CATIA V5 Training
Foils

V4/V5 Advanced Interoperability

Version 5 Release 19
January 2009

EDU_CAT_EN_V4A_FI_V5R19

Instructor Notes:

About this course

Objectives of the course

Upon completion of this course you will,

-Learn the advanced interoperability concepts about the migration of CATIA V4 geometric/application data to CATIA V5.

-Learn how V5 data can be saved in CATIA V4 formats or used directly in CATIA V4.

Targeted audience

Experienced CATIA V4/V5 users

Prerequisites

Students attending this course should have knowledge of CATIA V5 basics.

8 hours

Instructor Notes:

Table of Contents (1/2)

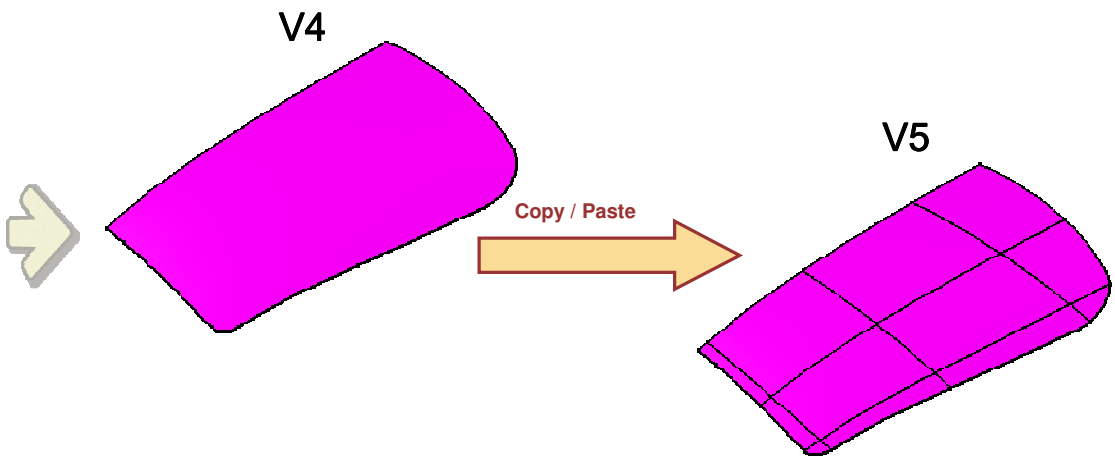
Instructor Notes:

Table of Contents (2/2)

Instructor Notes:

Transfer of V4 Geometric Data to V5

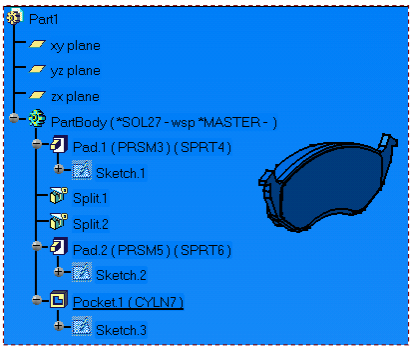
In this lesson you will learn how to transfer the V4 Geometric data to V5.



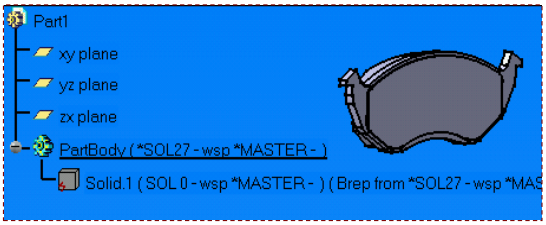
Instructor Notes:

Introduction

- **Copy / Paste As_Spec**
  - **Solids**
  - **Surfaces**
  - **Wireframe**



- **Copy / Paste As_Result**
  - **Solids**



Instructor Notes:

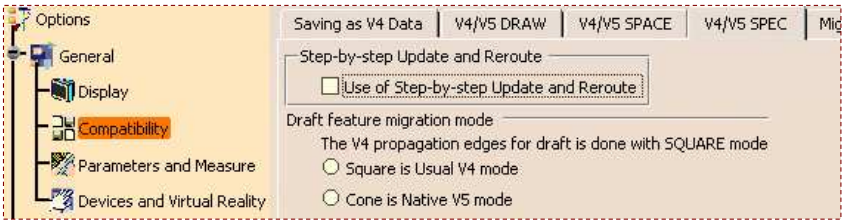
Solids: Exceptions / Restrictions

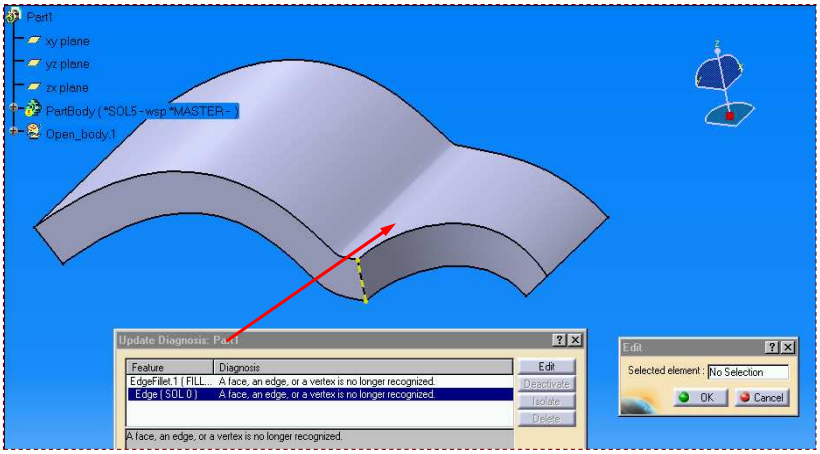
- Primitives (always transferred « As Result »)
  - Pyramid
  - Sweep non-closed / Until a sweep
  - Project
- « Out of model » solids ➔ « As Result »
  - Import primitive (MML solids)
  - Detail / Ditto from a Library
  - Operations (complete transfer « As Result »)
    - Draft reflect line with « keep edge » option
  - Detail-Ditto / Macroprimitive (multi-instances)
    - Body containing the specifications ➔ «Copy with link » instances
  - Inactive primitives / Unresolved features
    - Not migrated at all
- Copy / Paste AS RESULT or AS SPEC a V4 document into CATIA V5
  - No Possibility to copy / paste features belonging to different V4 Models (within the CATProduct) in the same transaction.

Instructor Notes:

Solids: Re-route Capabilities (Smart Solids) (1/2)

- **Manual Re-route**

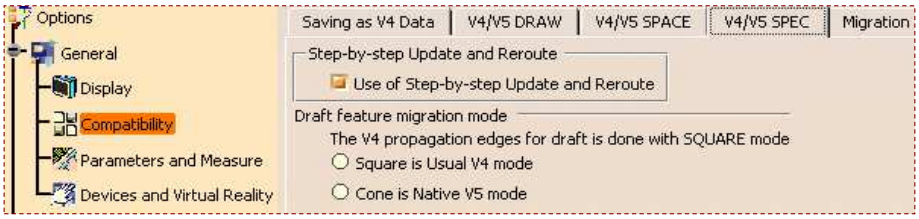


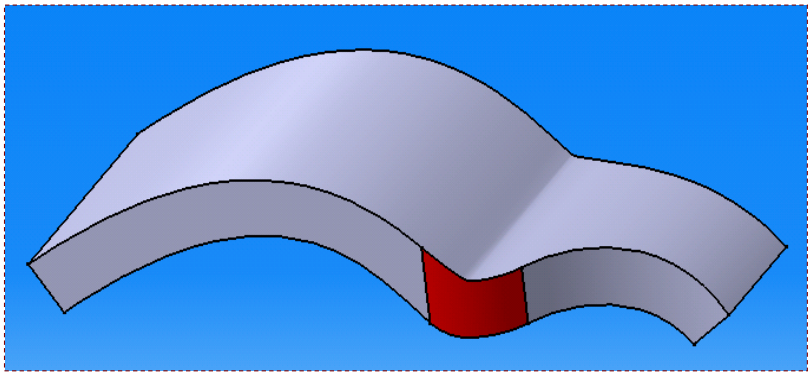


Instructor Notes:

Solids: Re-route Capabilities (Smart Solids) (2/2)

- **Automatic Re-route**





Instructor Notes:

Recommendations

- Identify your needs:
  - You need **not** copy a V4 solid As_Spec if you want to use the associated CATPart only in downstream applications: Generative Drafting, DMU, etc.
  - Copying As_Result does not mean that you will not be able to modify the V5 CATPart…
- In case of migration failure:
  - Smart solids
    - Re-route capabilities
    - Solids containing not yet supported features / operations
  - CATSOE utility (from V4)
    - Mock-up ➔ Exact
    - Non-Smart ➔ Smart
  - Use V4 commands
    - /CLN
    - /CHKTOP (New 424R1): twisted/overlapping faces, too sharp edges,etc.

