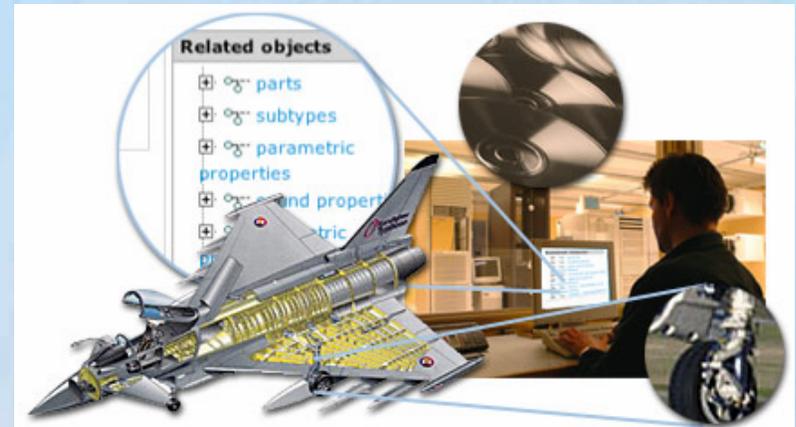




Atlantic Workshop on Long Term Knowledge Retention 12th. - 13th February 2007

The MIMER project

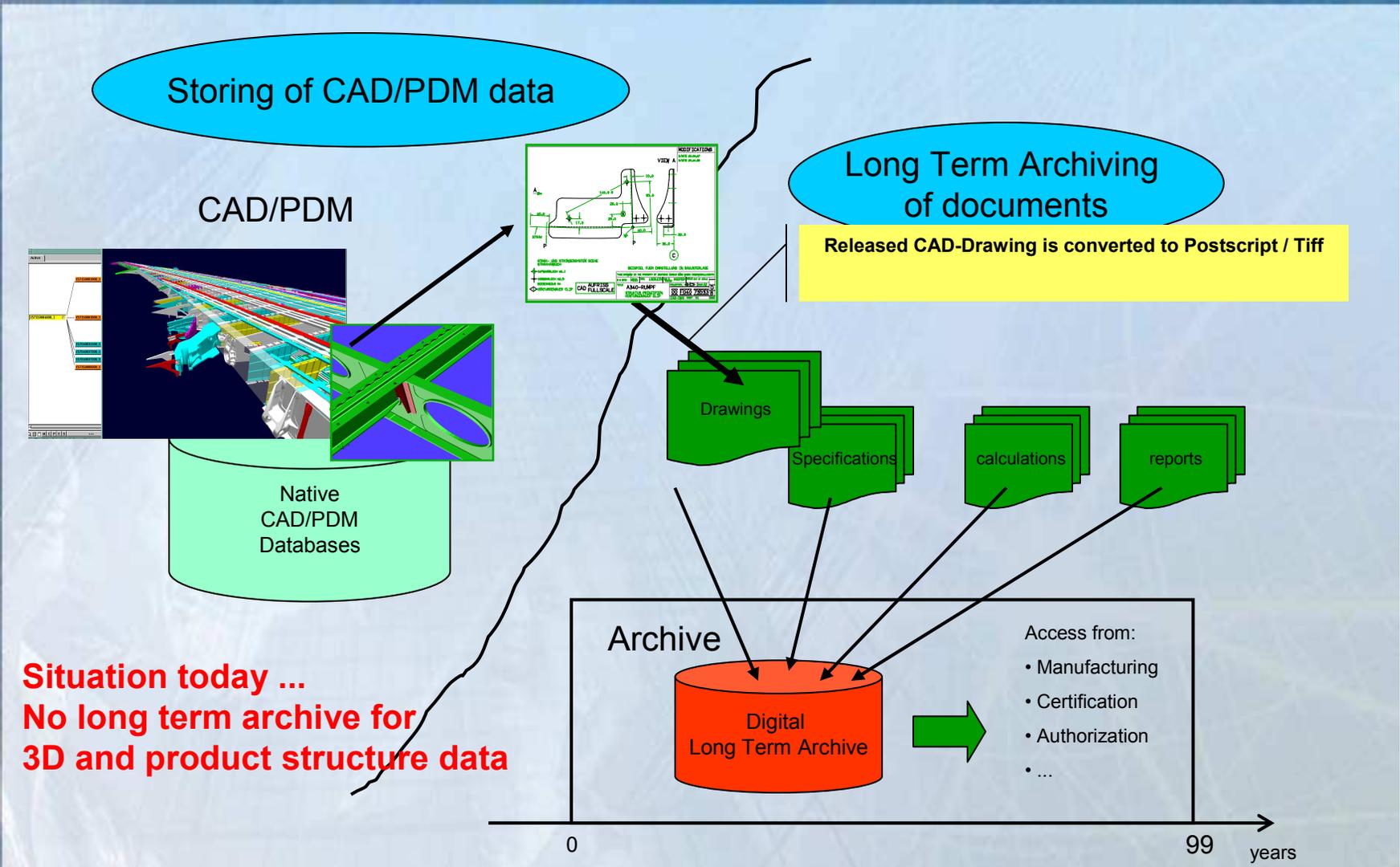
new solutions to archive
PLM and 3D data



