

AFNeT – prostep ivip STEP AP242 Day

17 October 2018

Airbus, Toulouse

Andy Attfield, Siemens PLM



Responding to Industry Trends

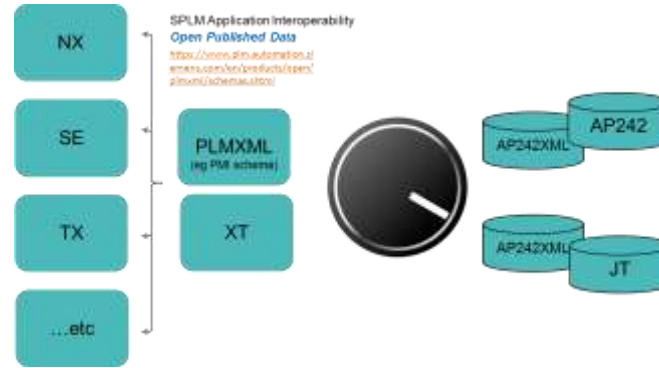
Open Standards to address Process Complexity



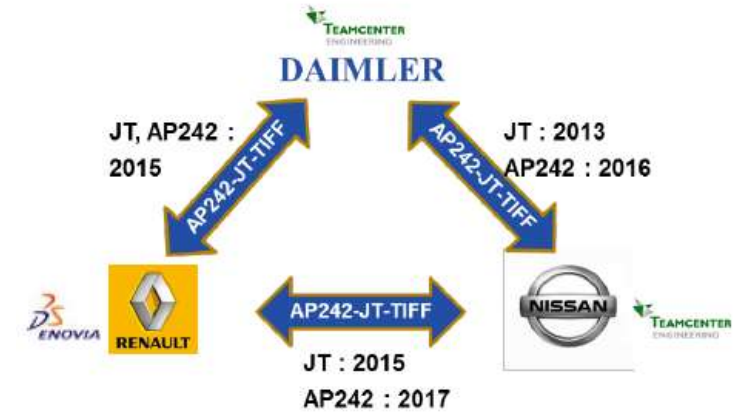
Standard CaX formats



Published Internal Formats



Standard PLM formats

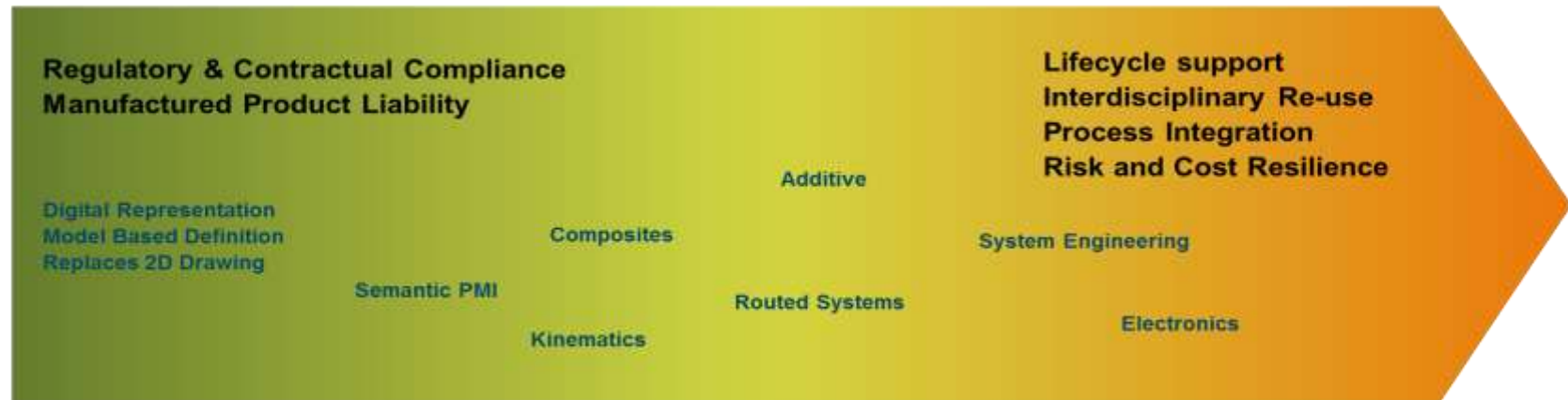


Data Quality Standards

MIL-STD-31000A
26 February 2013



Long Term Archive



Supplier Collaboration

Full Standardization

2018 NX Extends STEP AP242 Support for the Model Based Definition

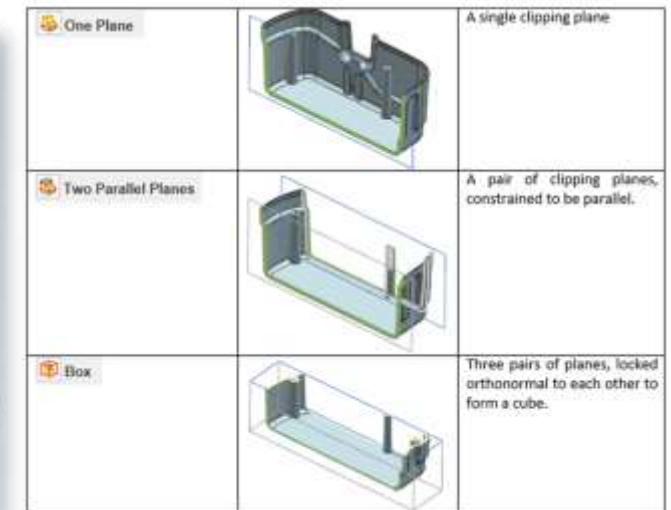
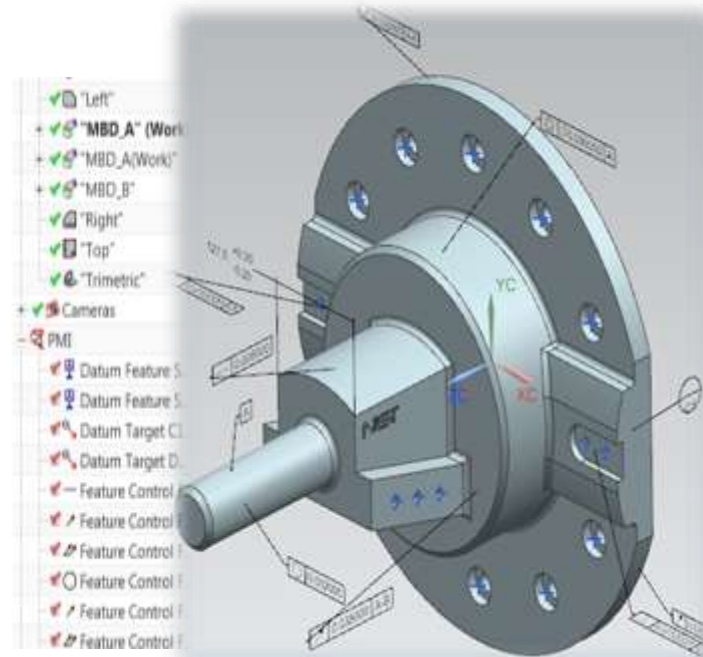
- ✓ Product Structure
- ✓ Exact Geometry
- ✓ Tessellated PMI
- ✓ All 4 Semantic PMI types
- ✓ Section Views
- ✓ Tessellated Geometry
- ✓ Validation Properties for Geometry
- ✓ Validation Properties for PMI
- ✓ User defined Attributes
- ✓ Import/Export Compressed Files
- ✓ Import/Export AP242 XML²
- ✓ Import/Export Compressed AP242XML

	CAD information	Implementation Format		Level of implementation		
		P21- AIM	XML BO M.	Pilot	IF test	COTS
3D geometry	3D exact BREP representation	✓				✓
	3D tessellated BREP representation	✓				✓
	presentation (color, layers, transparency, invisibility, etc)	✓				✓
3D Product & Manufacturing Information - PMI (GD&T, 3D annotations, 3D symbols, UDA)	graphic presentation	✓				✓
	semantic representation	✓			1	✓
Assembly structure	1 STEP file with assembly structure and 3D geometry	✓				✓
	1 assembly with references to CAD 3D files)	✓	✓			STP/IT
	nested assemblies with references to CAD 3D files)	✓	✓			STP/IT
Kinematics	Motion		✓	✓		
	Mechanism		✓	✓		
Composite design	Ply definition based on exact surface	AP203E2				✓
	Ply definition based on 3D tessellated solid BREP	Req?				
Electrical Wiring Harness	Topology (AP242 ed2 DIS)		✓			
	Wire list (AP242 ed2 DIS)		✓			
STEP compressed file		✓				✓
Validation Properties	3D geometry, PMI, assembly structure, composite	✓				✓

