

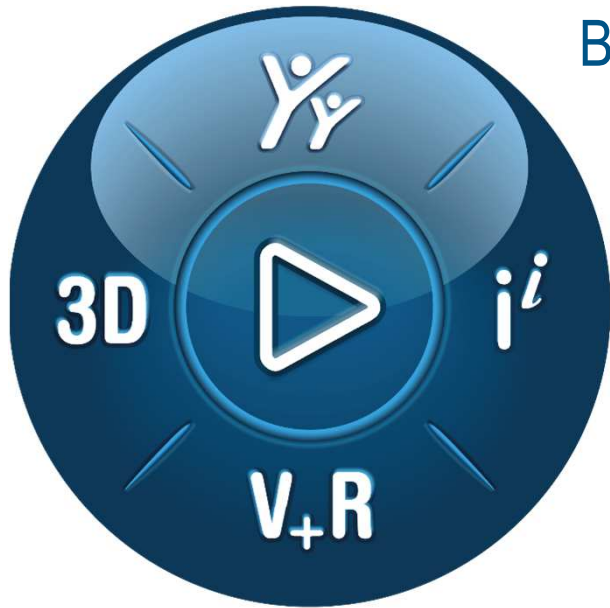


*In partnership with*



Dassault Systèmes

<http://standardsdays.afnet.fr> - AFNeT Standards Days 2020 : 6 & 7 October 2020 – team@afnet.fr



**3DEXPERIENCE®**

## Business Collaboration through Standards

Focus on STEP and IFC

Florian.Porcher@3DS.com  
R&D Technology Interoperability

AFNeT Standardization Days 2020

# Agenda

## R&D Involvement in STEP groups

STEP support within **3DEXPERIENCE** and CATIA V5

R&D Collaboration with buildingSMART on IFC

IFC support within **3DEXPERIENCE**

Conclusion

# R&D Involvement in STEP groups

- ▶ **Member of ISO/TC184 (AFNOR/IDMI) and AFNeT (FR), PDES Inc (US) and ProSTEP(DE)**
  - ▷ Strong collaboration with STEP experts to enhance Business Collaboration and Long Term Archiving
  - ▷ Contribution to and validation of STEP Recommended Practices
  - ▷ Participation to ISO/SC4 Plenary, Standardization Days, STEP AP242 Day
- ▶ **Cooperation on archiving with Aerospace joint group LOTAR**
  - ▷ Data model definition (tessellation, PMI, ...)
  - ▷ Participation to LOTAR pilots to validate data models
- ▶ **Key actor through AFNeT in Implementor Fora**
  - ▷ Participation to all CAX-IF Test rounds since TR2J (1999)
  - ▷ Participation to PDM-IF
  - ▷ Participation to EWIS-IF
- ▶ **Participation to CAD and PDM Benchmarks (AFNeT and ProSTEP IVIP)**

# Agenda

R&D Involvement in STEP groups

STEP support within **3DEXPERIENCE** and CATIA V5

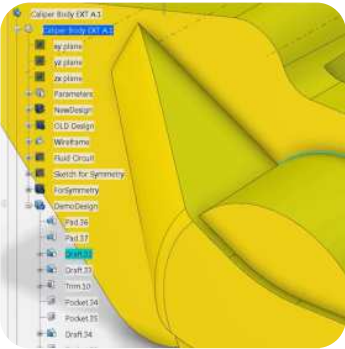
R&D Collaboration with buildingSMART on IFC