Instructor Notes:

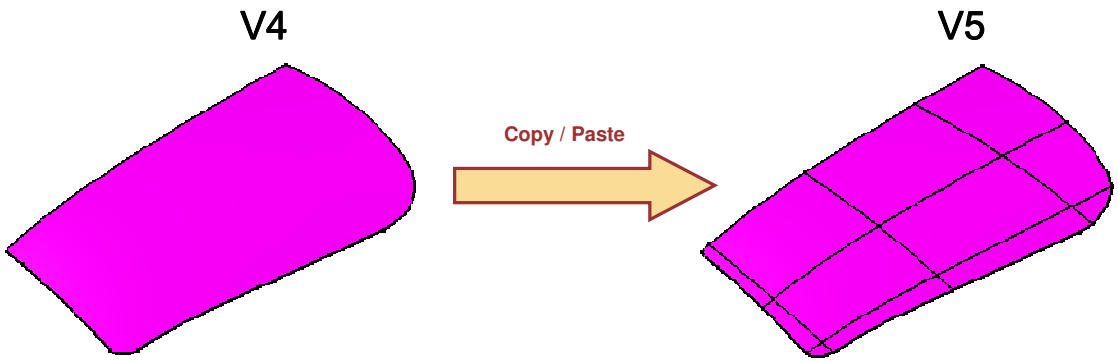
Solids: *SOE,*SOM, Smart, Non-Smart, Isolated

		As Result	As Spec
*SOE	Smart	OK	OK
	Non-smart	OK	OK if no non-supported features
*SOM	Non-Isolated	.cgr	OK
	Isolated	.cgr	.cgr

Instructor Notes:

Surfaces: *SUR, *FAC, *SKI, *SKD

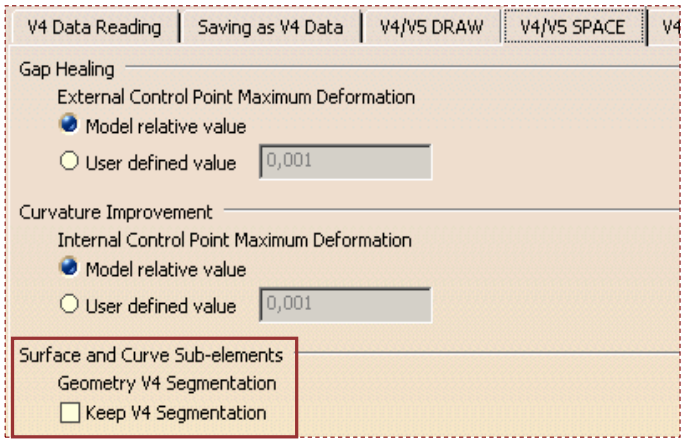
- Reminder on C2 continuity…
  - V4 Bezier ➔ V5 Nurbs



Instructor Notes:

Surfaces: Tools/Options (1/2)

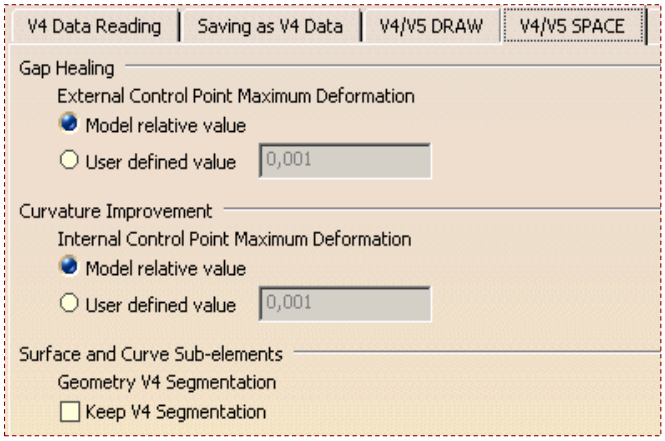
- « Segmentation » setting
  - Keep V4 segmentation (arcs, patches) or not (simplify)
  - Has an influence only when some nodes are C2
  - Default value: « inactive »



Instructor Notes:

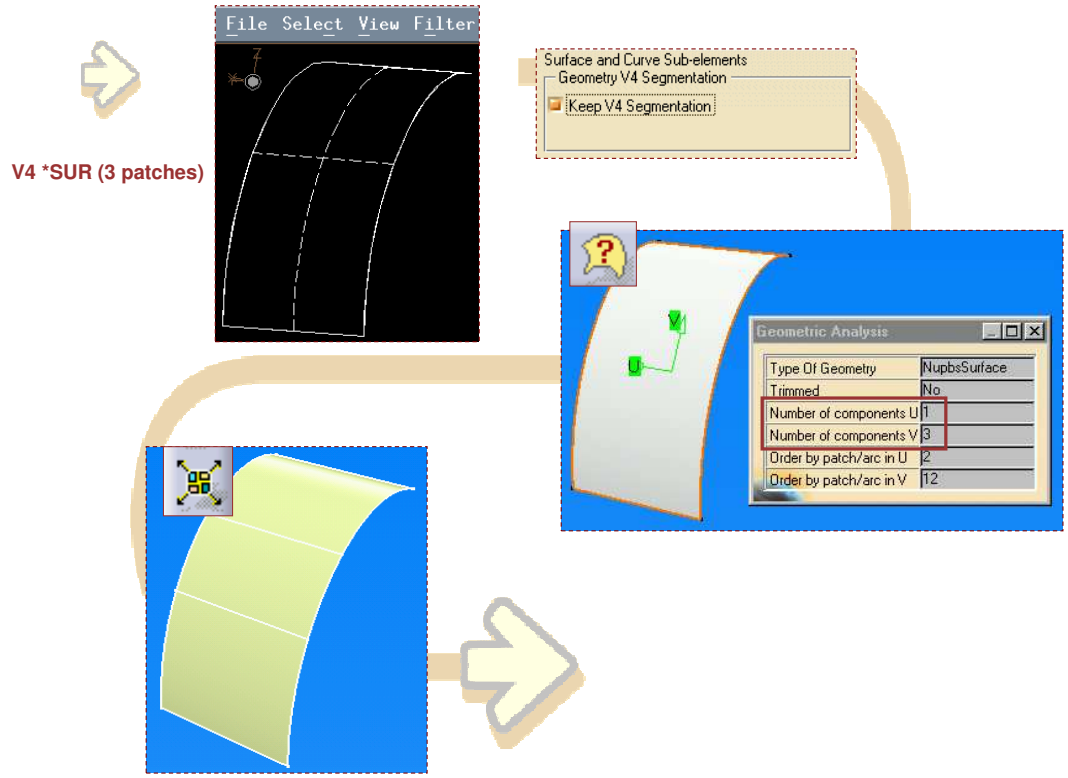
Surfaces: Tools/Options (2/2)

- « Max Deformation » (Gap Healing and Curvature Improvement) settings
  - Max deformation of control points (surface deviation < max deformation value)
  - Has an influence only when the nodes are almost C2
  - Model relative value: max between V4 « intersection projection » and V5 tol. (0.001mm for MD =10m)
  - Null value (0): no deformation of control points: V5 cells = V4 patches
  - Positive value: 0.001, 0.01, 0.1, …



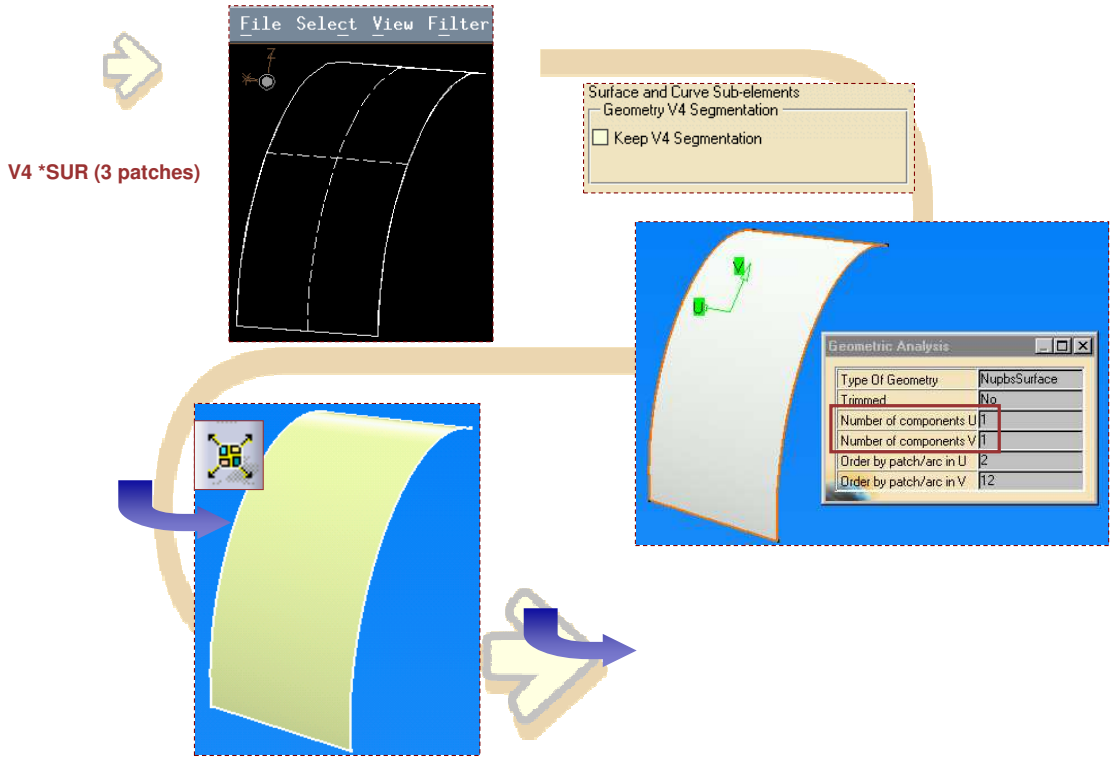
Instructor Notes:

Surfaces: Segmentation Setting (1/2)