1 - Semantic PMI schema is a work in progress
 2 - Import via MultiCAD today and via XML in 2019

AP242 Tessellated and Semantic PMI

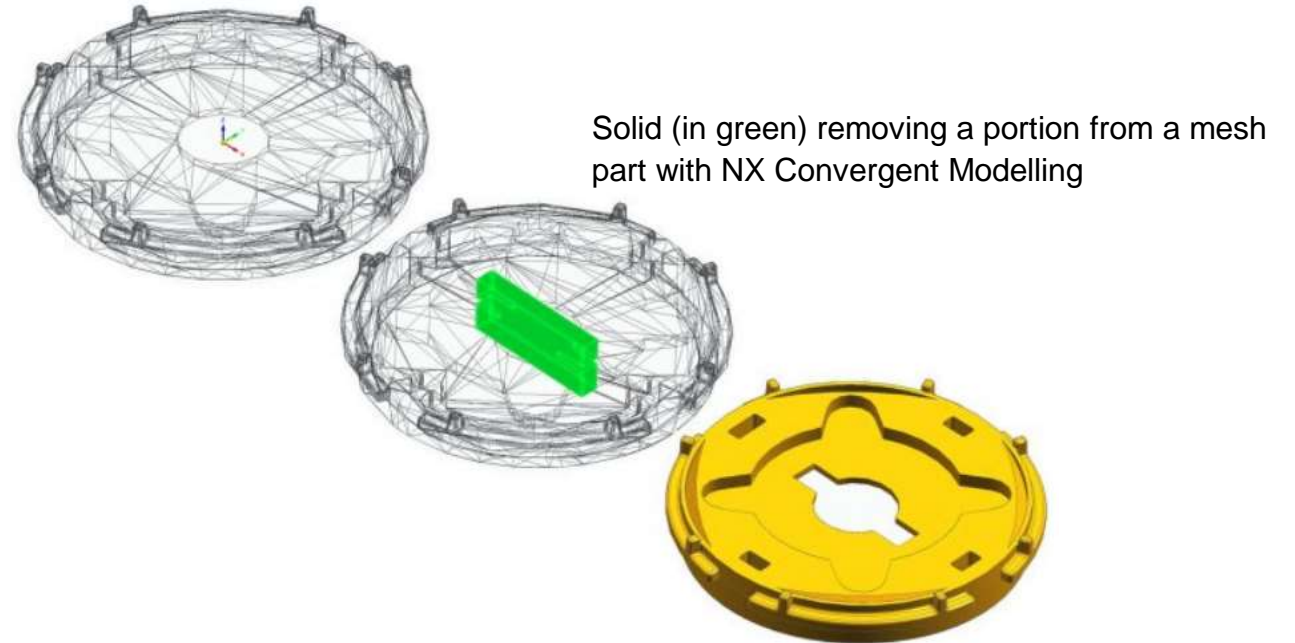
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- ✓ PMI Fidelity
 - ✓ PMI Counts
 - ✓ Graphical Display
 - ✓ PMI Centroid
 - ✓ PMI Presentation Polyline Length
- ✓ Associated/Attached Geometry
 - ✓ Associated Geometry
 - ✓ Attached Geometry

AP242 Tessellated Geometry as NX Convergent Bodies

- ✓ Product Structure
- ✓ Exact Geometry
- ✓ Tessellated PMI
- ✓ All 4 Semantic PMI types
- ✓ Section Views
- ✓ **Tessellated Geometry**
- ✓ Validation Properties for Geometry
- ✓ Validation Properties for PMI
- ✓ User defined Attributes
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NX Convergent and AP242 meets Increasing Demand for Facet Based Modelling Workflows

Implementer Forum Collaboration to Deliver Robust MultiCAD AP242 Definition

MBD Product Manufacturing Information

- Edition 1 - Common Interpretation of PMI Views
- 2019 Edition 2 – Placeholder PMI
- Edition 3 – Target Additional PMI Types (more than 4)
- Schema Extension Review – Full Dimensions Support
- Proposal Submitted – PMI View Validation

MBD Functional and Material Information

- NX 1872 – Edition 1 Technical Corrigendum update to AP242 XML Product Structure Schema to support Kinematics
- AP242 XML Kinematics Schema Mapping for NX Motion and Kinematic Definitions
- Composites Schema review for FiberSIM