IFC support within **3DEXPERIENCE**

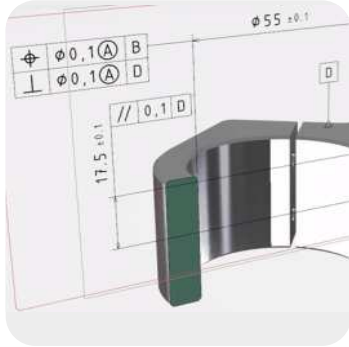
Conclusion

# STEP | Major Supported functionalities

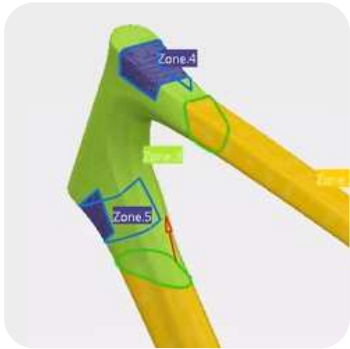
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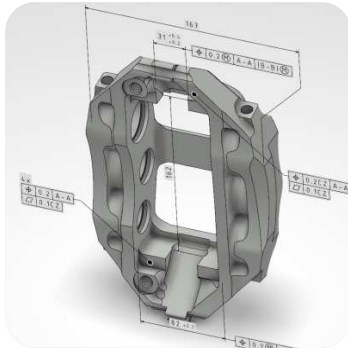
Exact Geometry,  
Product Structure



Graphic PMI,  
Validation Properties



Composite,  
Tessellated Geometry



Semantic PMI,  
PDM



V5R07

V5R20

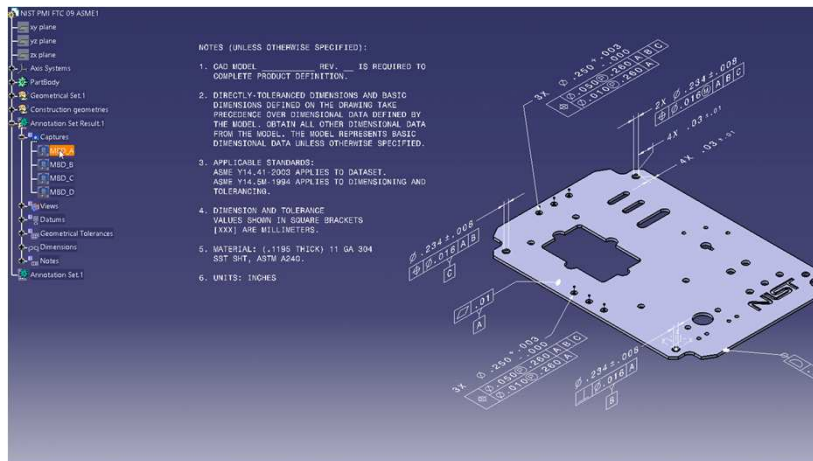
V6R2013x

V5-6R2013

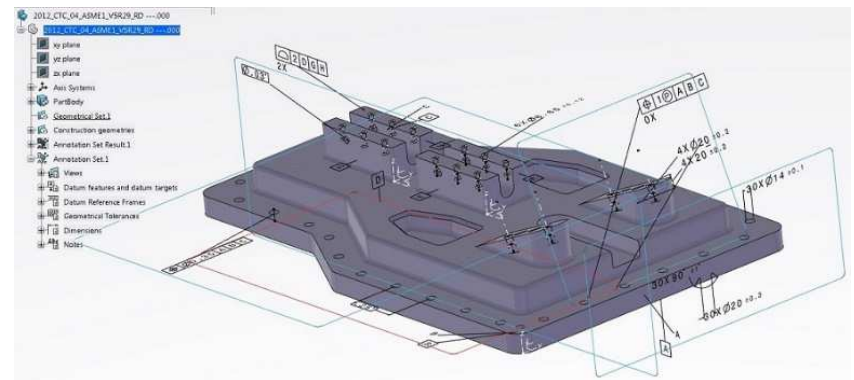
3DEXPERIENCE R2018x

# STEP AP242 CAD | Product & Manufacturing Information

- ▶ Facilitate design review with support of saved views with hide/show of geometry on Graphic PMI.