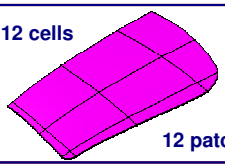
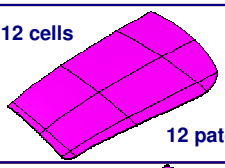
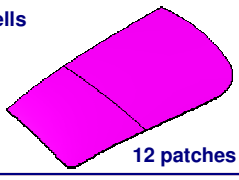
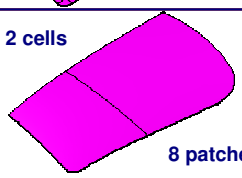
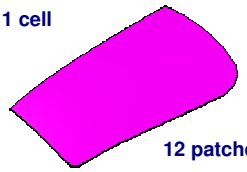
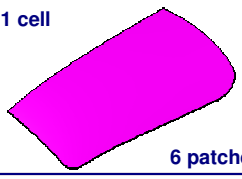
Instructor Notes:

Surfaces: Segmentation Setting (2/2)



Instructor Notes:

Surfaces: Deformation and Segmentation Settings

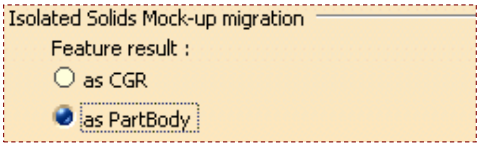
Max Def.	Keep V4 Segmentation	Keep V4 Segmentation	Max Dev.
0 mm.	12 cells  12 patches	12 cells  12 patches	N/A
0.001 mm.	2 cells  12 patches	2 cells  8 patches	8 E-05 mm
0.2 mm.	1 cell  12 patches	1 cell  6 patches	0.05 mm

Instructor Notes:

Migration Mode for V4 Mock-Up Solids

- A V4 Mock-Up Solid can be converted (as result) into aV5 exact solid, or a PartBody and therefore, it can be modified by V5 operators.
  - ➔ In Tools/Options/General/Compatibility, in the V4/V5 SPACE tab, check the "As PartBody" option.

  (by default, the SolidM will be migrated as CGR, only access to visualization mode (mesh), no modification on the data)



- Limitations:
  - High CPU Time consuming
  - Important CATPart Size

Instructor Notes:

Migration of 3D Text

- ➔ In Tools/Options/General/Compatibility, in the V4/V5 SPACE tab, check the “Keep 3D Text” option.
- If the Keep 3D Text button is checked, the V4 3D Text is migrated as an Annotation in the CATPart. The Annotation is visible in the 3D Space and in the Specification Tree (a node called Annotation Set.1 appears). It is possible to edit Annotation in CATIA V5.
- If the Keep 3D Text button is not checked, there is neither Annotation in 3D Space nor Annotation Set node.

- Limitations:

If the Keep 3D Text button is checked, the migration of V4 3D Texts into V5 Annotations is possible when they are associated to the following features:

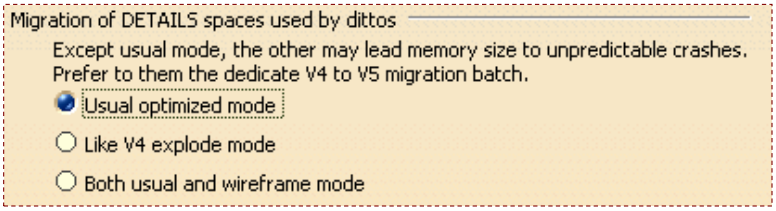
- All geometrical objects: Points, Curves, Surfaces
- Solids, Volumes, and Skins if the Text is set on the Solid, on the Volume, or on the Skin
- Faces migrated independently will have their associated 3D text migrated
- If V4 entities to be converted are numerous: high CPU time consuming

Instructor Notes:

Migration of Detail Spaces used by Dittos

In Tools/Options/General/Compatibility, in the V4/V5 SPACE tab:

- **Usual optimized mode**
  - **Corresponds to the normal and advised mode (with no setting): if you want to see the geometry (curves, lines, surfaces) not used by the solid and contained in the detail's area (called « Isolated WireframeGeometry »)**
- **Like V4 explode mode**
  - **If you want everything to be migrated without CARWL, like the explode of a V4 model. (corresponds to the setting « set V4V5ForceDetailToExplode=1 » on NT and « export V4V5ForceDetailToExplode=1 » on UNIX)**
- **Both usual and wireframe mode**
  - **Corresponds to the setting « set V4ToV5DetailGeomRequired=1 » on NT and « export set V4ToV5DetailGeomRequired=1 » on UNIX.**

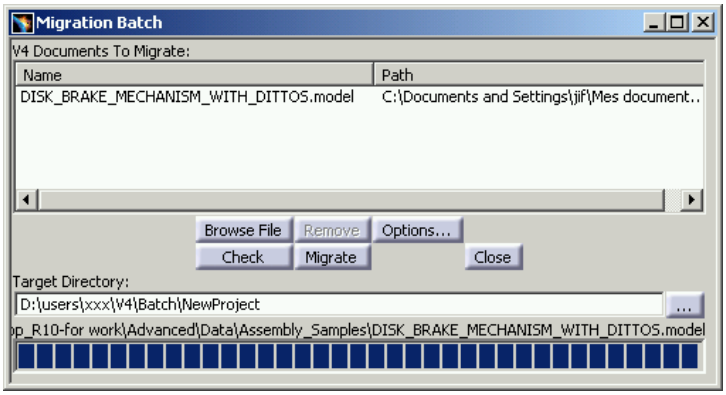


- **Interactive Multi-Copy / Paste As Result With Link: the interactive Multi-Copy / Paste As Result With Link is the default mode. It is done without the setting. It saves CPU, memory place and time. If you want to avoid this management, the by-pass is to close the .model after every Paste and to re-open it if you want to do another Paste.**

Instructor Notes:

Migration Batch (Models & Sessions) (1/2)

- Geometric set ➔ CATPart
- If more than one geometric set ➔ Part/Product structure
- « CNEXT –batch –e CATV4ToV5Migration »



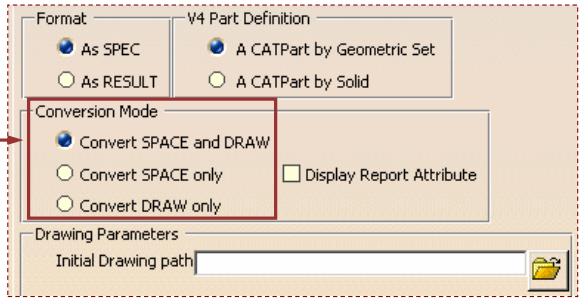
- Interface Location: allows you to customize application's migration from CATIA V4 to CATIA V5. You can choose how your applicative data will be migrated

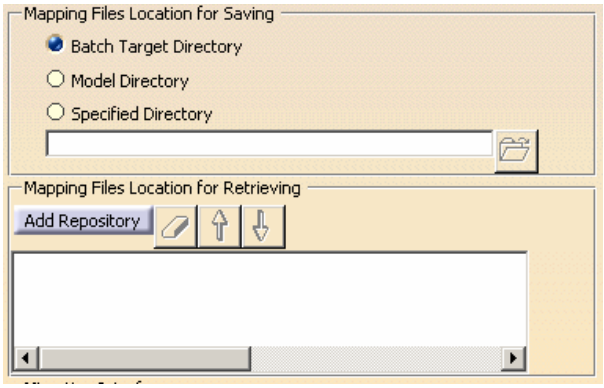
Instructor Notes:

Migration Batch (Models & Sessions) (2/2)

- Tools/Options/General/Compatibility/Migration Batch
  - Characters equivalence table path
  - Migration Batch Options

This will allow you to generate:
- A 3D geometry and the associated 2D draw
- A 3D geometry only
- A 2D draw



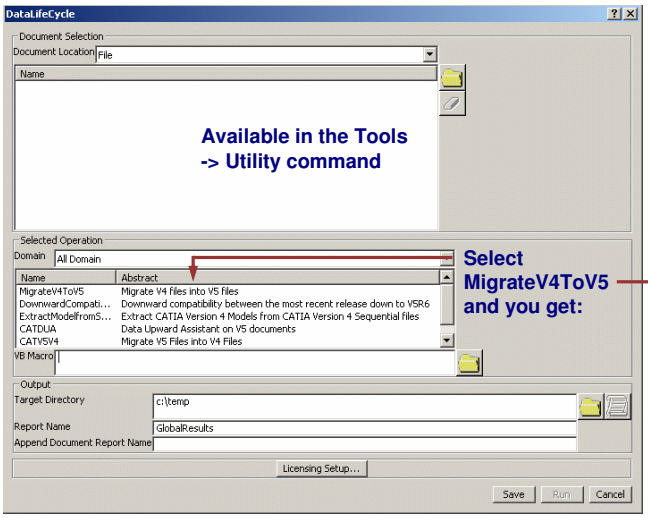


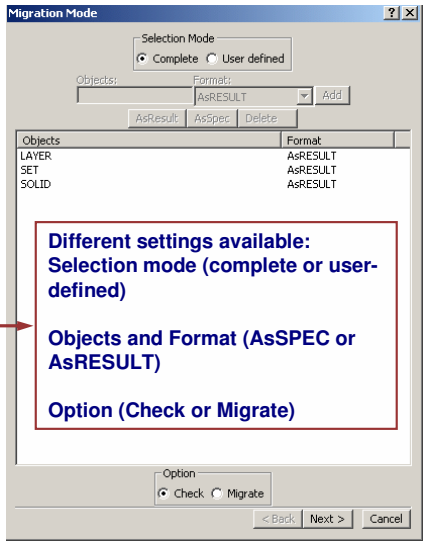
- Display Report Attribute allows the visualization of 3D elements attributes in the Migration Report.
- Projection of Space for transparent views: specify what kind of projection mode you want to use for transparent views during the migration: the NHR V4 mode, the HLR V4 mode, or the same projection mode as the V4 model.
- The migration report lists the V4 attributes of V4 elements.