Nadia Turpin Rincon
Jotne EPM Technology AS
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nadia.turpin@jotne.com

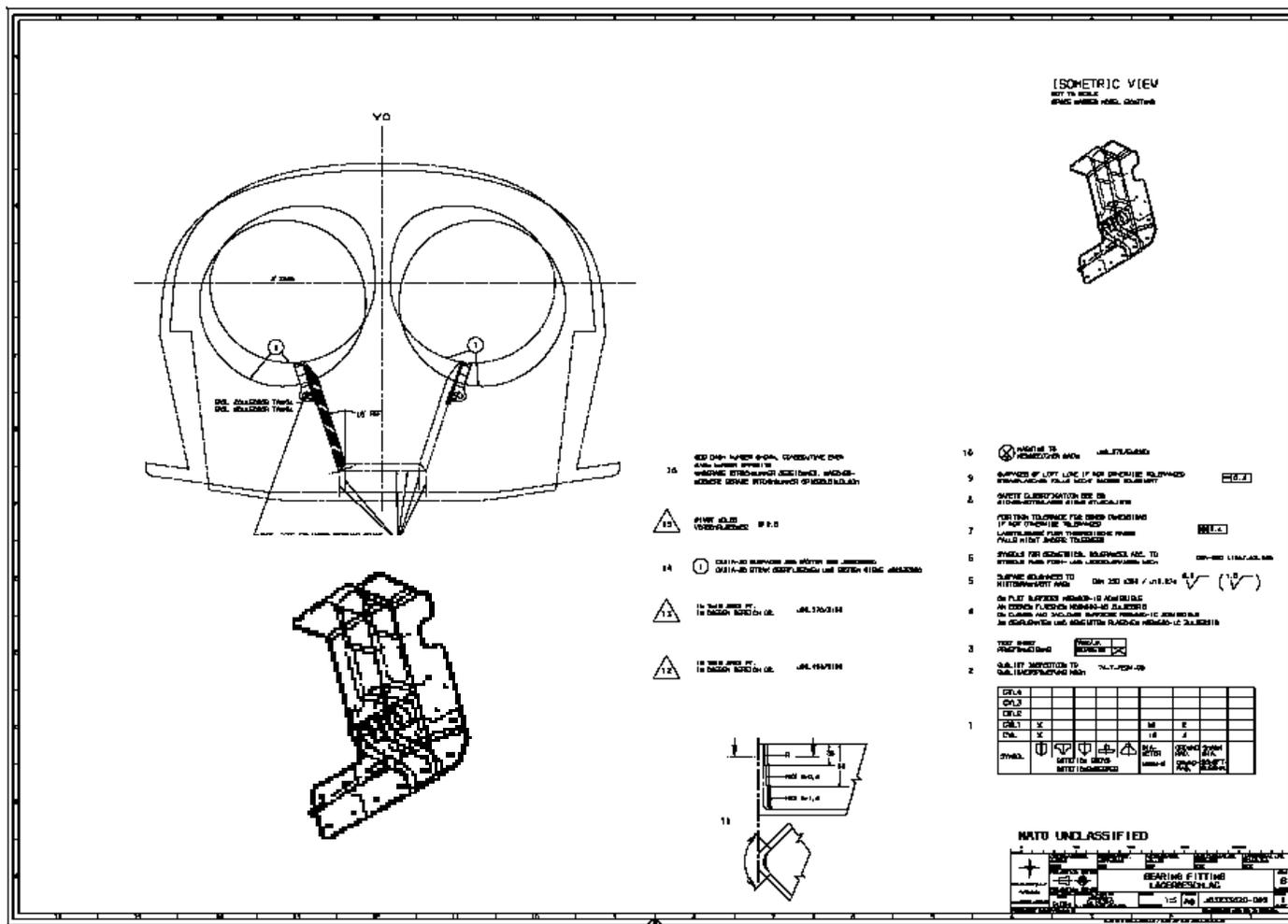
<http://www.epmtech.jotne.com>
Copyright, EPM Technology AS