Benefit: Same Validation Properties and Techniques for both AP242 and JT



Geometry Fidelity

Surface Area

Volume

Centroid

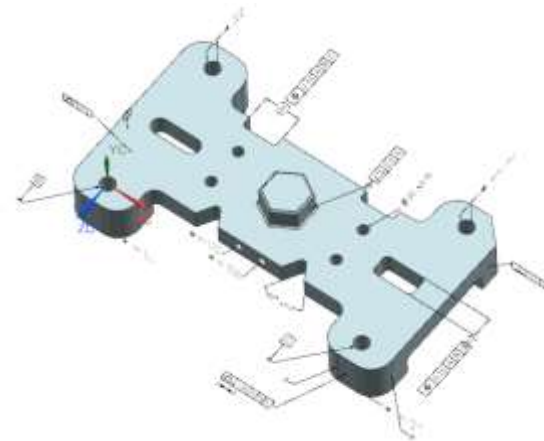
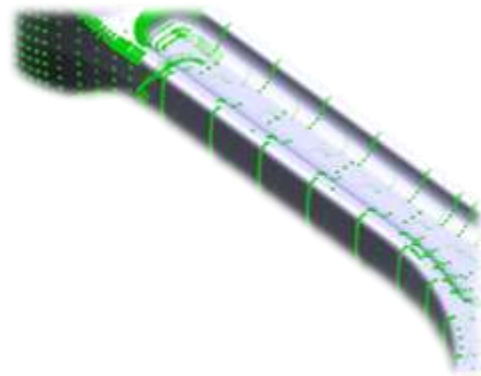
Cloud of Points

PMI Fidelity

PMI Count

Graphical Presentation

Affected Geometry



- ✓ Precise Geometry
 - ✓ Surface Area : Calculated Value Varies by 0.000
 - ✓ Volume : Calculated Value Varies by 0.000039%
 - ✓ Center Of Gravity : Calculated Value Varies by 0.000039%
- ✓ PMI Fidelity
 - ✓ PMI Counts
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AP242 XML + JT + Tiff Adopted by Global Automotive Group for OEM-OEM Collaboration

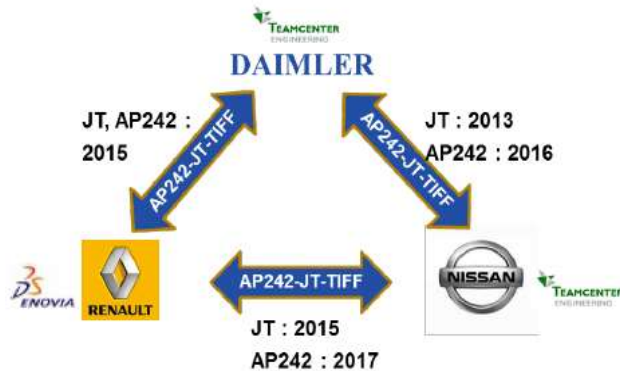
DAIMLER



The Daimler-Nissan-Renault CWS project status (1/3)

Project approach : step by step with progressive implementation in existing exchange tools

Step 1 : Agreement on exchange format and implementation in current interfaces for CAD-PDM : AP242 XML for metadata and product structure, JT Xt-Brep 9.5, TIFF for drawings



GAAG 2015

8

PDM information	Implementation Format		Level of implementation		
	P21-AIM	XML BOM	Pilot	IF test	COTS
"As Designed" PDM product structure		✓			✓
Nested PDM product structure		✓	✓		
Assembly validation properties		✓	✓		
Lifecycle management		✓			✓
Document structure		✓			✓
Person and organization		✓			✓
Date and Time		✓			✓
Classification		✓			✓
Material properties		✓			✓
Customized PDM properties		✓			✓
Configuration management - based on effectivities		✓	✓		
Configuration management - based on specifications		✓	✓		