Instructor Notes:

Migration Batch: With the DataLifeCycle Batch (1/3)

- This migration tool provides an interactive interface working on a different application from CATIA Version 5.
- The documents, target, directory, and report name can be selected in the DataLifeCycle panel.
- You have access to the read-only LCA and VPM databases.

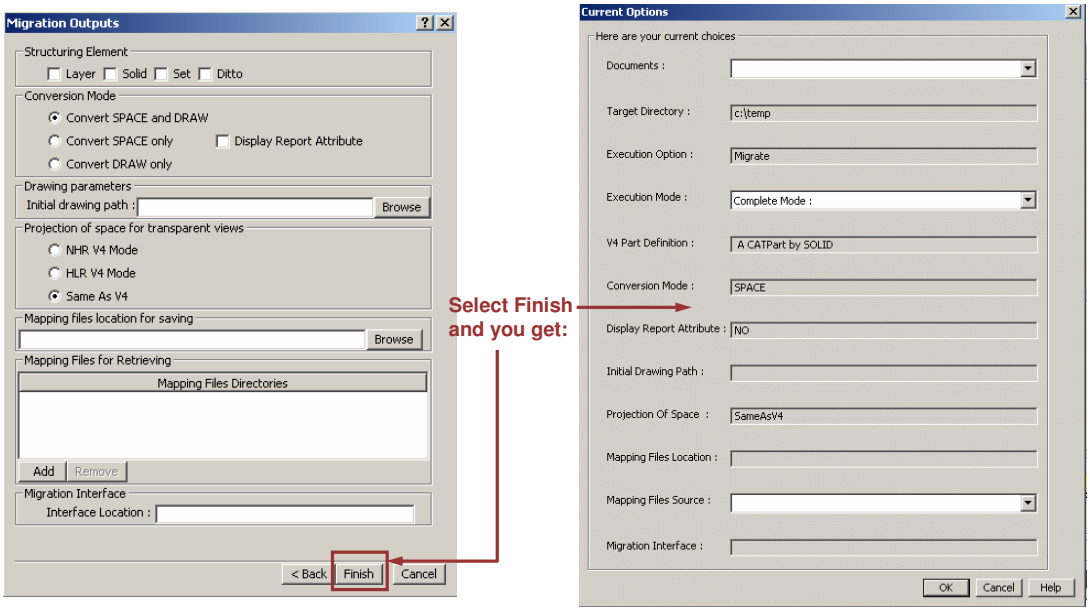




Instructor Notes:

Migration Batch: With the DataLifeCycle Batch (2/3)

- In the Migration outputs panel, select the settings for both the modes: Complete and User-defined
- The « Current Options » panel it is a sum up of the selected options



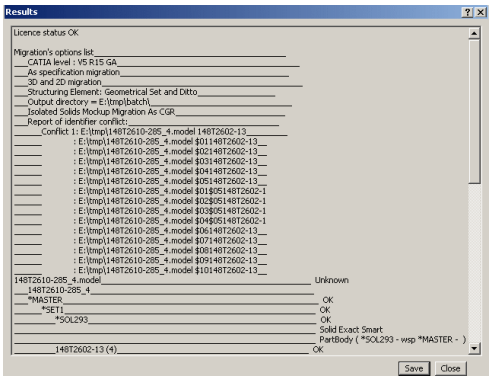
Instructor Notes:

Migration Batch: With the DataLifeCycle Batch (3/3)

- **Visualizing the report of a Batch Execution in the Batch Monitor:**

  The purpose of the UUID (Universally Unique Identifier) checker is to identify the models whose migration could lead to a false result compared to the V4 data, whereas from the geometrical point of view the migration itself would occur without errors.

- **You can find information about:**
  - **Option list of Migration**
  - **The path of the initial model**
  - **Information about the resulting CATProduct: Solid Mock-Up / Solid Exact**
  - **Isolated Solids Mock-up Migration As cgr or Isolated Solids Mockup Migration As PartBody**
  - **If the document has an identical UUID, the report indicates the entities having a problem**



The Check of UUID does not solve these problems, it only gives information. However, there are solutions to solve the conflicts:

- **If the UUID in conflict are in distinct documents, the user migrates each document separately**
- **For the other cases, there are V4 methodology**

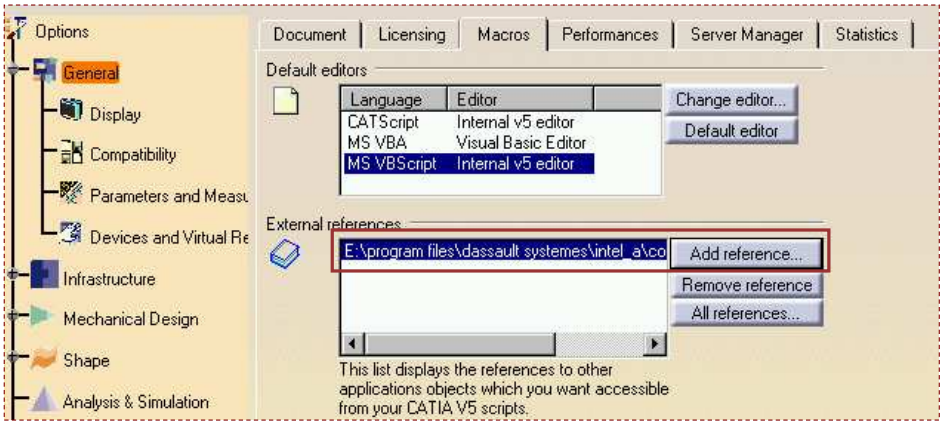
Restrictions to the LCA / VPM databases:

- **You cannot save in the database**
- **The dependency between the models that are stored in the database are not supported**

Instructor Notes:

V4 Library Migration into a V5 Catalog (1/2)

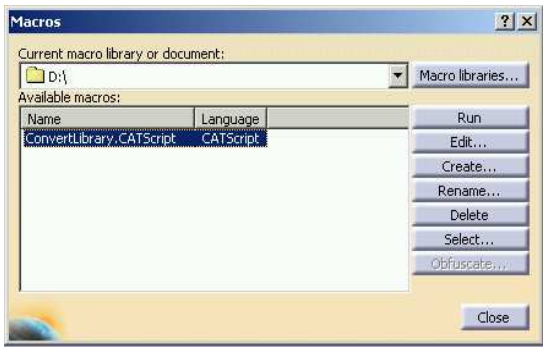
- **Make CclTypeLib.dll accessible in Tools/Options/general/Macros and browse it in the « intel_a/code/bin » directory (CATJNICclTypeLib.dll)**



Instructor Notes:

V4 Library Migration into a V5 Catalog (2/2)

- Edit the ConvertLibrary.CATScript, save it and run it (Tools/macros):
  - Conversion format
  - Library directory
  - Catalog directory
  - Character conversion table path



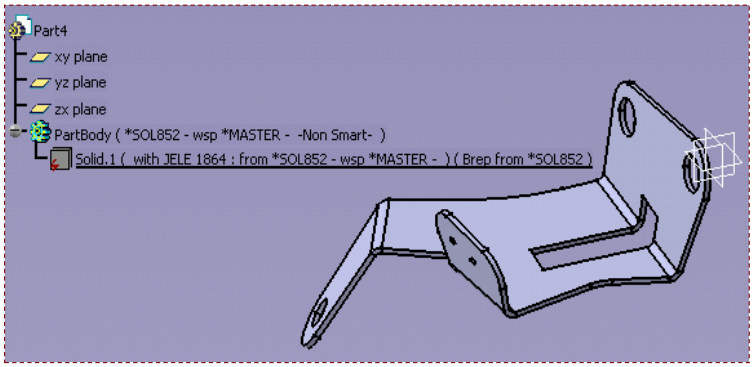
CATScript file available in the Online documentation. (Chapter « Converting V4 Libraries into V5 Catalogs »)

```
Language="VBSCRIPT"

Sub CATMain()

AS_SPEC   = 0
AS_RESULT = 1

CONVERSION_FORMAT = AS_SPEC

MIGRATION  = 0
SIMULATION = 1

BATCH_MODE = MIGRATION

libraryDirectory = "http://paterson/lib/VISSERIE"

catalogDirectory = "E:\tmp\catalog"

tablePath = "E:\users\TST_Student_V5R4\V4I_F\table.txt"
'tablePath = ""

Dim Catalog As Document
Set Catalog = CATIA.Documents.Add("CatalogDocument")

Catalog.CreateCatalogFromLibrary libraryDirectory,
projectDirectory, catalogDirectory, tablePath,
CONVERSION_FORMAT, BATCH_MODE

Catalog.Close

End Sub
```


Instructor Notes:

Transfer of V4 Application Data to V5

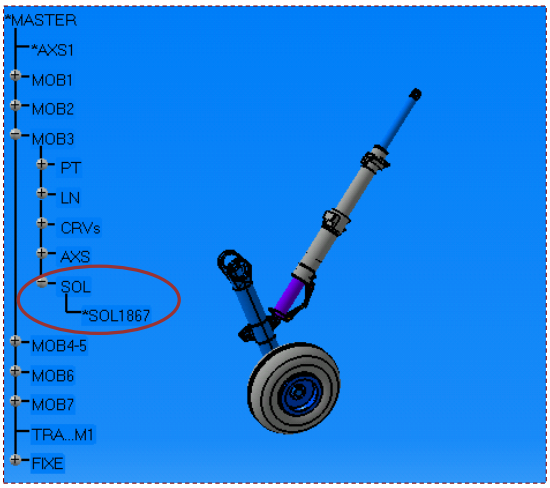
In this lesson you will learn how to transfer the V4 Application data to V5.