Archiving situation today



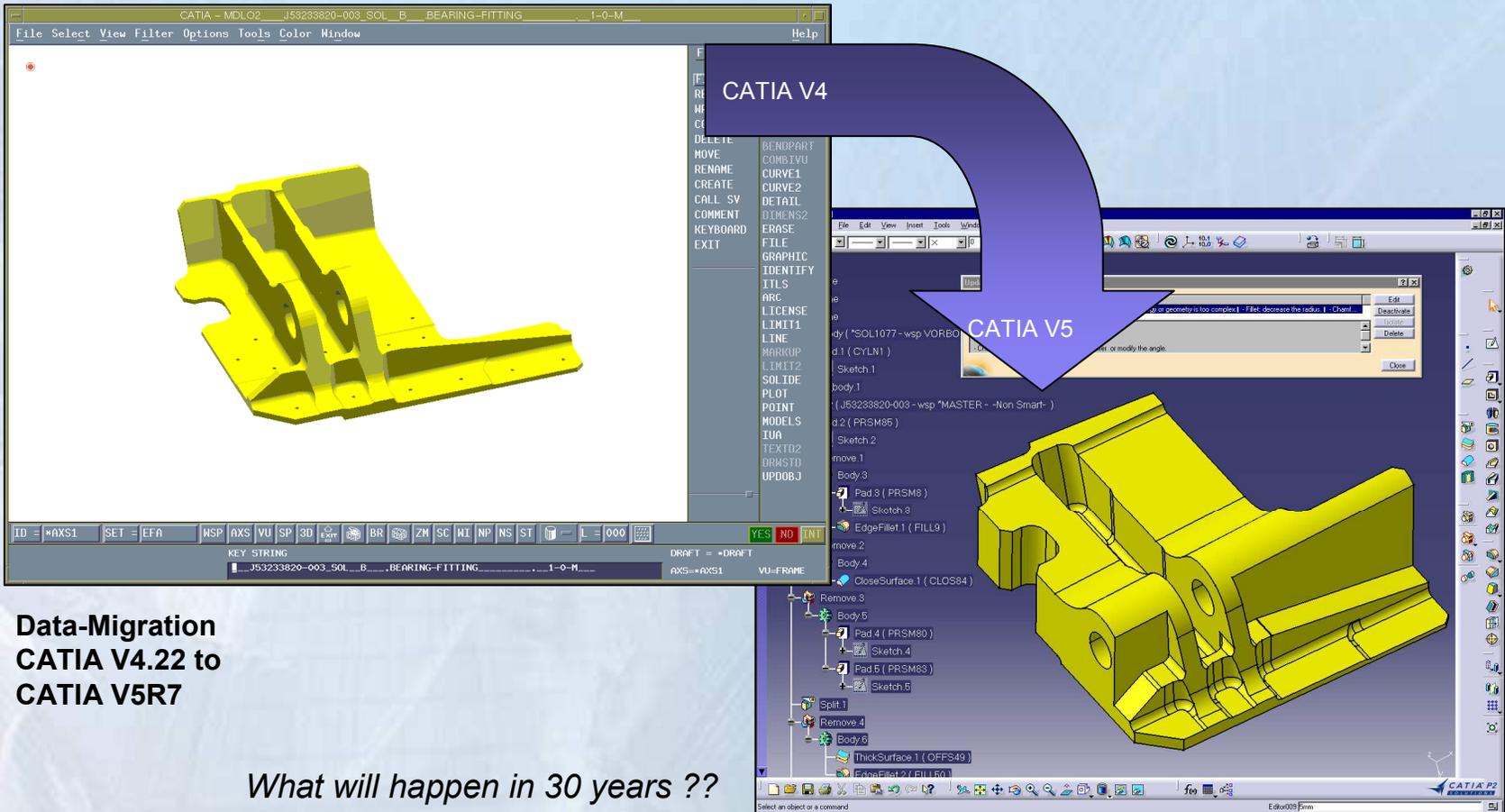
Example of the archiving problem

modern design drawings are simplified and undimensioned



Missing valid 3D Archiving process

Stored native CAD-format may lead to wrong or even no results when loading in new generation of CAD-System



Data-Migration
CATIA V4.22 to
CATIA V5R7

What will happen in 30 years ??