2018 Industry Trends

Standards Based PLM Data Exchange



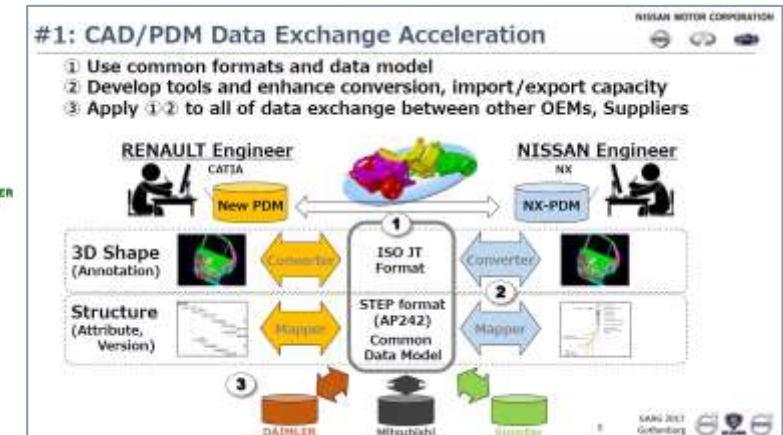
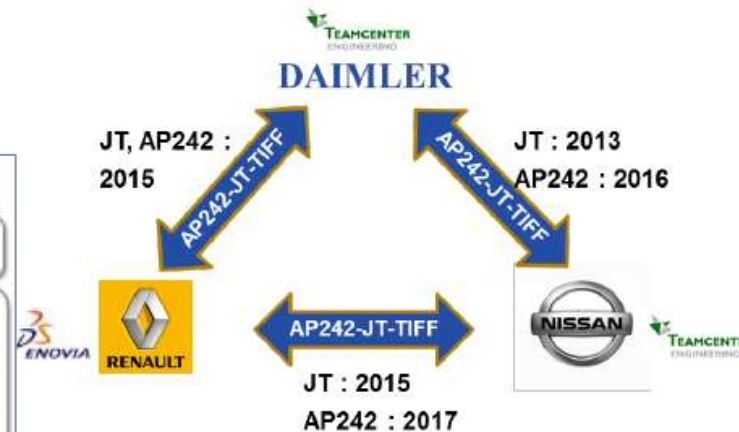
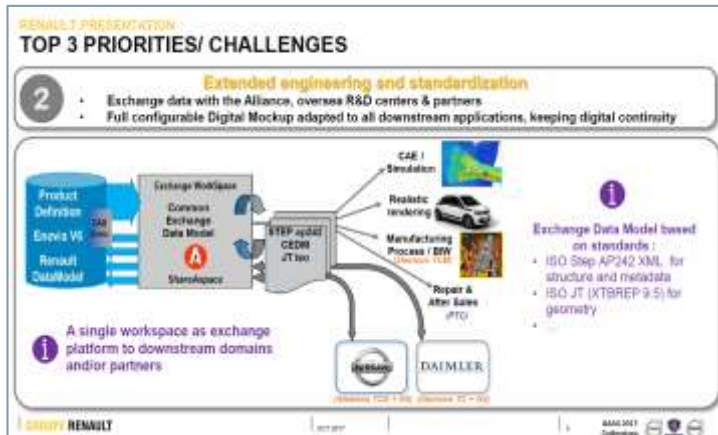
Daimler surpassed 20 million JT files under management and 80% of components have been approved for JT based collaboration*.
Source: Daimler 2018 PLM Connections

Renault #2 PDM Priority: Collaboration with partner companies based on AP242 xml + JT.

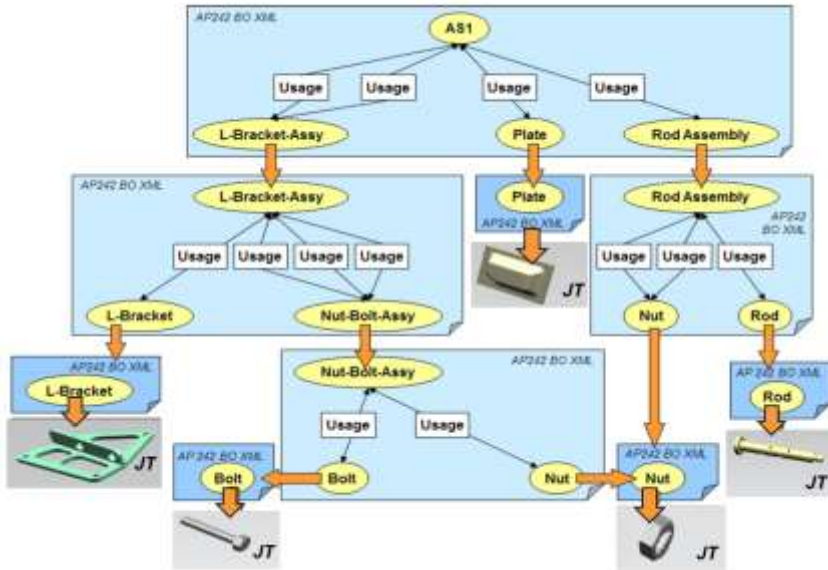
Source: GAAG 2018

Nissan #1 PDM Priority: Collaboration with partner companies based on AP242 xml + JT.