Instructor Notes:

V4 Kinematics (1/2)

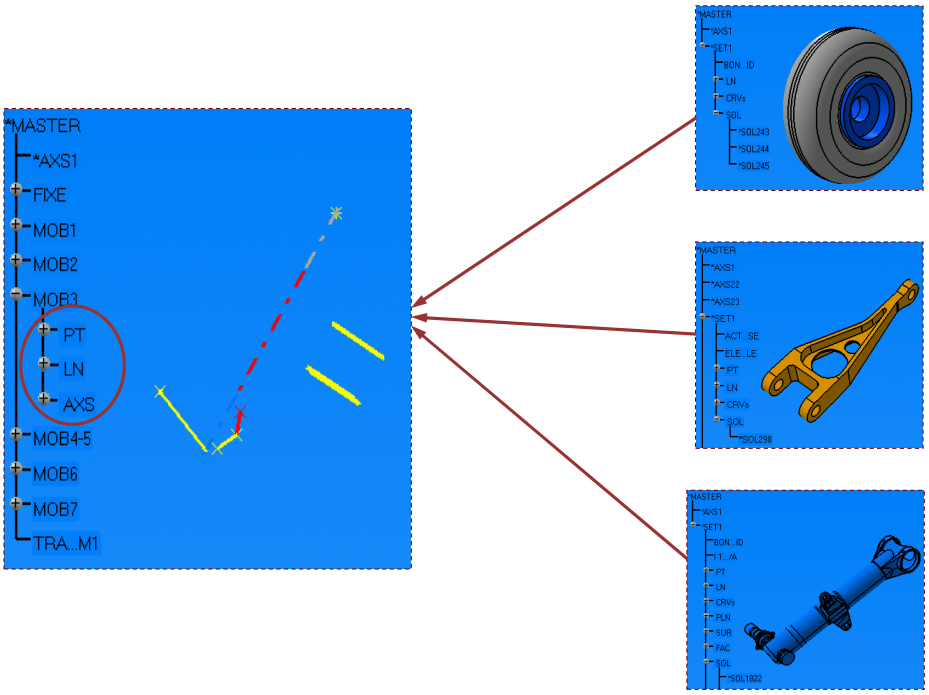
- **Mono-Model (Multi-Sets)**



Instructor Notes:

V4 Kinematics (2/2)

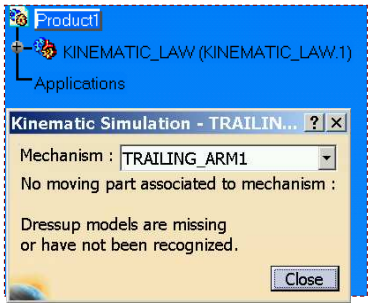
- **Multi-Model (Dress-Up)**



Instructor Notes:

Replay of V4 Kinematics in V5 (1/2)

- **Mono-Model (Multi-Sets)**

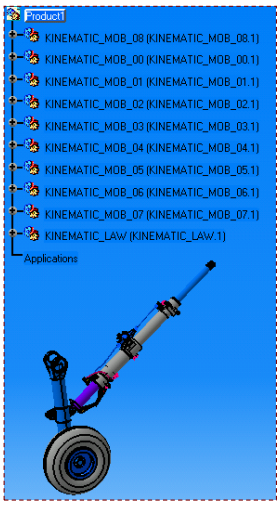


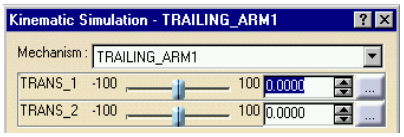
V4 CATKI Batch Program

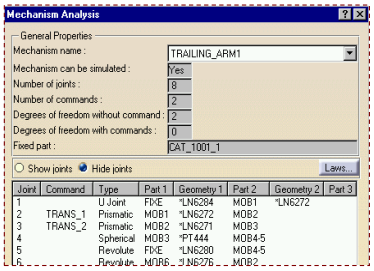
Instructor Notes:

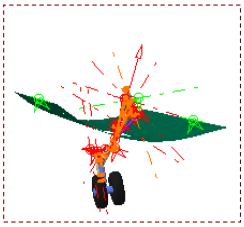
Replay of V4 Kinematics in V5 (2/2)

- **Multi-Model**





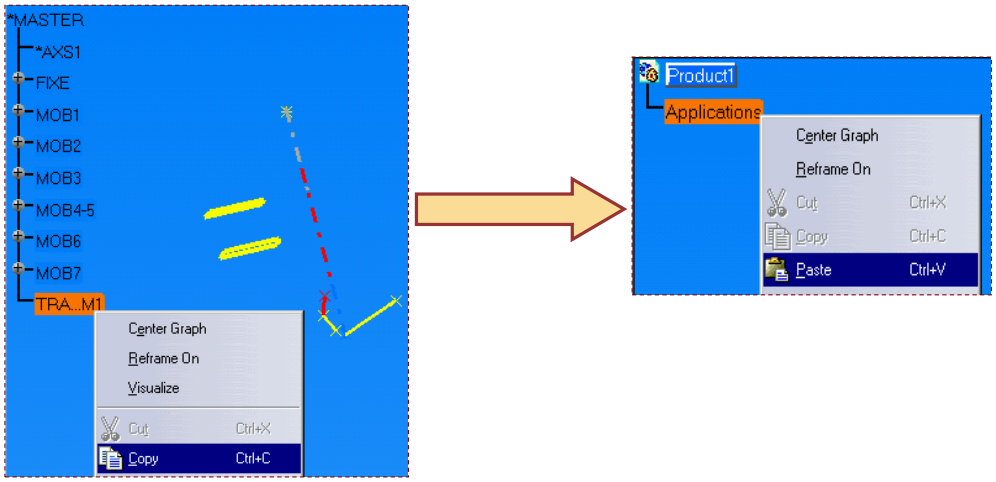




Instructor Notes:

Transfer of V4 Kinematics to V5 (1/2)

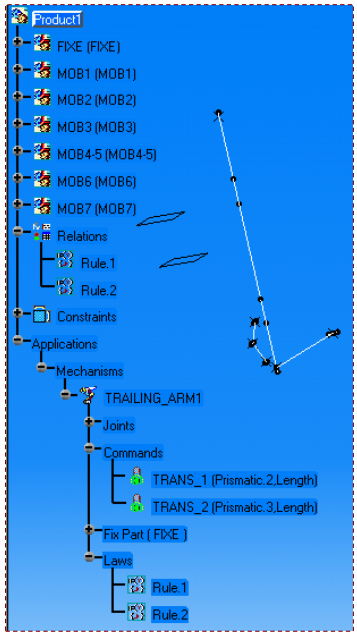
- **Mono-Model / Multi-Model**



Instructor Notes:

Transfer of V4 Kinematics to V5 (2/2)

- Mono-Model / Multi-Model
  - Geometric Set ➔ CATPart
  - V4 2D/3D Joints ➔ V5 3D Joints
  - Laws (numeric only) ➔ KWE Rules
  - Outputs are not converted



Instructor Notes:

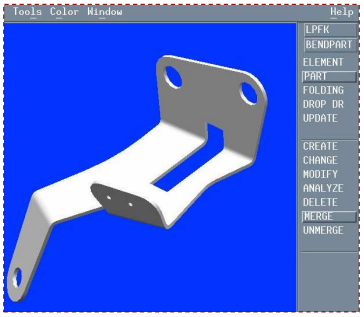
Kinematics: Resume

V5 / V4	Replay	Transfer
Mono-model	CATKI + Insert in CATProduct	Copy / Paste mechanism in Application box
Multi-model (Dress-up)	Insert in CATProduct	Copy / Paste mechanism in Application box + Dress-up

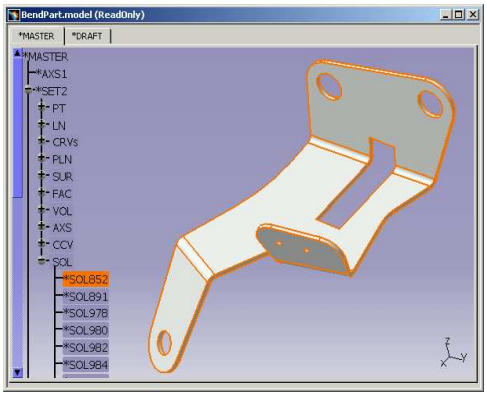
Instructor Notes:

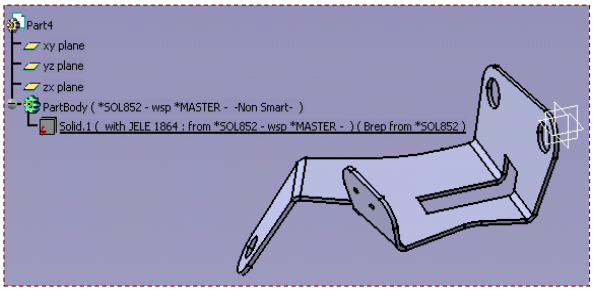
Sheetmetal: Transfer of BENDPART Data to V5 (1/2)

- **BENDPART / PART / MERGE**
  - **Gives one single solid**
  - **CATGEO's: BYGMRG, BYGUMG, etc**