The basic approach: Archiving on the Base of a standard :ISO10303 (STEP)

conclusion

3D => 2D => microfilm

advantages: good legal proof-ability

disadvantages: no 3D-info, surface supplements↑



IT-hardware & IT-software archive

advantages: good legal proof-ability

disadvantages: IT-maintenance costs↑



continuous 3D-conversion

advantages: good legal proof-ability

disadvantages: conversion failure rate↑



neutral data format & spec. processes

advantages: less resource intensive

disadvantages: neutral data format & processes to be defined



LOTAR

The MIMER Project

Company: Eurofighter Jagdflugzeug GmbH (EF) and EPM
Project Name: MIMER
Project budget: M€ 1,7 - 50% funded by Norwegian Ministry of Defence
Duration: 2005-2007



Abstract :

Eurofighter has a long-standing relation with EPM Technology daily using *EXPRESS Data Manager(tm)* in the exchange of data between different PDM systems and is therefore a natural choice of partner for Eurofighter when new systems for **Digital Archiving** Solutions for complex products and systems are to be developed.

This project aims to capitalize on the Eurofighter "Center of Excellence" within data exchange and sharing capabilities and the recent European aerospace industry (AECMA) joint initiative, EN 9300. Further, the new Norwegian MOD requirement of PLCS ISO 10303-239 will also be supported.

The purpose of the MIMER project is to deploy the next generation of Information Quality Management tools and to roll out an end-user application for Digital Archives. Starting with a successful industrial take up at Eurofighter in Germany, the rest of the Aerospace Industry will follow.

Partners in the MIMER project

➤ **SINTEF (Knowledge – R&D)**



→ Performed research in geometry analysis, reports and recommendation

➤ **CapVidia (Technology)**

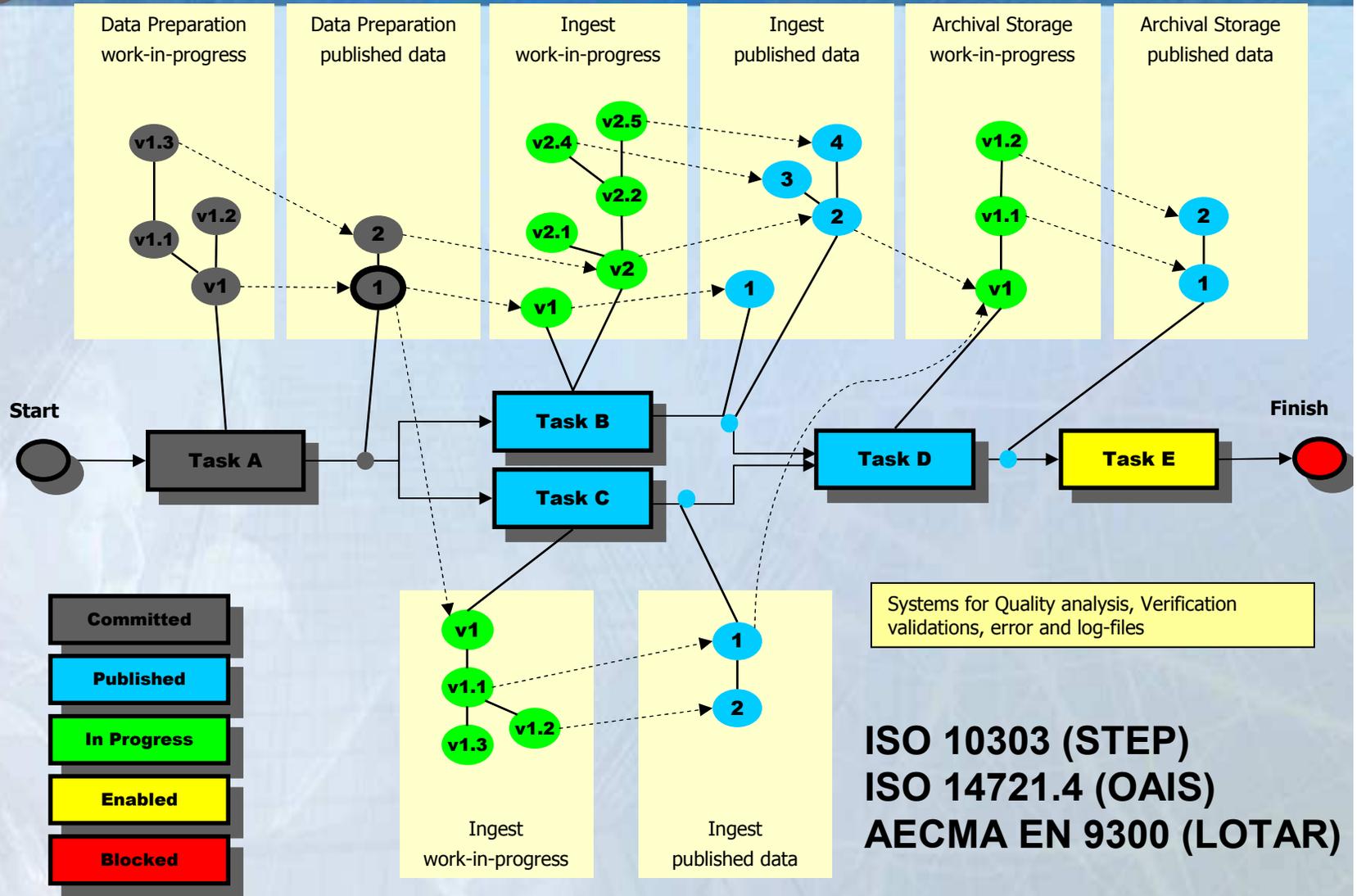
→ Extended their product TransVidia to include EN9300-110 rules

