

# AFNeT – prostep ivip STEP AP242 Day

27 November 2019

Hamburg, ZAL

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# Presentation : Datakit - CrossCADWare Content

Datakit : long term involvement in STEP (LOTAR group, MBXIF, PDM-IF ..)

Product : Datakit CrossCADWare suite

- CrossCADWare (library components for integration in an application)
- CrossManager (conversion application)
- CrossCADPlg (plugins for SolidWorks, Rhino, OpenCascade ..)

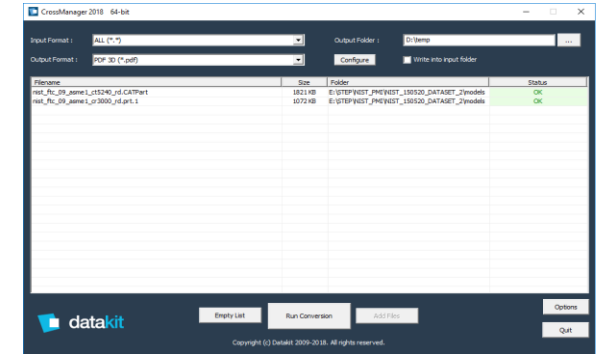


Table of functional capabilities : next slides

- for each item, status

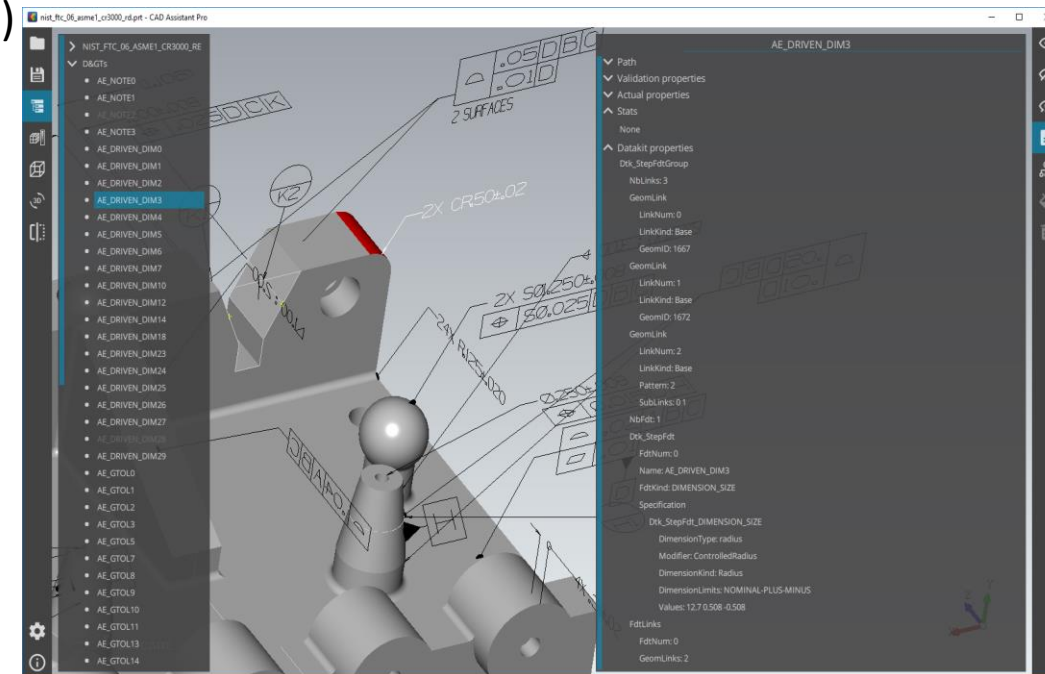
(Study, Proto/Pilot, IF Test, COTS : available or planned (April 2020))

Additional Information

- Domain (Geometry, PMI, Modelling, others on MBD, PDM)
- Status (Study, Proto/Pilot, IF Test, COTS)