- ▶ Improve display of Semantic PMI using “Presentation Placeholder”

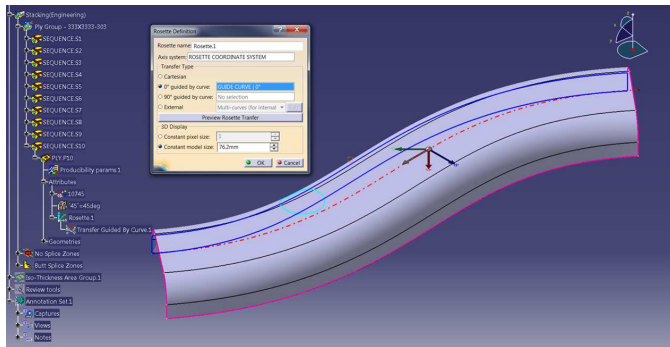


- ▶ Collaboration with STEP community on Semantic PMI

- ▶ Continuous feedback from DS expert about lack in STEP to support ASME-ANSI and ISO standard

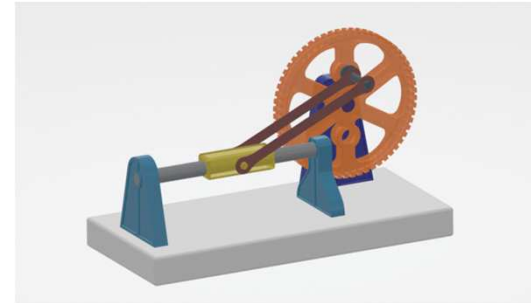
# STEP AP242 CAD | Applicative Data

- ▶ Enhance composite design support thanks to STEP AP242 Ed2
  - ▷ Multiple rosettes
  - ▷ Rosette guided by curve



- ▶ Improve support of “user defined” Key/Value attributes at part and at geometry level

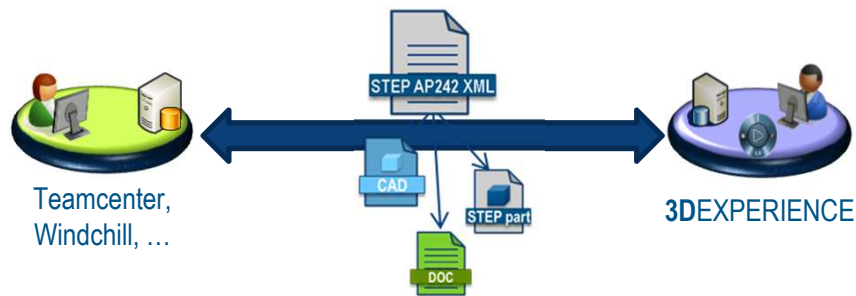
- ▶ Prototype on exchange of Kinematics Mechanism realized in the context of CAX-IF with 3DEXPERIENCE



- ▶ Electrical Harness
  - ▷ Participation to EWIS-IF



# STEP AP242 PDM | Collaboration in 3DEXPERIENCE



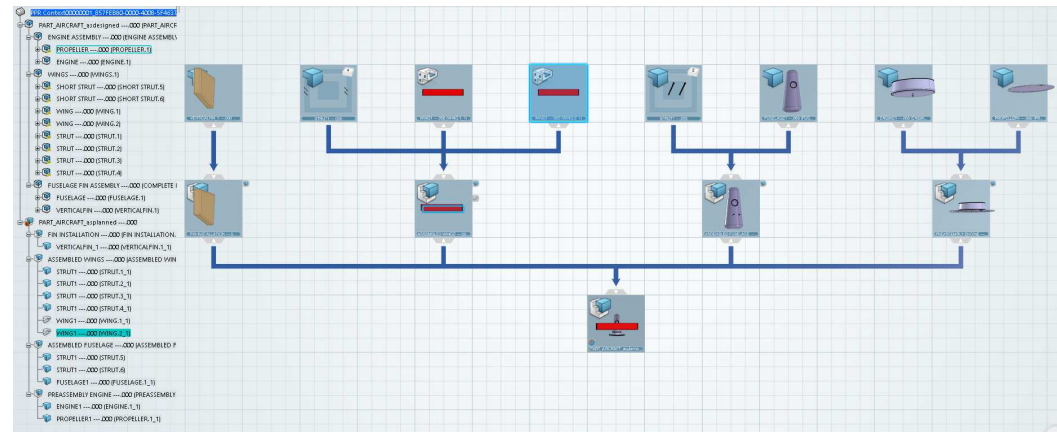
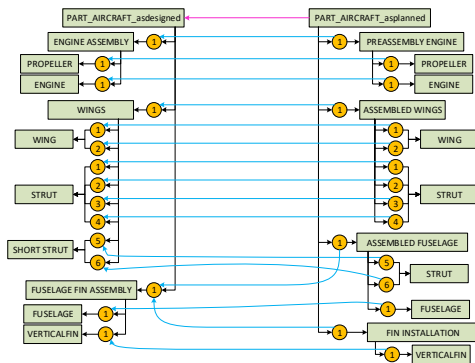
## ► Scenarios supported with STEP AP242 XML.

- ▷ Exchange of assemblies referencing CAD files (STEP or native) and non-CAD documents (PDF, Office,...)
- ▷ STEP PDM Collaboration with **lifecycle** management (Update and Versioning)
- ▷ STEP PDM Collaboration with **configuration** management (Effectivities)
- ▷ Exchange between **customized PDM system**

# STEP AP242 PDM | Work in progress

## ► AsDesigned/AsPlanned Structure

### ▷ Participation to PDM-IF Test round



## ► Process Planning

### ▷ Study of STEP data model

## ► Change management

### ▷ Participation to VIM (Visual Issue Management) use case of PDM-IF Test round

# Agenda

R&D Involvement in STEP groups

STEP support within 3DEXPERIENCE and CATIA V5

R&D Collaboration with buildingSMART on IFC

IFC support within **3DEXPERIENCE**

Conclusion

# R&D Collaboration with buildingSMART on IFC

- ▶ **Member of buildingSMART Community**
  - ▷ BuildingSMART International enables the development, creation and adoption of open digital standards such as the Industry Foundation Classes (IFC).
- ▶ **Participation to bSI-ISG/MSG/IFC Development Meeting**
  - ▷ Implementor and Modeling expert meetings to discuss implementation and future of IFC.
- ▶ **Participation to IFC Rail Implementers Forum**
  - ▷ Implementers forum to test and validate upcoming IFC4x3 Rail standard.

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R&D Involvement in STEP groups

STEP support within 3DEXPERIENCE and CATIA V5

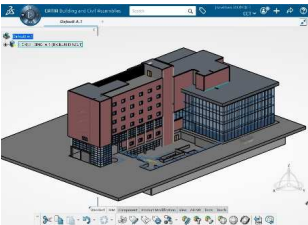
R&D Collaboration with buildingSMART on IFC

**IFC support within 3DEXPERIENCE**

Conclusion

# IFC | Major Supported functionalities

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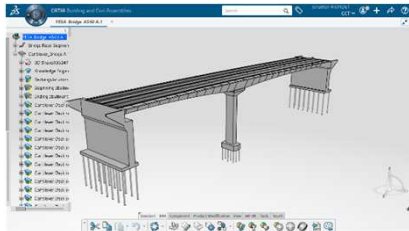
Building semantic  
Faceted geometry



Exact geometry (IFC4)  
Tessellation (IFC4)



Terrain (IFC4)  
Alignments (IFC4x1)



Piping, HVAC, Raceway  
Bridge (IFC4x2)

3DEXPERIENCE R2014x

3DEXPERIENCE R2016x

3DEXPERIENCE R2018x

3DEXPERIENCE R2020x

# IFC | Work In progress

- ▶ Prototyping of IFC Rail support (IFC4x3)



- ▶ Support of Geolocation entities (IFC4)
- ▶ Enhance merging and filtering capabilities at Import ([Video](#))

# Agenda

R&D Involvement in STEP groups

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# Conclusion

- ▶ Dassault Systèmes R&D will continue to contribute to both development and implementation of Standards.
- ▶ Client need is captured through direct relationship and via « User-Group Use Cases » (defined and tested in Implementers Fora )
  
- ▶ Next milestones
  - ▷ STEP AP242 Ed2 implementation as GA.
  - ▷ Expand semantic coverage of STEP and IFC within our solution.



# CAD functional capabilities supported by the STEP AP242 interface

## 3DEXPERIENCE

3DEXPERIENCE STEP AP242	CAD information	Implementation format		Level of implementation		
		P21	XML	Pilot	IF test	COTS
3D Geometry	3D exact Brep	YES	n/a			X
	3D tessellated Brep	YES	n/a			X
	presentation(colors, layers, transparency, invisibility, etc...)	YES	n/a			X
3D PMI (GD&T, 3D Annotations, UDA)	graphic presentation	YES	n/a			X
	semantic presentation	YES	n/a			X
Assembly Structure	1 single P21 STEP file	YES	YES			X
	1 assembly STEP file referencing CAD P21 STEP files	YES	YES			X
	nested assembly STEP files referencing CAD P21 STEP files	YES	YES			X
Kinematics	Motion	NO	YES		X	
	Mechanism	NO	YES		X	
Composites design	implicit ply definition based on exact surface and contour	YES	NO			X
	explicit ply definition based on 3D tessellated solid	YES	NO			X
Electrical Wire   Harness	Electrical BOM	NO	in work			
	Wire Harness Topology	NO	in work			
STEP Compressed file		YES	YES			X
Validation Properties	3D geometry, PMI, assembly, composite	YES	YES			X

# CAD functional capabilities supported by the STEP AP242 interface

## CATIA V5

V5 STEP AP242	CAD information	Implementation format		Level of implementation		
		P21	XML	Pilot	IF test	COTS
3D Geometry	3D exact Brep	YES	n/a			X
	3D tessellated Brep	YES	n/a			X
	presentation(colors, layers, transparency, invisibility, etc...)	YES	n/a			X
3D PMI (GD&T, 3D Annotations, UDA)	graphic presentation	YES	n/a			X
	semantic presentation	YES	n/a			X
Assembly Structure	1 single P21 STEP file	YES	YES			X
	1 assembly STEP file referencing CAD P21 STEP files	YES	YES			X
	nested assembly STEP files referencing CAD P21 STEP files	YES	YES			X
Kinematics	Motion	NO	NO			
	Mechanism	NO	NO			
Composites design	implicit ply definition based on exact surface and contour	YES	NO			X
	explicit ply definition based on 3D tessellated solid	YES	NO			X
Electrical Wire   Harness	Electrical BOM	NO	NO			
	Wire Harness Topology	NO	NO			
STEP Compressed file		YES	YES			X
Validation Properties	3D geometry, PMI, assembly, composite	YES	YES			X

# PDM functional capabilities supported by the STEP AP242 interface

## 3DEXPERIENCE

3DEXPERIENCE STEP AP242 PDM information	Implementation format		Level of implementation		
	P21	XML	Pilot	IF test	COTS
"As Designed" Product Structure	NO	YES			X
nested Product structure	NO	YES			X
Lifecycle management	NO	YES			X
Document Structure	NO	YES			X
Person and Organization	NO	YES			X
Date and Time	NO	YES			X
Classification	NO	YES			X
Material Properties	NO	NO			
Customized PDM properties	NO	YES			X
Configuration management - based on effectivities	NO	YES		X	
Configuration management - based on specifications	NO	YES		X	
Change management	NO	in work		X	
"As planned" Product Structure related to "As Designed"	NO	in work		X	
Process Planning	NO	in work			