➤ **Adobe Acrobat 3D PDF (Technology)**

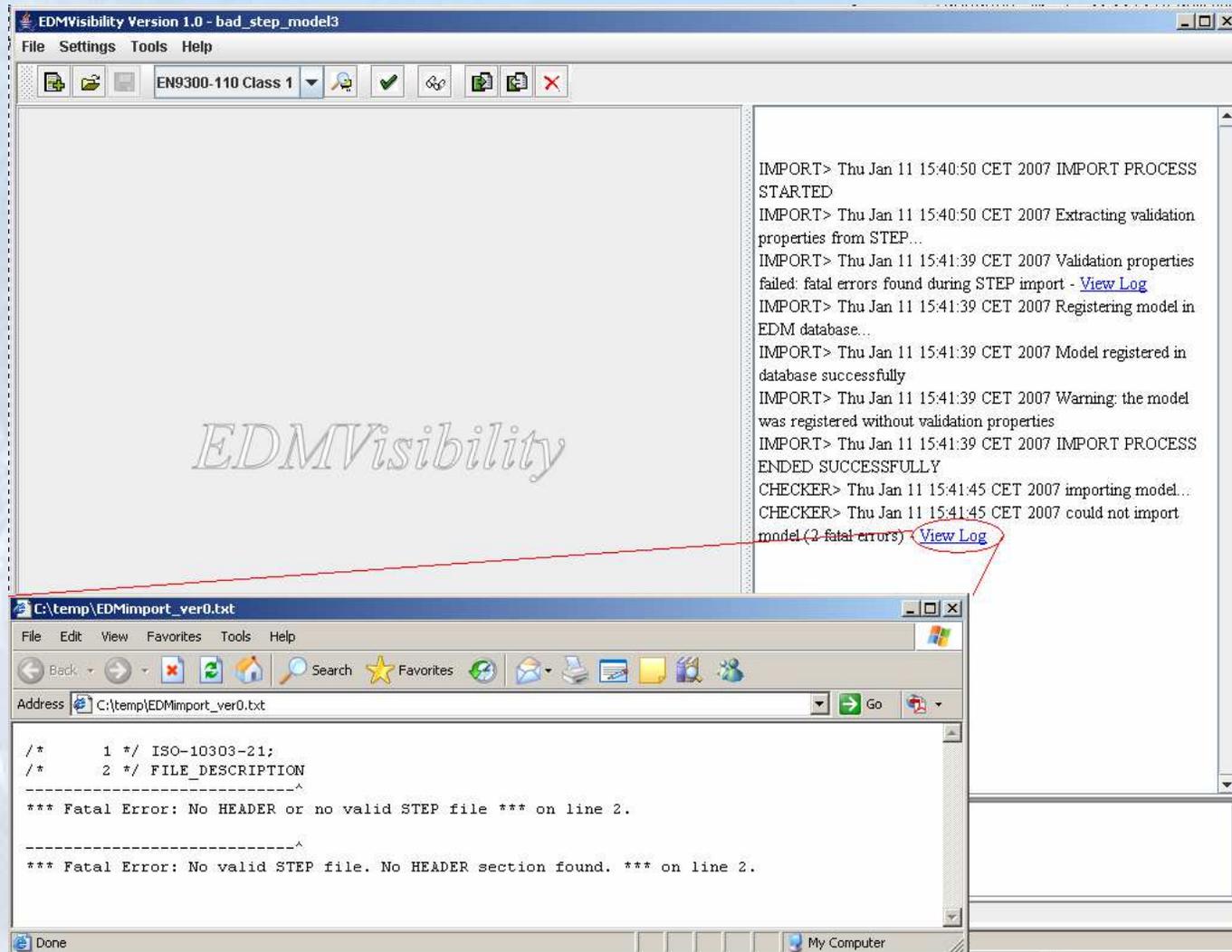
→ Integration to Acrobat 3D PDF for visualization and distribution of data



