC 24 is also in liaison with ISO/TC 184/SC 4. Christophe MOUTON and Prof. Soonhung HAN are representing these committees as liaison officers.

Web3D Consortium finds synergies between the two committees between ISO 19775 eXtensible 3D and ISO 10303 STEP and SC 4 standards and sincerely thanks the stakeholders, especially Prof. Soonhung HAN and Jean BRANGE, who took part, last summer, to Web3D Consortium open meetings at Web3D 2016 conference and SIGGRAPH 2016 to present their challenges and point of views to combine our standardization efforts.

Web3D Consortium proposes Christophe Mouton as a Web3D Consortium member to be authorized to represent the Web3D Consortium as a liaison to ISO/TC 184/SC 4 Industrial Data and its working groups, in particular the potential JWG 16 on Visualization.

Web3D Consortium is pleased to invite ISO/TC 184/SC 4 members to attend our technical and scientific events: [Web3D 2017](#) conference in Brisbane, 5-7 June and SIGGRAPH 2017 in Los Angeles, 30 July - 3 August.

With our best regards

On behalf of Web3D Consortium

Nicholas POLYS, President  
Anita HAVELE, Executive Director



# ISO 23301

# STEP Geometry Services



# **Geometry Services for ISO 10303 – STEP standards**

*linking product definition, management  
and visualization in the value chain*

Presentation at TC 184/SC 4/WG 12/T 1  
2018-11-28

Jean Brangé : [Jean.brange@boost-conseil.com](mailto:Jean.brange@boost-conseil.com)  
Project leader ISO\_NP TS 23301



## CAD Dublin Core

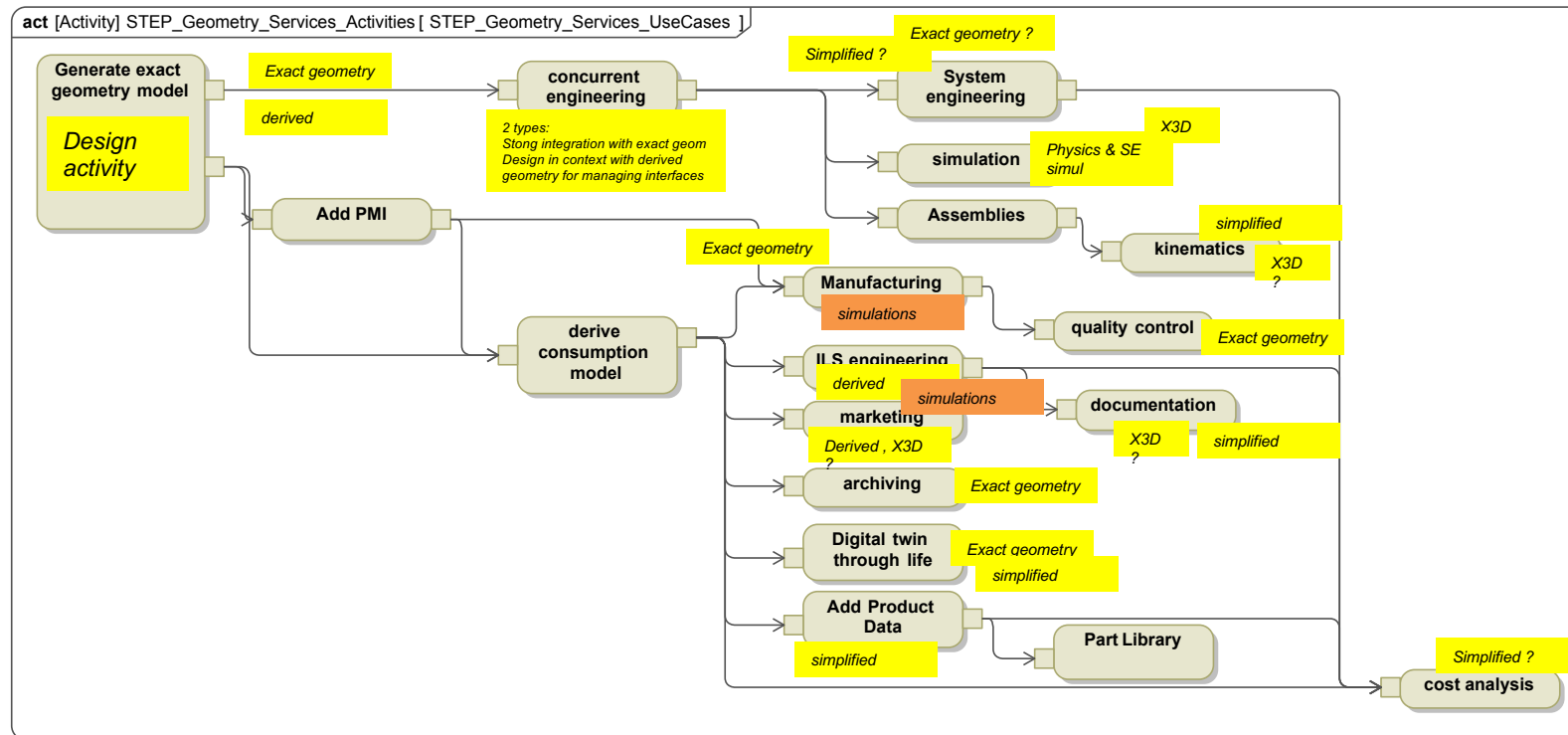


- *Geometry data set as long as they are under the management of a single PLM system can be linked together and audit trails and transformation process can be tracked. Once the geometry is taken out of the PLM system we loose the traceability. So the « CAD dublin core » shall allow us to keep track of the geometry genetics.*
- *Question: What are the properties (meta-data) that we shall keep with one instance of a geometry (file, representation, stream) in order to ensure the audit trail of the geometry transformations from original to exact to lightweight ... and qualify the data.*

# Scope (2/2)

**Draft**

## Designer / DMU manager activities related to Geometry consumption



June 13:  
Use Case for geometry consumption from the company view point  
Does not yet include extended enterprise

Objective: identify all the type of geometry which flows on the arrows

Are some arrow bidirectional or does some arrows goes back to previous boxes : this will influence the services identification

Geometry data set as long as they are under the management of a single PLM system can be linked together and audit trails and transformation process can be tracked. Once the geometry is taken out of the PLM system we loose the traceability. So the « CAD dublin core » shall allow us to keep track of the geometry genetics

June 21:  
Add an extra box at the end to include other activities not yet identified explicitly ? Shall we ?

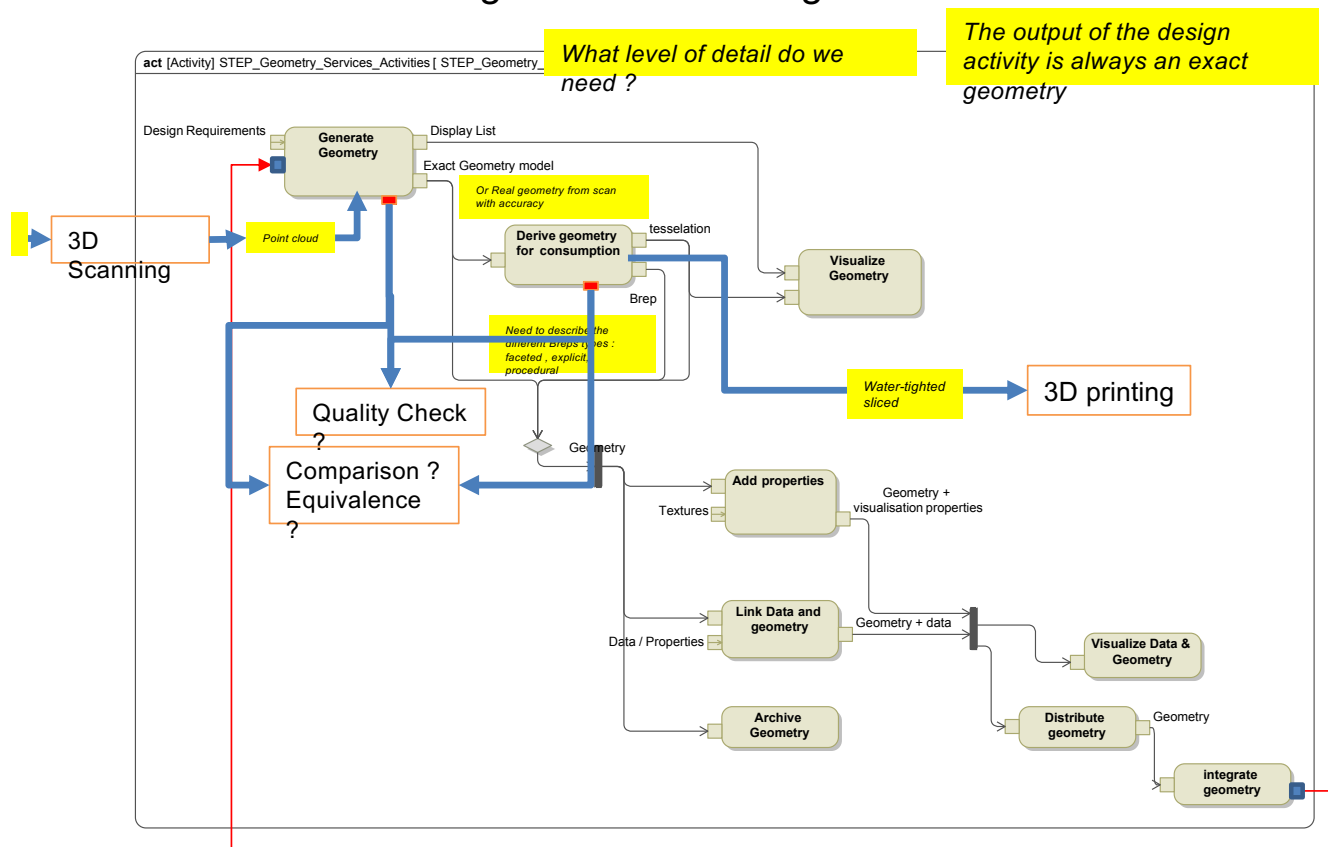
July 11: change slide name to activity diagram



# Scope ? Starts with Activity Diagrams (1/2)

Draft

Designer / DMU manager activities related to Geometry consumption



June 13:

Use Case from the Geometry designer or DMU manager on how to handle geometry, derive geometry, augment geometry

Question: is a Brep the exact original geometry or can we expect Breps to already be a derived form of a CSG model ?  
What are the type of geometry derived forms: CSG-> Breps -> Tessellated -> ? Or ??

What are we expecting to add to geometry : properties, textures, data

Define geometry « stream ».

June 21:

Need to define : original geometry, exact geometry, derived geometry, constructive geometry, pmi , helpers  
Brep definition exists, csg also , tessellation ?

Which arrows are bi-directional ?

Add an arrow from integrate geometry to generate geometry  
inside of generate geometry shall we add constructive ?  
Add an arrow input on link data and geometry for PMI

Each of the terms of the standard shall be defined in the activity diagram (at least up to the right granularity or supertyping.

July 11: change slide name to activity diagram





# Vigoulet-Auzil Core metadata



- Name
- ID
- URI ? or SHA-1 ?
- Created by
- Modified by
- Modified date
- Modification type (format transformation, modification, properties addition)
- Geometry format
- software
- Level of detail
- Original ID
- Source ID

*These metadata managed by a tree in a repo or blockchain ?*