First Users' feedback on AP242

- in the domains of NC, Metrology, Inspection
- Focus (3D+PMI), expectations



# CAD functional capabilities supported by the STEP AP242 interface

## Datakit CrossCADWare suite



	CAD information	AP242 edition	Implement
			P21- AIM
3D geometry	3D exact BREP representation	ed1	COTS
	3D tessellated BREP representation	ed1	COTS
	3D tessellated curved triangle representation	ed2	Apr.20
	3D scan	ed2	proto
	presentation (color, layers, transparency, invisibility, etc)	ed1	COTS
	3D texture	ed2	study
3D PMI (Product & Manuf. Information) (GD&T, 3D annotations, 3D symbols, UDA)	graphic presentation	ed1	COTS
	semantic representation	ed1	COTS
3D machining form feature	Milling, Turning, Drilling, etc	ed1	proto
Validation	Validation Properties	ed1	COTS
	Equivalence validation (shape)	ed2	study
assembly structure	1 STEP file with assembly structure and 3D geometry	ed1	COTS
	1 assembly with references to CAD 3D files	ed1	COTS
	nested assemblies with references to CAD 3D files	ed1	COTS
	3D assembly constraint	ed1	proto
Kinematics	Motion	ed1	study
	Mechanism	ed1	proto
Composite design	ply definition based on exact surface	ed1	
	ply definition based on explicit 3D tessellated solid BREP	ed1	
Electrical Wiring Harness	topology	ed2	proto
	wire list	ed2	proto
Additive Manufacturing	build orientation, part placement, support, etc	ed2	proto
STEP compressed file	Date, Author	ed1	GOTS

Additional information on the version(s) of the COTS AP242 interface: to be described by the PLM vendor – PLM integrator

# PDM and other meta data functional capabilities supported by the STEP AP242 interface

## Datakit CrossCADWare suite



PDM and other meta data information	AP242 edition	Implementation Format		Level of implementation		
		P21- AIM	XML BO M.	Pilot	IF test	COTS
"As Design" product structure	ed1	X	X		x	x
"As Planned" product structure				study		
"As Built" product structure (including "individual product")				study		
Traceability links between product views				proto		
Document structure	ed1	X	X		x	x
Person and organization	ed1		x( R )		x	x( R )
Classification				study		
Customized PDM properties			x( R )		x	x( R )
Configuration management - based on effectivities	ed1		x( R )		x	x( R )
Configuration management - based on specifications				study		
Change management						
Contract management						
Project management						
Delta change management						
Interface management						
Mating definition				study		
Requirement management (text based, property based)						
Process planning						
Validation and verification	ed2					
Message	ed2					

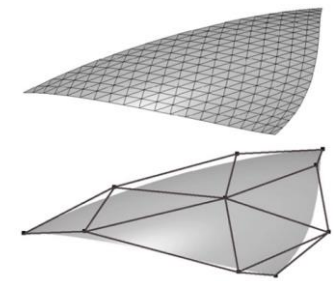
# CrossCADWare

## Additional Informations



### ■ Additional Information on 3D Geometry

- In COTS : read mode “normal” (full computation of geometry) or “fast” (computation deferred to caller)
- Validation properties : read, read+check, write – on geometry, tessellation ..
- For E2 IS : tessellation with
- Later (spring 2020) : tessellation with curved triangles
- IF Test to come : Persistent ID on geometry, PMI



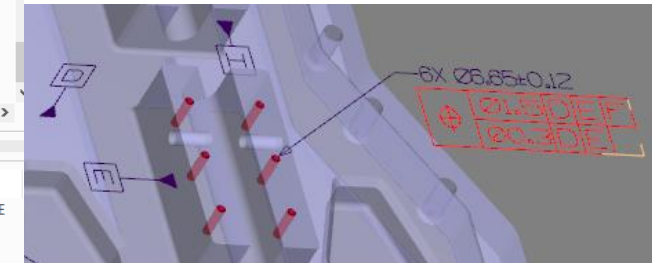
### ■ Additional Information on PMI & Modelling

- For E2 IS : PMI with placeholder, enhanced validation properties
- For E2 IS : new types of PMI
- Continuing (cf IF tests & pilots) : PMI in assembly, saved views
- AP242 group + IF tests to come : Hole Features (with tolerancing)
- AP242 group + Pilots to come (after E2) : Holes & Fasteners

Tree View:

- AD1075
- AD1076
- GeomTol8
- GeomTol9
- GeomTol10
- GeomTol11
- GeomTol12
- Views

Property	Value
FDT Type	TOLERANCE
Multiple Tolerance	composite
(T1) Tolerance Type	Position
(T1) Tolerance Value	∅1.5
(T1) [1] Value	1.5
(T1) [2] Zone	cy/circ
(T1) DatumRef 1	D
(T1) DatumRef 2	E
(T1) DatumRef 3	F
(T2) Tolerance Type	Position
(T2) Tolerance Value	∅0.3
(T2) [1] Value	0.3
(T2) [2] Zone	cy/circ
(T2) DatumRef 1	D
(T2) DatumRef 2	E
nodeType	FDT



# CrossCADWare

## Additional Informations



- On other domains of MBD
  - LOTAR Pilot + EWIS-IF : Electrical Harness (product structure, Ed2, validation properties)
  - AP242 group : Additive Manufacturing (discussions on standard, proofs of concept)
  - R&D : User Defined Features, 3D parametric model, Machining Features (proposals, proofs of concept)
  - Follow-up on STEP-NC AP238
- Additional Information on PDM
  - Frame : PDM-IF , on Business Objects Model in XML
  - Read/Write CAD Assemblies, parts as STEP Part21 or other formats
  - Read PDM data
  - Current works on : effectivities, attributes, multiple ID, parts multi-version & multi-view
  - Upgrading to AP242E2 Domain Model

The screenshot shows a CAD software interface. On the left, a tree view displays a hierarchy: 'A 1 A ST PACKAG, CAR, PRJA' (expanded), 'ID' (expanded), and 'Part\_PDM\_General'. Below the tree is a property table with the following data:

Property	Value
ID_1	P0NPDG5
ID_1_Context_Id	[Sender URL]
ID_1_Context_Name	[Sender Organization]
ID_1_Role	identification information
ID_2	P0NPDG5 PDM-IF
ID_2_Context_Id	PDM-IF
ID_2_Context_Name	PDM-IF
ID_2_Role	exchange identification information

On the right side of the screenshot, a 3D model of a mechanical part is visible in a perspective view.

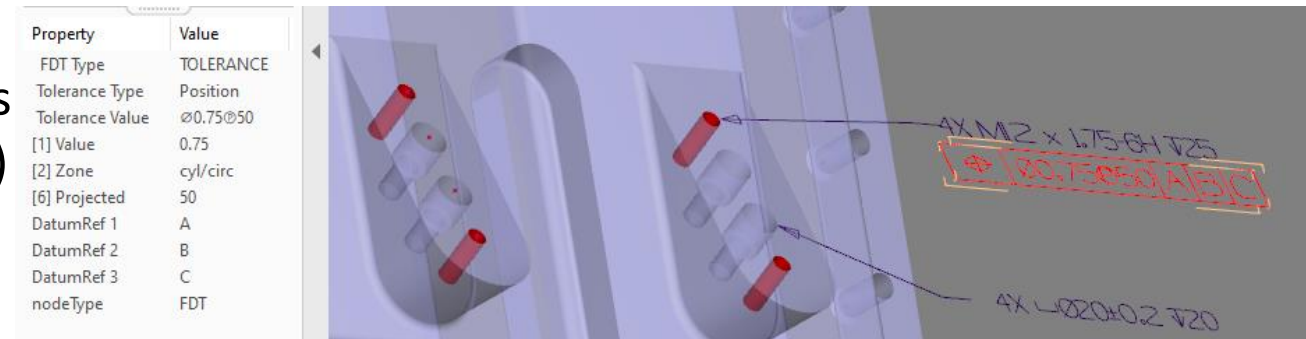


### ■ Scope

- Domain : Numerical Control, Metrology, Inspection
- Major focus : 3D Geometry (exact), PMI semantics (downstream use)
- Growing interest, already several customers have started on AP242 models, beside native models

### ■ Appreciations & expectations (summary)

- Most appreciated : clear definition of semantics
- Consistent with GD&T standards (mostly ASME)
- Concern on geometric links, especially on constructive geometries
- Expectation on features (firstly holes)
- Some “popular” info like leader lines are not present => waiting for place holder
- Concern : consistency between graphic display and semantic description (e.g. projected zone on tolerance)
- Expectation for comprehensive semantics (like Roughness)



THANK YOU FOR YOUR ATTENTION  
MERCI DE VOTRE ATTENTION

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