Archive Process Execution (8)



Action 1: Checking step syntax



Action 2: Check AP214 rules

The screenshot displays the EDMVisibility software interface. The main window shows a report titled "Quality results EN9300-110" with a conformance class of "EN9300-110 Class 2". The report includes a tree view of results, with "EN9300-110 Class 2" expanded to show several errors related to "dq_continuity" and "dq_multiknots". A log window in the foreground shows the execution of AP214 rule checks, including a "FAILED" status for the "AP214 rule check".

Quality results EN9300-110
 Conformance class: EN9300-110 Class 2 (builds upon class: EN9300-110 Class 1)

- Verification Results
- Validation Results
 - Deviation
 - Area: 0.004155699 % < 4.0 %
 - Volume: 0.22340234 % < 2.0 %
 - Center of mass: 3.274133 mm > 1.0 mm
 - SourceValidationProperties
 - StepValidationProperties
- Healing
- Verification Details
 - EN9300-110 Class 1
 - dq_polynomial_degree::curve: 2 errors
 - EN9300-110 Class 2
 - dq_continuity (G2 bending discontinuity loop): 17 errors
 - dq_continuity (G1 tangent discontinuity loop): 2 errors
 - dq_continuity (G1 tangent discontinuity shell): 1 errors
 - dq_continuity (G2 bending discontinuity shell): 1 errors
 - dq_multiknots::curve: 16 errors

Log Window (C:\temp\AP214result_ver1.txt):

```

IMPORT> Thu Jan 11 15:08:53 CET 2007 IMPORT PROCESS STARTED
IMPORT> Thu Jan 11 15:08:53 CET 2007 Extracting validation properties from STEP...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Validation properties calculated successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 Registering model in EDM database...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Model registered in database successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 Registering validation properties in EDM database...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Validation properties registered in database successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 IMPORT PROCESS ENDED SUCCESSFULLY
CHECKER> Thu Jan 11 15:08:56 CET 2007 importing model...
CHECKER> Thu Jan 11 15:08:56 CET 2007 model imported successfully (0 errors)
CHECKER> Thu Jan 11 15:09:02 CET 2007 checking EN9300-110, conformance class "EN9300-110 Class 2"...
CHECKER> Thu Jan 11 15:11:41 CET 2007 EN9300-110 check done - View Repair Log - View Log
CHECKER> Thu Jan 11 15:13:52 CET 2007 checking AP214 rules on imported model...
CHECKER> Thu Jan 11 15:13:56 CET 2007 AP214 rule check FAILED - View Log
  
```

AP214 Rule Violations Summary:

```

44 VERTEX_POINT

1 LENGTH_UNIT+SI_UNIT
1 PLANE_ANGLE_UNIT+SI_UNIT
1 SI_UNIT+SOLID_ANGLE_UNIT
1 GEOMETRIC_REPRESENTATION_CONTEXT+GLOBAL_UNCERTAINTY_ASSIGNED_CONTEXT+GLOBAL_UNIT_AS

Violating global Rule: DEPENDENT_INSTANTIABLE_MEASURE_WITH_UNIT at line #17307
Violated WHERE rule: DEPENDENT_INSTANTIABLE_MEASURE_WITH_UNIT.wr1 at line #17309
Possible failing instances:
436211098 (stepId: #14)

Violating global Rule: PRODUCT_REQUIRES_ID_OWNER at line #17795
Violated WHERE rule: PRODUCT_REQUIRES_ID_OWNER.wr1 at line #17797
Possible failing instances:
436209697 (stepId: #5)

-----
Total number of Global RULE violations.....: 2
Total number of WHERE rule violation.....: 1
  
```

Action 3: Checking geometry - Quality Report

EDMVisibility Version 1.0 - SOL_J53225D12_001_B_00_01_SPLICE_ANGLE

File Settings Tools Help

EN9300-110 Class 2

Report 1

Quality results EN9300-110

Conformance class: EN9300-110 Class 2 (builds upon class: EN9300-110 Class 1)

- Verification Results
- Validation Results
 - Deviation
 - Area: 0.004155699 % < 4.0 %
 - Volume: 0.22340234 % < 2.0 %
 - Center of mass: 3.274133 mm > 1.0 mm
 - SourceValidationProperties
 - StepValidationProperties
- Healing
- Verification Details
 - EN9300-110 Class 1
 - dq_polynomial_degree::curve: 2 errors
 - Edge 579
 - Edge 551
 - EN9300-110 Class 2
 - dq_continuity (G2 bending discontinuity loop): 17 errors
 - dq_continuity (G1 tangent discontinuity loop): 2 errors
 - dq_continuity (G1 tangent discontinuity shell): 1 errors
 - dq_continuity (G2 bending discontinuity shell): 1 errors
 - dq_multiknots::curve: 16 errors

```
IMPORT> Thu Jan 11 15:08:53 CET 2007 IMPORT PROCESS STARTED
IMPORT> Thu Jan 11 15:08:53 CET 2007 Extracting validation properties from STEP...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Validation properties calculated successfully
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CHECKER> Thu Jan 11 15:09:02 CET 2007 checking EN9300-110, conformance class "EN9300-110 Class 2"...
CHECKER> Thu Jan 11 15:11:41 CET 2007 EN9300-110 check done - View Repair Log - View Log
CHECKER> Thu Jan 11 15:13:52 CET 2007 checking AP214 rules on imported model...
CHECKER> Thu Jan 11 15:13:56 CET 2007 AP214 rule check FAILED - View Log
```

Action 3: Checking geometry - Error details

Quality results EN9300-110
Conformance class: EN9300-110 Class 2 (builds upon class: EN9300-110 Class 1)

- Verification Results
- Validation Results
 - Deviation
 - Area: 0.004155699 % < 4.0 %
 - Volume: 0.22340234 % < 2.0 %
 - Center of mass: 3.274133 mm > 1.0 mm
 - SourceValidationProperties
 - StepValidationProperties
- Healing
- Verification Details
 - EN9300-110 Class 1
 - dq_polynomial_degree::curve: 2 errors
 - Edge 579
 - Edge 551
 - EN9300-110 Class 2
 - dq_continuity (G2 bending discontinuity loop): 17 errors
 - dq_continuity (G1 tangent discontinuity loop): 2 errors
 - dq_continuity (G1 tangent discontinuity shell): 1 errors
 - dq_continuity (G2 bending discontinuity shell): 1 errors
 - dq_multiknots::curve: 16 errors

Log Window:

```
IMPORT> Thu Jan 11 15:08:53 CET 2007 IMPORT PROCESS STARTED
IMPORT> Thu Jan 11 15:08:53 CET 2007 Extracting validation properties from STEP...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Validation properties calculated successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 Registering model in EDM database...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Model registered in database successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 Registering validation properties in EDM database...
IMPORT> Thu Jan 11 15:08:54 CET 2007 Validation properties registered in database successfully
IMPORT> Thu Jan 11 15:08:54 CET 2007 IMPORT PROCESS ENDED SUCCESSFULLY
CHECKER> Thu Jan 11 15:08:56 CET 2007 importing model...
CHECKER> Thu Jan 11 15:08:56 CET 2007 model imported successfully (0 errors)
CHECKER> Thu Jan 11 15:09:02 CET 2007 checking EN9300-110, conformance class "EN9300-110 Class 2"...
CHECKER> Thu Jan 11 15:11:41 CET 2007 EN9300-110 check done - View Repair Log - View Log
```

3D Model: A 3D model of a mechanical part with a red highlight on the top edge, indicating a geometry error.

Action 3: Checking geometry - Error details (2)

The screenshot displays the EDMVisibility software interface. The title bar reads "EDMVisibility Version 1.0 - SOL_J53225012_001_B_00_01_SPLICE_ANGLE". The menu bar includes "File", "Settings", "Tools", and "Help". The toolbar contains icons for file operations and a dropdown menu set to "EN9300-110 Class 2".

The main window is divided into two panes. The left pane, titled "Report 1", shows a tree view of verification results:

- Verification Results
 - Validation Results
 - Deviation
 - Area: 0.004155699 % < 4.0 %
 - Volume: 0.22340234 % < 2.0 %
 - Center of mass: 3.274133 mm > 1.0 mm
 - SourceValidationProperties
 - StepValidationProperties
 - Healing
 - Verification Details
 - EN9300-110 Class 1
 - dq_polynomial_degree::curve: 2 errors
 - EN9300-110 Class 2
 - dq_continuity (G2 bending discontinuity loop): 17 errors
 - dq_continuity (G1 tangent discontinuity loop): 2 errors
 - dq_continuity (G1 tangent discontinuity shell): 1 errors
 - Edge 1264
 - Error details
 - Subproblem
 - angle = 1.10138334019672
 - point1 = 5619.92730023 -664.632235909 2769.22238128
 - point2 = 5619.92727742466 -664.632219827424 2769.22237552447
 - dq_continuity (G2 bending discontinuity shell): 1 errors
 - dq_multiknots::curve: 16 errors

Visibility of Archived Product Data

➤ Logon as user into the Product Data Visibility Application

➤ Search for either of:

- ➔ Part Number
- ➔ Part Name
- ➔ Document Number
- ➔ Document Name

➤ Locate related files

- ➔ View TIFF Files
- ➔ View STEP Files

➤ Perform

- ➔ "Advanced Search"

The screenshot displays the EDMvisibility application interface within a Microsoft Internet Explorer browser window. The browser address bar shows the URL: `http://localhost:8724/mule/browser/index.jsp`. The application header includes the title "EDMvisibility" and navigation links: "Welcome", "My Parts", "My Projects", "Production", "Order Release", "Admin", "Debug", "Help". Below the header, there are search options: "Simple", "Advanced", and "Help".

The main interface is divided into several sections:

- Product structure:** A tree view on the left showing a hierarchy of parts including "A6_ENGINE refset ENGINES_V1", "BRACKET_ASSY", "BRACKET_SIDE", "BRACKET_SIDE_ASSY", "CABLE", "CABLE_SIDE", "COCKPIT refset Entire Part", "DASH refset DASH_V1", "EMPENAGE", "EMPENAGE_DECAL", "EMPENAGE_HORIZ refset EMPENAGE_HORIZ_V1", "EMPENAGE_VERT refset EMPENAGE_VERT_V1", and "99.6% copper".
- Project Reviewer - [a[1]]:** A central window showing a 3D model of a red bucket and a technical drawing of a bracket with dimensions like "Ø 40 REF".
- Files:** A table at the bottom listing files with columns for "id", "name", "type", "description", "has_products", "digital", and "physical".

id	name	type	description	has_products	digital	physical
c:/mimer_extra_files/step_files/4141913FADBA2CFD.stp	4141913FADBA2CFD	STEP Data		true	false	false
c:/mimer_extra_files/step_files/4141920AEB4915D5.stp	4141920AEB4915D5	STEP Data		true	false	false
c:/mimer_extra_files/step_files/414192969450305B.stp	414192969450305B	STEP Data		true	false	false
c:/mimer_extra_files/step_files/4141929694551A88.stp	4141929694551A88	STEP Data		true	false	false
c:/mimer_extra_files/tiff_files/J28120102_DRW_1__A001.tif	Bonding lug drawing	TIFF Image		true	false	false
c:/mimer_extra_files/tiff_files/J28120149-405_DRW_1__A.tif	Vent line drawing	TIFF Image		true	false	false
c:/mimer_extra_files/tiff_files/J28120149_DRW_1__A001.tif	Vent line drawing	TIFF Image		true	false	false
c:/mimer_extra_files/tiff_files/J28120149_DRW_2__IL2.tif	Fighter in attack	TIFF Image		true	false	false

The end