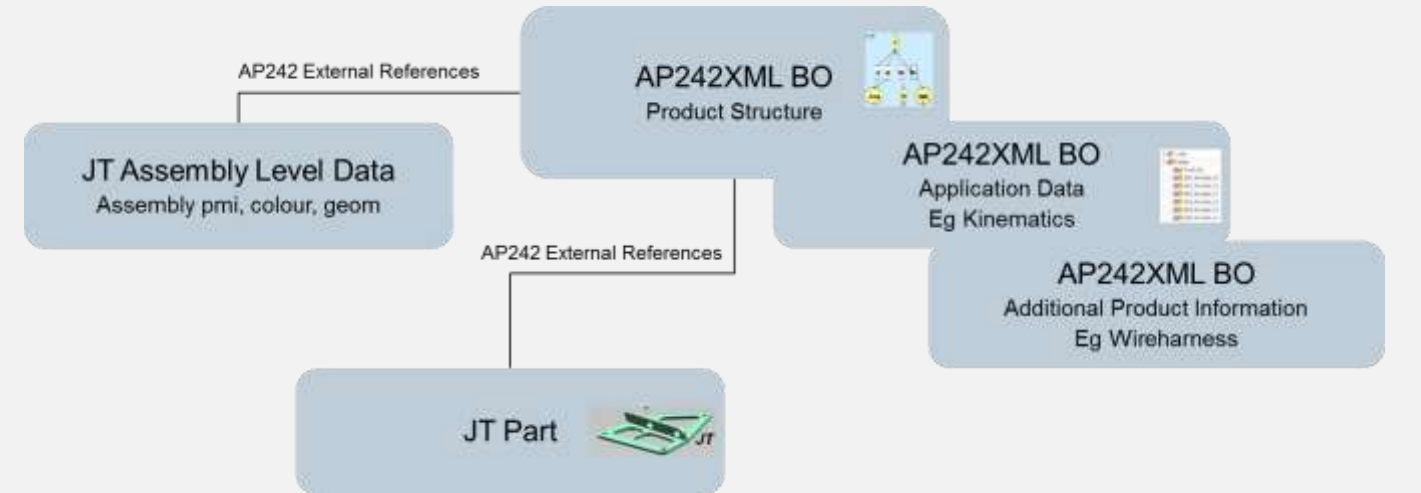
Source GAAG 2018



Using GAAG Recommendation for Hybrid Approach of AP242 XML plus JT



Sweet Spot: AP242 XML Business Objects



Complementary ISO Standards

Address Complexity of the Digital Thread

example: Kinematics (in work)

example: Wire-harness

Opportunity: Extend AP242 XML Schemas to **“Complete the Complement”**

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Open Standards to address Process Complexity



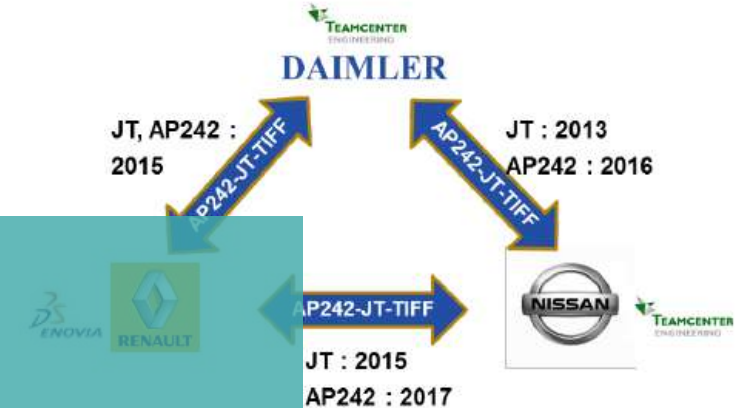
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Thank You!

Long Term Archive

AFNeT – prostep ivip STEP AP242 Day

**17 October 2018
Airbus, Toulouse**

Obsolescence Management

Lifecycle support
Interdisciplinary Re-use
Process Integration
Risk and Cost Resilience

System Engineering

Electronics

Supplier Collaboration

Full Standardization

Data Quality Standards

MIL-STD-31000A
26 February 2013