- **Copy / Paste « As Result »**

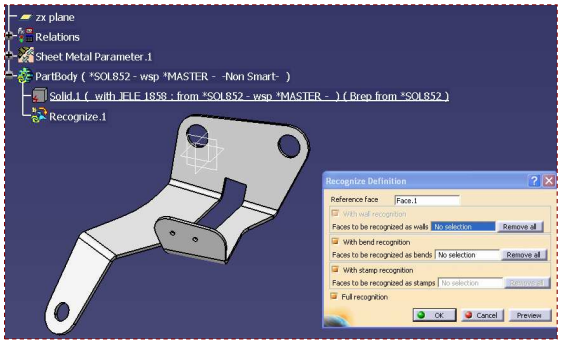


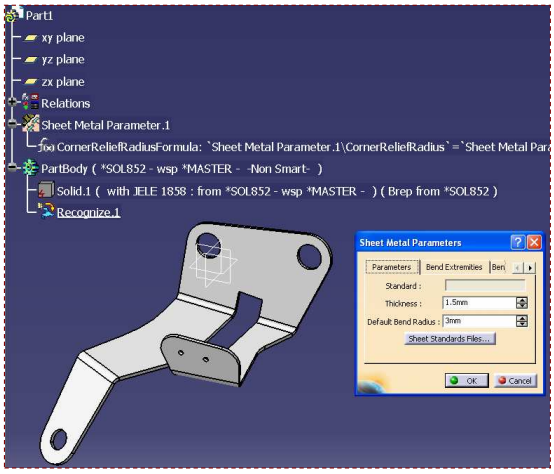


Instructor Notes:

Sheetmetal: Transfer of BENDPART Data to V5 (2/2)

- V5 « Wall Recognition »
  - Walls, Cutouts, Bends, etc
  - Selected face ➔ ref. wall
  - Parameters are updated

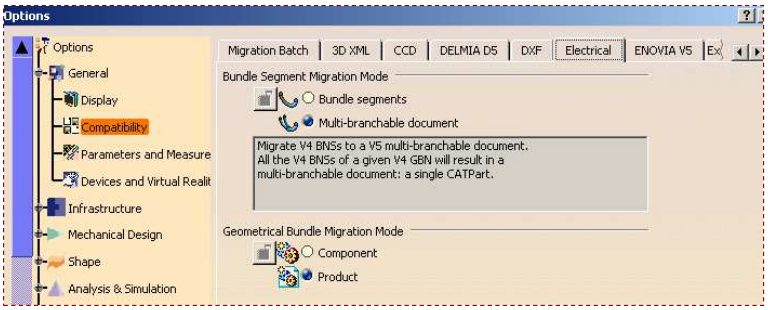




Instructor Notes:

Electrical Data (1/3)

- The MASTER workspace becomes the main CATProduct document while:
  - Each geometrical SET becomes a CATPart
  - Each DETAIL workspace becomes a CATPart
  - Each GBN becomes a CATProduct
  - Each BNS becomes a CATPart depending on the option set in the following panel



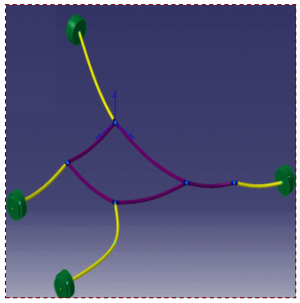
Instructor Notes:

Electrical Data (2/3)

- While migrating a V4 model, only the components in the model are migrated even if the Electrical applications use catalogs
- Some restrictions exist:
  - No mechanical links and no electrical links between the single insert connectors.
  - For the time being, while migrating the multi-section supports, only the first created section keeps the link with the bundle segments. For the other sections of the support, the bundle segments are not linked to the support.
  - The rectangular section BNS is migrated as a circular section bundle segment.
  - The V4 BNS created in the BEND mode ends in a slightly different shape and thus, might have a different length.

Instructor Notes:

Electrical Data (3/3)



V4

* MASTER
  - * SET1
  - *SGBN1
    - *BNS1
    - *BNS2
    - *BNS9
  - *SEQT2
    - CON1
    - CON2
    - CON3
    - CON4

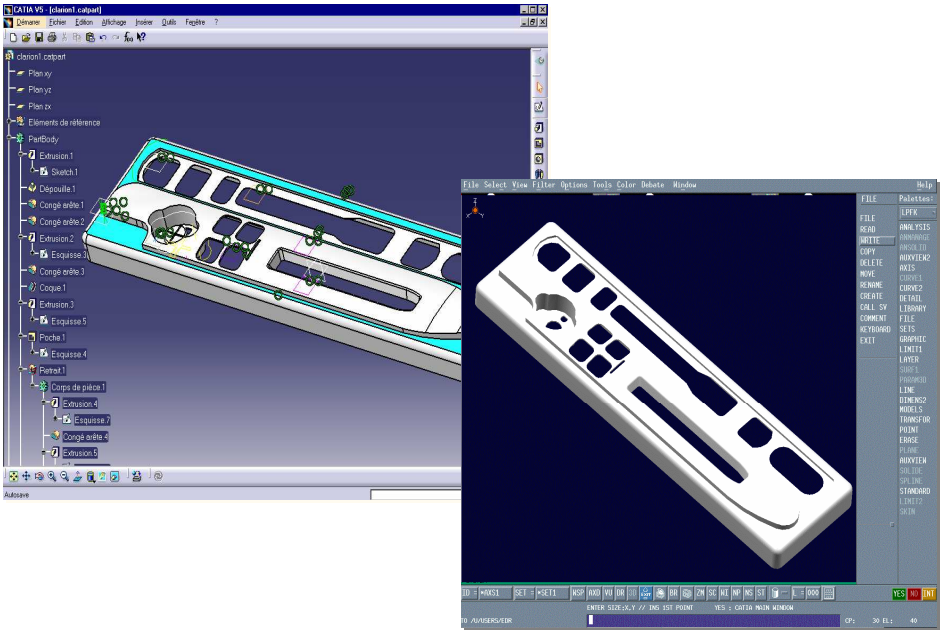
V5

Product 1
- GBN (CATProduct)
  - BNS1 (instance of BNS1.CATPart)
  - BNS2 (instance of BNS2.CATPart)
  - BNS9 (instance of BNS9.CATPart)
- Points (instance of BNS1.CATpart)
  - Pt 1
  - Pt 2
  - Pt N
- CON1 (instance of CON.CATPart)
- CON2 (instance of CON.CATPart)
- CON3 (instance of CON.CATPart)
- CON4 (instance of CON.CATPart)

Instructor Notes:

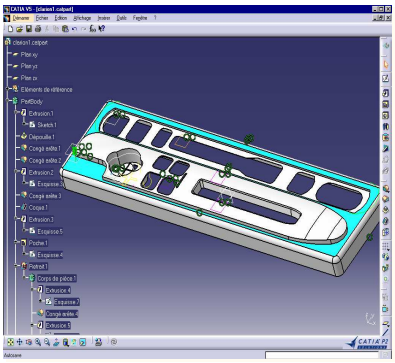
Using V5 Data in V4

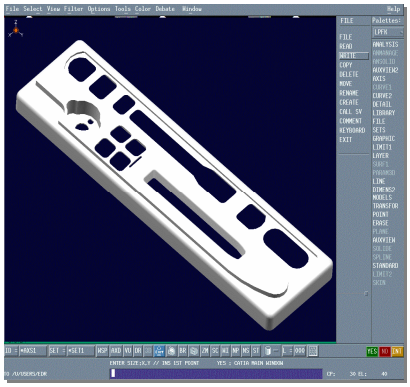
In this lesson you will learn how to use the V5 data in V4.

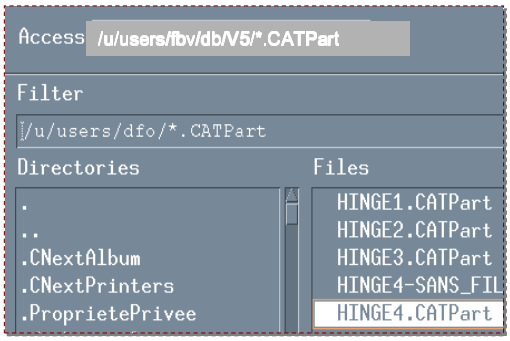


Instructor Notes:

Opening a CATPart in V4 (1/2)







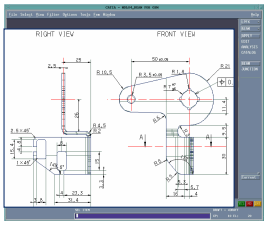
Instructor Notes:

Opening a CATPart in V4 (2/2)

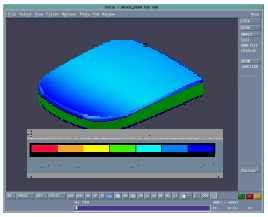
- Models / Copy:

VOLM1

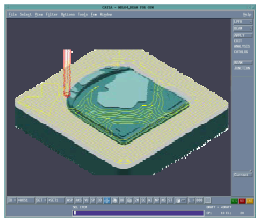
*SOL1



- CATIA V4 downstream applications
  - Drafting (AUXVIEW2)
  - FEA ➔ V4.22
  - NC Manuf. (PMP,SMP,MMP) ➔ V4.23



- CATIA V5 must be installed

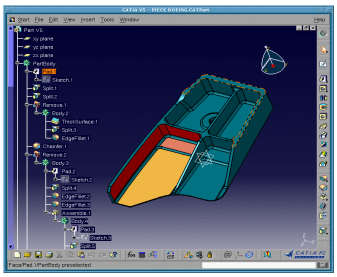


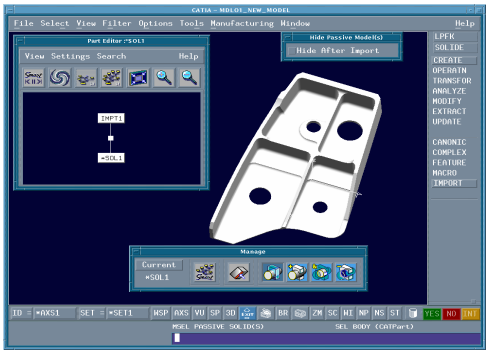
Instructor Notes:

V4 Solid Import Primitive Referencing a CATPart

- Full associativity with CATPart
- Standard CATIA V4 synchronization mechanism
  - Check Links & Change Links
- Full SolidE integration
- 424R1

V4 SolidE import primitive referencing a CATPart

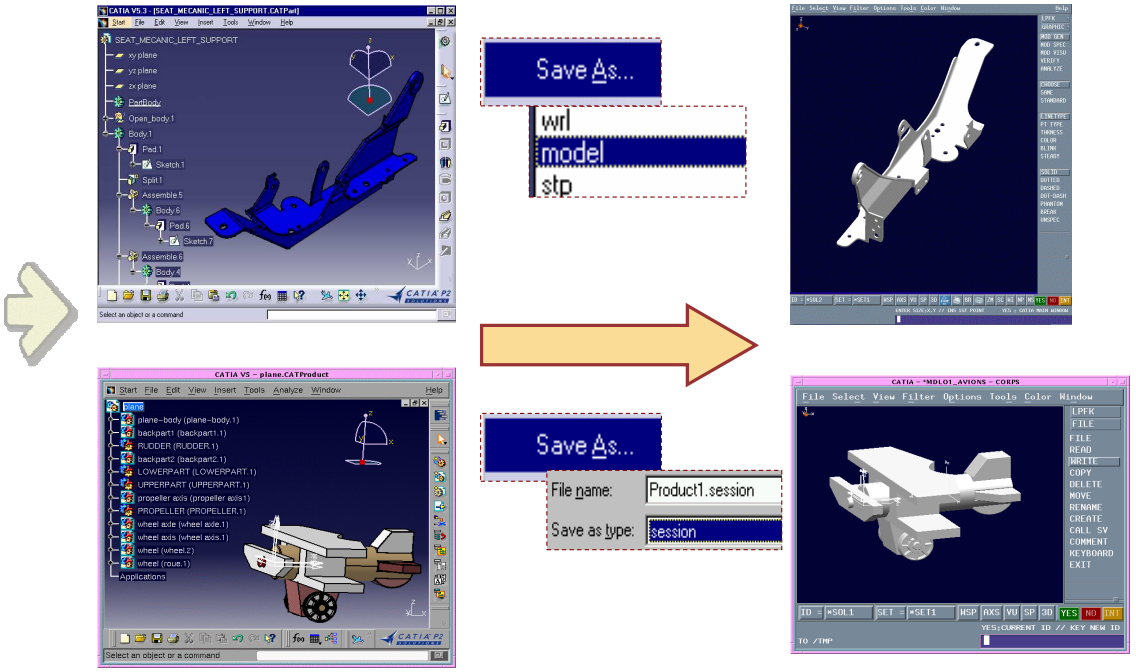




Instructor Notes:

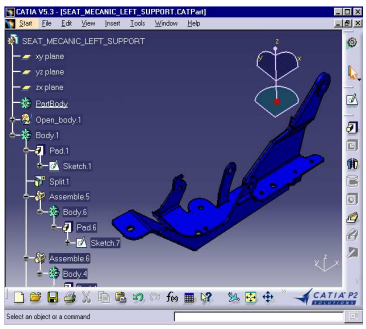
Saving V5 Data in V4 Formats

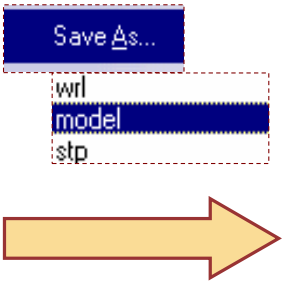
In this lesson you will learn how to save the V5 data in V4 formats.

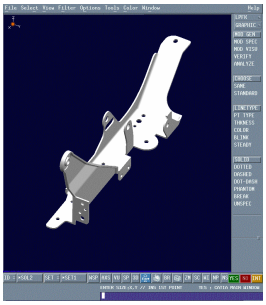


Instructor Notes:

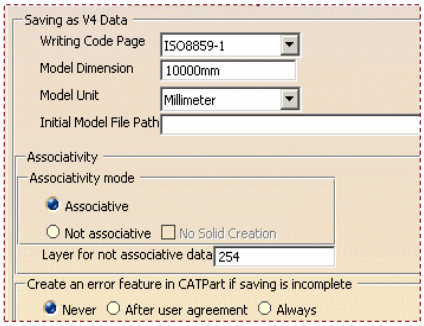
Saving a V5 CATPart as a V4 .Model (1/3)



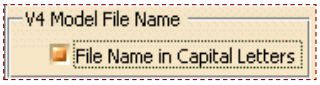




- Tools / Options / General / Compatibility
  - V4 « StartUp » model path: Layer filters, colors, Space&Draw elements standards
  - Code page
  - Model dimension
  - Model units



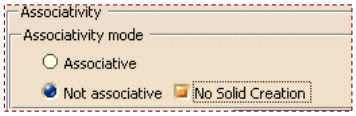
Before migrating a CATPart into a .model, you can specify in the Saving as V4 Data settings that the resulting .model must have Capital Letters.



Instructor Notes:

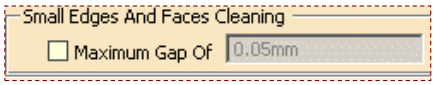
Saving a V5 CATPart as a V4 .Model (2/3)

- **No Solid Creation:**
  - If the Not associative mode has been chosen, the button No Solid Creation can be checked or unchecked. By default, it is not checked. If you check this button, no V4 solid will be created, only V4 volumes will be generated in the .model.



It is advised to use this option only when high memory is required in order to create a V4 model.

- **Small Edges and Faces Cleaning:**
  - The parameter entered in the Small Edges And Faces Cleaning frame is used in order to choose a maximum gap that may be generated when a small element (Face or Edge) is cleaned in V4 model.
    - If it is not checked, the value used will be the V4 tolerance for Curves. This value appears in the grey editor.
    - If it is checked, it is possible to enter another tolerance which must be lower than V4 tolerance for Curves and higher than 0. If the value chosen by the customer is higher than the V4 tolerance for curves, then this parameter will not be taken into account and the default value will be used.



Instructor Notes:

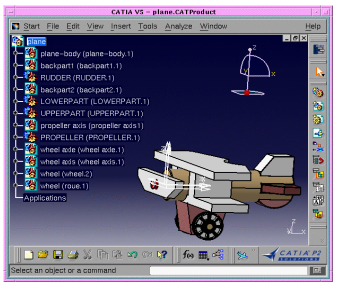
Saving a V5 CATPart as a V4 .Model (3/3)

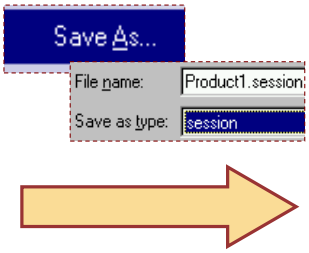
- Generalities
  - Only geometry in the SHOW mode can be converted
  - Can be read in V418 or higher version
  - Maximum deviation = 0.001mm (for MD=10m)
  - File/Comment in the V4 model: « The CATIA version is V5 »
  - (CATGEO: GIMVER)

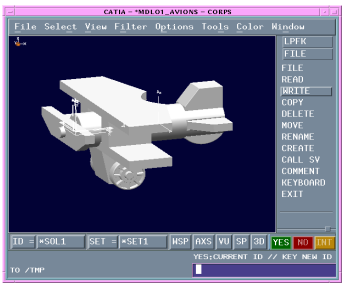
- Generated data
  - PartBody features: converted as *VOL + *SOL
    (or set V5V4SaveAsVolume=1 to generate *VOL only)
  - OpenBody features: converted as *FAC or *FAC + *SKI
  - Graphic properties: layers and colors are kept
  - CATIA V5 3D Text, Parabola, Hyperbola, Torus, and Revolution Surface migrate into CATIA V4 3D Text, Parabola, Hyperbola, Torus, and Revolution Surface.

Instructor Notes:

Saving a V5 CATProduct as a V4 .Session





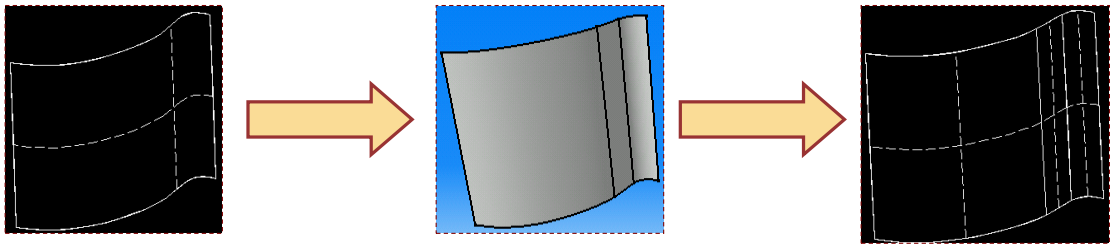


- **Generalities**
  - **Since V5R7 is available on both UNIX and NT**
  - **The product has to be in design mode**
  - **Abc.CATProduct ➔ Abc.session (« save ref only » mode)**
  - **CATParts ➔ .models**
  - **.models ➔ .models**
  - **Positioning is kept**

Instructor Notes:

Model - CATPart – Model Process (V4➔V5➔V4)

- G1 - Concatenation



V4: 1 *SUR (3 patches)

V5 Surface (3 cells)

V4: 1 *FAC With 3 *SUR(BSF)

Instructor Notes:

Tolerances Issues (1/3)

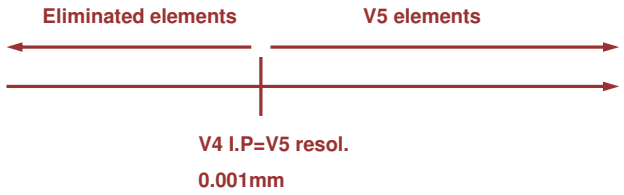
- V4 tolerances
  - « Intersection projection »: 0.001 mm (MD=10m)
  - « Identical curve » tol: 0.1mm (MD=10m)

- V5 tolerances
  - « Resolution »: 0.001mm (minimum length of a valid object)
  - No max distance between the two edges to consider them as a single one

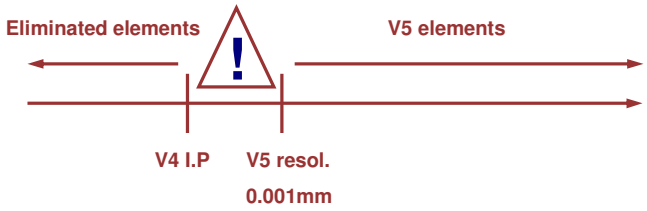
Instructor Notes:

Tolerances Issues (2/3)

- MD = 10m



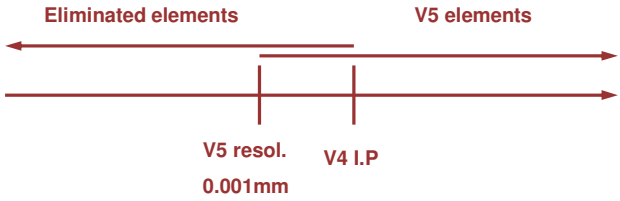
- MD<10m



Instructor Notes:

Tolerances Issues (3/3)

- MD>10m

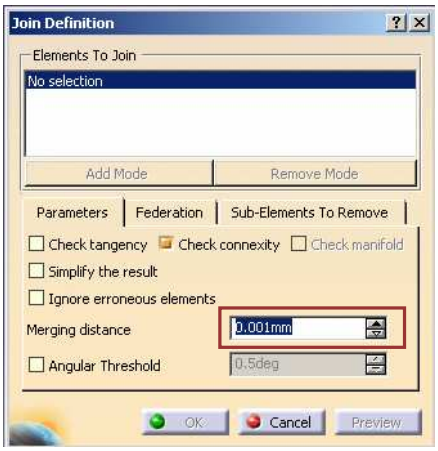


- Conclusion:
  - V5/V4 process always « coherent » with the V4 receiving model
  - Max deviation between V5 and V4➔ V4 « Projection intersection » tolerance
  - V4 I.P tolerance vs V5 resolution➔ problems (not significant…) only if MD > 10m
  - V4 I.C tolerance vs V5 resolution ➔ Undefined area

Instructor Notes:

Recommendations (1/2)

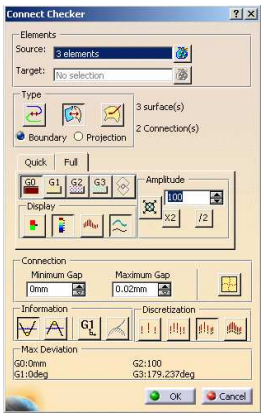
- GSD « Join » function
  - Use « Merging distance » < V4 « identical curve » tolerance

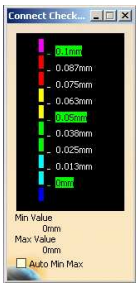


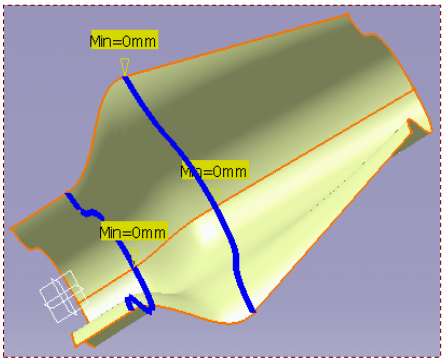
Instructor Notes:

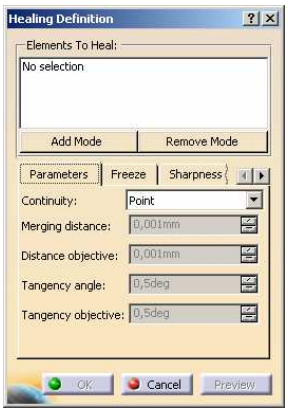
Recommendations (2/2)

- GSD « Connect Checker » and « Heal Surface »
  - « Connect Checker » ➔ Detect gaps
  - « Heal Surface » ➔ Close gaps









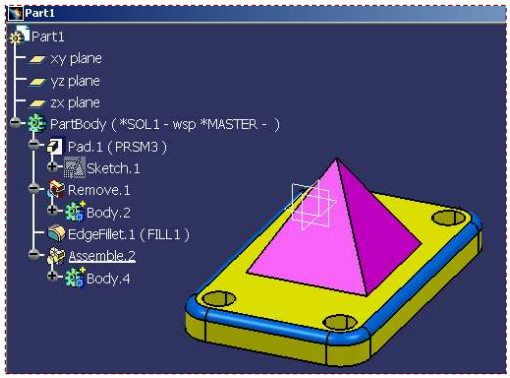
Instructor Notes:

Recap Exercise

Exercise 1: Smart/Unsmart Solid

15 min

In this this exercise, you will migrate a CATIA V4 model file containing an unsmart solid. Later, you will check the warning message in CATIA V5 and compare this migration with a model cleaned in CATIA V4.



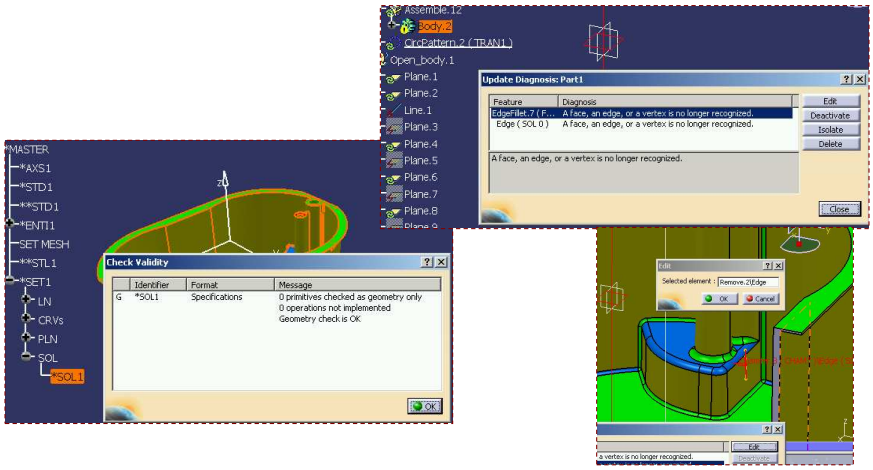
Instructor Notes:

Recap Exercise

Exercise 2: Error during Update

15 min

In this exercise you will open a CATIA V4 model, then check the geometry for unresolved features and copy/paste the solid entity into a CATPart.



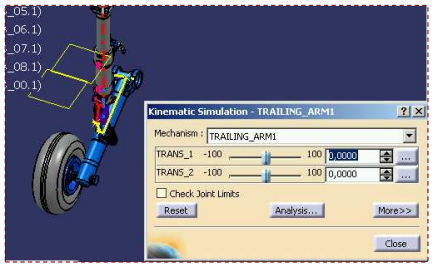
Instructor Notes:

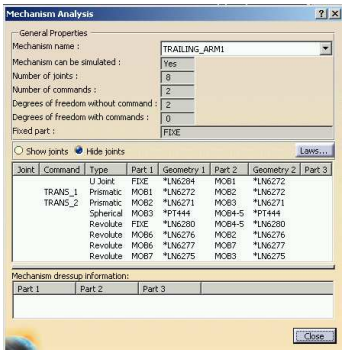
Recap Exercise

Exercise 3: Migration of Kinematics Data

25 min

In this exercise, you will learn how to read the CATIA V4 Kinematics data in the DMU Kinematics Simulator workbench (mono-model and multi-model), and then to convert them into V5 data.





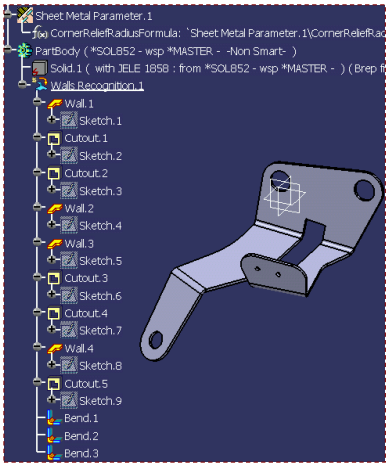
Instructor Notes:

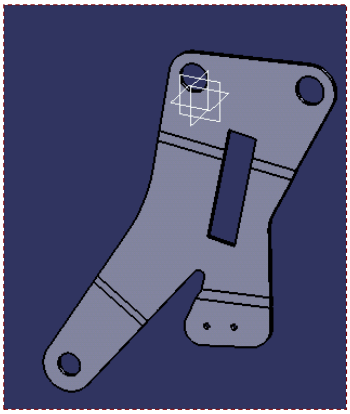
Recap Exercise

Exercise 4: Sheet Metal Design

10 min

In this exercise, you will learn how to migrate the V4 data and use the Walls Recognition Tool in the Generative Sheet Metal workbench Projected Points with data from V4.





Instructor Notes: