3DEXCITE

3DEXPERIENCE®

3DEXCITE DELTAGEN
DIRECT MAYA® PLUGIN - INSTALLATION & USER GUIDE
R2020x RF1

DASSAULT SYSTEMES

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DELTAGEN DIRECT MAYA® Plugin

The DELTAGEN DIRECT MAYA® Plugin is the interface integrated into Autodesk Maya® in order to allow the bidirectional data exchange with DELTAGEN, DELTAGEN HUB or DELTAGEN STAGE in .3xf and .csb formats. The interface can process .3xf and .csb data in pure polygon format or with exact geometry (NURBS).

NOTE

The DIRECT MAYA® Plugin needs an installation of Autodesk® Maya 2016, 2017, 2018 or 2019.

Supported Properties

Export

When exporting a Maya® scene or a selection to .csb or .3xf file the following properties are supported during conversion:

- Geometry (Polygons and NURBS)
- Scene structure with groups and object names
- References
- Transformation

  Objects with SHEAR TRANSFORMATIONS specified in Maya® get flattened on export to .3xf or .csb. That means that the scene tree in DELTAGEN will not show the transformation indication as well as no references.
- LODs (only relevant for DELTAGEN)
- Cameras
- Light objects (Area/Rectangular light only via .3xf)
- Switches
- Visibility
- Selected UV set + Shadow UVs and normals
- Materials (name, assignment, basic colors, transparency)
- Texture (only via .csb)
- Default Metadata
- Camera and Vertex animation (only via .csb)

Import

During .3xf or .csb import the following properties are converted to a Maya® scene.

- Geometry (Polygons and NURBS)
- Scene structure/hierarchy with object names
- References
- Transformations
- LODs (only relevant for DELTAGEN)
- Cameras
- Light objects (Rectangular/Area light only via .3xf)
- Switches (converted into Maya® groups with prefix "_3DEXCITE_SWITCH_SW"
- Variants (only via .3xf; switching via standalone variant switcher)
- Visibility
- UVs and normals
- Materials (name, assignment, basic colors, transparency)
- Textures
- Default Metadata (appearing under EXTRA ATTRIBUTES inside the Attribute Editor in Maya®.)

Material Conversion

The following table shows the material properties being converted during .3xf and .csb import/export:

DELTAGEN	Maya®
Diffuse/Albedo color	Color
Reflection/Specular (Color/Tint)	Specular Color
Shininess (only in Look)	Eccentricity (converted)
Transparency	Transparency
Emission Color	Incandescence
Ambient Color (only in Look)	Ambient color

Export Specifics

Only the base Maya® shader types Blinn, Lambert, Phong, PhongE and Anisotropic are supported. All other types of shaders get only the material name and the following default values assigned:

- Default diffuse color: 255, 255, 255
- Default specular color: 0, 0, 0
- Default emissive color: 0, 0, 0
- Default ambient color: 0, 0, 0
- Default shininess: 2
- Default transparency: 0

Import Specifics

Materials/Looks with Specular or Reflection color = 0/0/0 result in a Lambert shader in Maya®. All others are converted to Phong.

Stellar material types GLASS and THIN GLASS automatically get a transparency value of 70% in Maya®.

Material properties that also have a texture assigned get a color value of 0 in Maya®. E.g. if an 3DEXPERIENCE PBR material has an Albedo color and an Albedo texture the color is set to black in Maya®.

3DEXPERIENCE PBR material import and conversion is only supported via .3xf.

Texture Conversion

The following table shows the textures being supported during .csb import and export and during .3xf import:

DELTAGEN	Maya®
Base/Diffuse/Albedo texture	Color texture
Emission/Specular texture	Incandescence texture (only via .3xf)
Alpha/Transparency texture	Transparency texture (only via .3xf)

Supported Transformation parameters:

DELTAGEN	Maya®
Rotation	Rotate frame (converted)
Translation	Offset
Scale/Repeat U & V (only if MODE is set to REPEAT in DELTAGEN)	Repeat UV (under 2D TEXTURE PLACEMENT ATTRIBUTES)
UV mapping (type)	UV mapping

Camera Attribute Conversion

The following table shows the supported camera attributes when importing/exporting . csb or .3xf files:

DELTAGEN	Maya®
Camera Name	Camera
View (Orthographic/Perspective)	Orthographic views
Position (Translate/Rotate)	Transform attributes (Translate /Rotate (converted))
Field of view	Angle of View (converted to keep the visual appearance)
Focal length	Focal Length
Sensor size	Film Back - Camera Aperture (mm)
Render output fit	Film Back - Fit resolution gate
Offset (mm)	Film Back - Film Offset (converted to inches and *0,1)
Prescale	Film Back - Pre Scale
Clipping plane Near (Auto/Manual)	Near Clip Plane
Clipping plane Far (Auto/Manual)	Far Clip Plane
Display - Overscan	Display options - Overscan
Display - render output	Display options - Display Resolution
Display - Mask	Display options - Display Gate Mask
Display - Mask Opacity	Display options - Gate Mask Opacity
Display - Mask Color	Display options - Gate Mask Color
Display - Show sensor	Display options - Display Film Gate

NOTE

DELTAGEN allows different render output settings per camera. In Maya®, the render output settings are global and used for all cameras. Therefore you should adjust the render output settings in Maya® manually to the desired resolution.

Switch Conversion

After importing a scene containing switches into Maya® the switch is converted into a Maya® group with the prefix "_3DEXCITE_SWITCH_SWx". The number behind SW shows the active switch child (starting by 0) when saving the file from DELTAGEN.

E.g. the switch with the name switch_01 in DELTAGEN will be a group with the name switch_01_3DEXCITE_SWITCH_SW0 after Maya® import. Which means the first switch child is active all others are imported, but hidden in Maya®.

Dependant on the group name the switch can be exported for DELTAGEN again. Meaning if you hide manually the first switch child and unhide the second one, but do not rename the group to _3DEXCITE_SWITCH_SW1 still the first child will be enabled when opening the scene in DELTAGEN again.

Visibility Conversion

When using the DIRECT MAYA® Plugin for exporting a Maya® scene with hidden objects they can either be imported into DELTAGEN as disabled switch children or as scene tree object with disabled visibility. The first option is explained under Switch conversion. If a hidden Maya® object is not part of such a switch group the result will be an object with inactive visibility check mark in DELTAGEN.

When importing invisible objects from DELTAGEN independent if switch children or objects with disabled visibility they are hidden automatically in Maya®.

The import option IGNORE HIDDEN OBJECTS however only applies to objects with disabled visibility in the scene tree. They will not be imported at all if this option is active when importing.

Geometry Conversion

The import of NURBS information is only supported if no polygons are contained in the scene. Otherwise only the polygons are imported.

Light Object Conversion

The following table shows the light properties being converted during .3xf and .csb import/export:

DELTAGEN	Maya®
Color	Color
Intensity/Light value	Intensity
Attenuation	Decay Rate
Light Value	3DEXCITE Light Value, under Extra Attributes (only via .3xf)
Light Unit	3DEXCITE Light Unit, under Extra Attributes (only via .3xf)
Radius	Light Radius (converted and only via .3xf, under Attribute Editor > Shadows > Raytrace Shadow Attributes)
Cut-off angle	Cone Angle (converted)
Width	Scale x value (converted and only via .3xf, under Transformation Attributes)
Height	Scale y value (converted and only via .3xf, under Transformation Attributes)

NOTE

Maya light linking is not supported. Rectangular/Area lights can only be exported via .3xf. A visual consistency is not guaranteed.

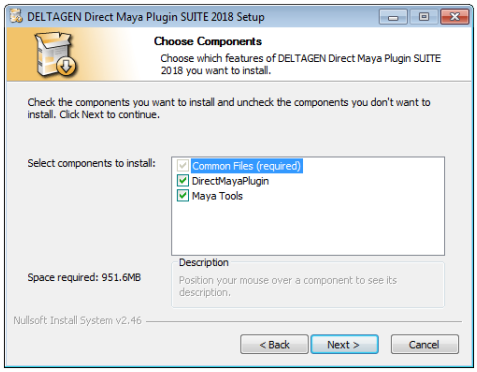
Installing the DIRECT MAYA® Plugin

CONTEXT

There are two possibilities to run the installation of the DIRECT MAYA® Plugin®. Either by executing the installer directly from the 3DEXCITE_DIRECT_MAYA_PLUGIN folder. Or by using the general Setup.exe e.g. after installing DELTAGEN, DELTAGEN HUB or DELTAGEN STAGE:

TASK

1. Hold the mouse pointer over the DIRECT MAYA® Plugin selection field to read important information.
2. Click INSTALL DELTAGEN DIRECT MAYA PLUGIN.
   STEP RESULT: The setup wizard starts.
3. Click NEXT >.
4. Choose the components you want to install.



5. Confirm with NEXT >.
6. Set the installation path.
   STEP RESULT: We recommend the default setting, e.g., `C:\Program Files\Dassault Systemes\3DEXCITE\`.
7. Click INSTALL.
   STEP RESULT: The installation starts with an option to SHOW DETAILS and later your are asked if you want to install the 3DEXCITE License Server FlexLM.
8. Confirm with YES or NO.
   STEP RESULT: If yo select YES the wizard for installing the License Server opens.

NOTE

You can cancel this installation if you selected YES **by mistake.**

9. Confirm with NEXT > and follow the instructions. For more infor-mation see *Installing FlexLM* inside the DELTAGEN Installation Guide.
   STEP RESULT: Once the installation is finished successfully the setup wizard waits for you to confirm.
10. Click NEXT >
    STEP RESULT: The closing screen appears
11. Select SHOW README
12. Click FINISH
    STEP RESULT: A text file containing the latest information on the plug-in opens and you are returned to the starting page of the software setup.

Silent Installation and Removal

Silent installation of the DIRECT MAYA® Plugin can be enabled by starting the 3DEXCITE_DIRECT_MAYA_PLUGIN_Setup.exe inside the 3DEXCITE_DIRECT_MAYA_PLUGIN folder via the following command line options:

NOTE

Do not use the general Setup.exe for the silent installation!

`/S` Start installer silent

`/All` Install DirectMaya and MayaTools

`/DirectMaya` Install DirectMaya only

`/MayaTools` Install MayaTools only

`/nDocu` Install without Documentation

`/D=<Path>` Sets the Destination folder path.

- This must be the last parameter used in the command line.
- It must not contain any quotes, even if the path contains spaces.
- Without this parameter the installer uses the standard installation folder (e.g. “C:\Program Files\Dassault Systemes\3DEXCITE\DELTAGEN”).
- Only absolute paths are supported.

Example

To silently install the Direct Maya without MayaTools into folder `D:\Software x.y` run the following command:

```
3DEXCITE_DIRECT_MAYA_PLUGIN_Setup.exe /S /DirectMaya
/D=D:\Software xy
```

Silent Removal

For silent removal start DirectMayaPlugin_uninstall.exe from the installation folder of the Plugin with the command line option /S:
`<INSTALLATION_FOLDER>\DirectMayaPlugin_uninstall.exe /S`

Loading Direct Maya or Maya Tools

CONTEXT

Before you can use the Direct Maya or Maya Tools interface, you have to activate the corresponding plugin inside the Autodesk Maya® software.

TASK

1. In Maya®, select WINDOWS > SETTINGS/PREFERENCES > PLUG-IN MANAGER.

   STEP RESULT: The PLUG-IN MANAGER dialog opens.

2. Depending on the Autodesk Maya® version used, enable the LOADED check mark for the corresponding .mll

   ADDITIONAL INFORMATION: Pick `rttDirectMayaPlugInxy.mll` for DELTAGEN Direct Maya® or `rttMayaToolsxy.mll` for the Maya Tools plug-in. If you select AUTO LOAD the plugin will be loaded automatically when starting Autodesk Maya®.

   STEP RESULT: The plug-in is loaded instantly. For 3DEXCITE Maya-Tools a new menu entry appears.

3. Click the info icon for detailed information on the plug-in.
4. Click CLOSE to exit the dialog.

Importing and Exporting Files in Maya®

CONTEXT

In order to import or export .csb or .3xf files within Maya® you need to proceed as follows:

TASK

1. In Maya®, select FILE > IMPORT or alternatively for the export:
   - EXPORT ALL
   - EXPORT SELECTION
2. For FILES OF TYPE select CSB_3DEXCITE or 3XF_3DEXCITE.
3. Set up your Import/Export within the Options dialog.
4. Click IMPORT/EXPORT SELECTION/EXPORT ALL

Import & Export Options

The FILE TYPE SPECIFIC OPTIONS section inside the Import/Export Options dialog of Autodesk Maya® allows you to specify special import and export options for the 3DEXCITE formats .3xf and .csb.

Global Options Field

Treat File Units As

TREAT CSB/3XF UNITS AS ensures that the size of a model, taking account of the model unit used in DELTAGEN, is correctly converted into centimeter units for Autodesk Maya®.

It is not important which option you choose as long as the same option is used for both import and export. With the same option selected, the model in DELTAGEN will have the right size. If different settings are used for import and export, the model size changes.

The resulting size of the model after import into Autodesk Maya® is important for some Autodesk Maya® functionalities like clipping planes for cameras or when using lights or textures.

- MM makes a unit from DELTAGEN 0.1 cm in Maya®.
- CM makes a unit from DELTAGEN 1 cm in Maya®.
- M makes a unit from DELTAGEN 100 cm in Maya®.

Message Logging

MESSAGE LOGGING writes a log of the import or export procedure.

Export Options

Material Type

MATERIAL TYPE let's you choose whether the default renderer should be set to STELLAR or LOOK when exporting the scene file. The selected renderer defines in which render mode DELTAGEN opens the exported .csb or .3xf file. This function is only available for DELTAGEN.

Node Types

- LIGHTS defines whether lights are exported together with the scene or not.
- TEXTURES defines whether textures are exported together with the geometry or not. This option is only available for .csb export.
- CAMERAS defines whether the cameras are exported together with the scene or not.
- NORMALS defines whether normals are exported together with the geometry or not.
  - VERTEX NORMAL TOLERANCE combines vertices with the same or similar names in a specific tolerance range.
- COLORPERVERTEX defines whether the color information of vertices should be exported or not (only available with .csb export). The result is visible in Look renderer with VIEW SOLID WIREFRAME MODE only.

Object Names

OBJECT NAMES exports the objects with the original DELTAGEN name specified under EXTRA ATTRIBUTES 3DEXCITE OBJECT NAME instead of the cleaned Maya® one.

Translation Offset

TRANSLATION OFFSET adds the defined offset to the original translation of the exported object.

Rotation Offset

ROTATION OFFSET adds the defined offset to the original rotation of the exported object e.g. to compensate a differing 3d axis orientation.

Export Animation Options

These options are only available for .csb export.

Write Animation File

WRITE ANIMATION FILE creates an animation file in the VRML format .wrl for vertex animations or an additional .xml file for camera animations. These files can be loaded in DELTAGEN afterwards.

Keyframes

KEY FRAMES: selecting USE ANIM CURVES exports the key frames of the animation only. The program always interpolates linearly between the key frames. This does not correspond to the Autodesk Maya® animation if the interpolation type of the tangents is not set to linear. If this option is disabled, the animation is exported with the correct frames. Then the frames of the animation are viewed and exported in even step-widths. Which frames are used as key frames is irrelevant.

Step

STEP specifies the size of the step with which the frames of an animation are exported. You can specify this value only if the USE ANIM CURVES option is disabled. All frames, including key frames, are used. With a step value of 10, 100 frames are exported from an animation described with 1000 frames in Autodesk Maya®.

Range Control

RANGE CONTROL: selecting LOOP exports the animation in an infinite loop.

Start/End

START / END specifies the start and end key frames of the animation.

Frame per sec

FRAMES PER SEC. specifies the number of frames per second at which the animation is to be played back.

Create Initiator

CREATE INITIATOR creates the possibility to trigger the animation in DELTAGEN with one key. The initiator can be found and edited inside the Logic network editor in DELTAGEN.

Key

KEY specifies the key with which the animation is started in DELTAGEN.

Animate vertices

ANIMATE VERTICES exports also the vertex animations that can be used in DELTAGEN. If enabled, you cannot enable OPTIMIZE VERTICES.

Optimize Animated vertices

OPTIMIZE ANIMATED VERTICES ensures that in mesh animations, vertices with the same position are combined in the geometry. This results in smaller `.csb` and (particularly) `.wrl` files.

NOTE

Do not use this function if vertices with the same positions initially move away from each other during the animation.

Import Options

Import LOD children

- ALL imports all LODs from objects. The LOD switches are copied in Maya®.
- BY INDEX imports only one of several LOD levels of objects.
  - LOD INDEX specifies which of the LODs is imported by objects.

Shadows

- IGNORE SHADOW UVS specifies that the UV set of the template shadow textures is not loaded to Maya®.

Names

- APPEND UNIQUE NODE ID appends an identification number to the object name of all objects. DELTAGEN objects with the same name receive a unique name in Autodesk Maya®.

Objects

- IGNORE HIDDEN OBJECTS imports only visible objects to Autodesk Maya®.

NOTE

Tip for exporting UV sets to DELTAGEN: Only the UV sets map1 and shadow UVs are exported to DELTAGEN, irrespective of the currently selected UV set in Autodesk Maya®. The name of the UV set must correspond exactly to these names. If necessary, rename a generated UV set or copy the layout to a correspondingly named UV set.

- IMPORT CAMERAS imports the cameras saved inside the .csb or .3xf file together with the geometry.

  Under PANELS > PERSPECTIVE the imported cameras can be applied to the viewer in Maya®.

- GEOMETRY CLEAN UP runs a geometry cleanup reducing the number of vertices and the border edges during import.

  - VERTEX MERGE TOLERANCE defines the value (in model units) under which vertices are being merged during import when GEOMETRY CLEAN UP is selected.

- CORRECT CAMERA ORIENTATION adjusts the orientation of the camera so that the scene appears in the same way as in DELTAGEN though the 3d axis orientation differs.

Materials

- AUTOMATIC MATERIAL ASSIGNMENT replaces the DELTAGEN materials of the .3xf file with existing Maya® materials if the naming matches. The materials need to be open already in Maya® when importing the .3xf file.

Variants

- ATTACH VARIANTS ONLY imports only the variants included in a .3xf file and ignores the geometry when importing. For more information, see *Attaching Variants to an Existing Maya® Scene.*

Maya Tools

The Maya Tools provide practical functionalities that help you to format data in Autodesk Maya®.

NOTE

Maya Tools need an installation of Autodesk® Maya 2016, 2017, 2018 or 2019.

Maya Tools Menu

When you activate the plug-in, the Autodesk Maya® menu MAYA TOOLS is available.

FLATTEN TRANSFORMS resets all transformation values to 0. This tool is approximately the equivalent of the Autodesk Maya® FREEZE TRANSFORMATIONS function or the DELTAGEN function FLATTEN TRANSFORMS. However, Maya®'s FREEZE TRANSFORMATIONS function does not take vertex normals into account, which destroys shading. The Maya tool gets around this problem by converting the normals. This can, however, lead to problems with larger polygon sets. In that case, user Flatten transforms in DELTAGEN.

POLY SEPARATE separates the selected polygons from an object. For this purpose, select the faces of a polygon object. The Maya tool deletes these faces from the object and creates a new object consisting of these deleted polygons.

RASTERIZE divides selected polygon objects along the XYZ axis. The default value is a unit of length. Other values can be set by calling this function in the script editor: `rtt_rasterize -cx 1.0 -cy 5.0 -cz 10.0`.

PNG CAMERA IMPORT imports camera information contained in the bitmap to create a scene camera or a camera flight.

IMPORT MODES

SINGLE MODE imports a single camera

IMAGE SEQUENCE MODE imports a camera flight using individual images, merging all cameras to one with keyframes.

BATCH opens a dialog to specify the source path for the camera to import. You can select the images to import and confirm with IMPORT PNGS.

PNG CAMERA EXPORT opens a dialog to enter the export options.

- START FRAME and END FRAME
- TARGET FOLDER specifies the destination folder.
- TRANSLATION, ROTATION and SCALE OFFSET can also be entered.
- EXPORT RANGE to saves the `.png` sequence into the specified destination folder.

POLY CUT TOOL inserts polygon edges in overlapping polygon objects (two or more objects). You can set an offset value by which the inserted edge is shifted from the actual intersecting line.

HELP opens the help.

ABOUT shows the version number.

Standalone Variant Switcher

When using the Standalone Variant Switcher it is possible to control the variants in the loaded Maya® scene via an imported .3xf file that has been created in DELTAGEN upfront. It even allows the simultaneously switching of variants inside different third party software or together with DELTAGEN.

Supported variant set types are:

- Geometry sets
- Switch sets
- Look sets
- Object sets (only for visibility)
- Packages (with singly supported sets)
- Code state sets

Name based Variants are resolved during the .3xf import to function based on Unique IDs. Their original DELTAGEN name (see 3DEXCITE OBJECT NAME under EXTRA ATTRIBUTES) is imported, but not used for switching. As a consequence you are not able to edit imported variants in Maya.

User Interface Overview

For the detailed description of the User interface please have a look inside the DELTAGEN User Guide Variants section “Standalone Variant Switcher”.

Preparing the Standalone Variant Switcher for Maya®

CONTEXT

Before using the standalone variants switcher a connection to the software needs to be created and the variant file has to be loaded.

TASK

1. Open the ExternalVariantSwitcher.exe
2. Click on load  or drag the .3xf file into the standalone variant switcher to open the same .3xf file that is imported into Maya®
3. Click the flyout next to the connect icon:

   STEP RESULT: The list shows all connectible software applications that are installed on the computer.
4. Select 3DEXCITE DIRECT MAYA®.

   ADDITIONAL INFORMATION: It is possible to connect to several applications in parallel.

   STEP RESULT: A check mark appears next to the plug-in name and the connection icon turns green  when the linkage to the software has been created.

Attaching Variants to an Existing Maya® Scene

CONTEXT

When a .3xf file has already been opened in Maya® and saved as .mb file the variants created in DELTAGEN are no longer stored inside. However it is still possible to add variants to this mb scene file. This re-enables the switching of variants with the standalone variant switcher. It is even possible to load and use variants that have been updated retrospectively without reloading the whole original .3xf scene file in Maya®.

TASK

1. Load the saved .mb scene (that was the original .3xf file) into Maya®.

   ADDITIONAL INFORMATION: Former DELTAGEN objects can be identified by their unique ID under EXTRA ATTRIBUTES inside the ATTRIBUTE EDITOR.

2. Create or update existing variants in the respective DELTAGEN scene.
3. in DELTAGEN go to FILE > SAVE AS
4. Save the scene with the updated variants as .3xf file.
5. Open the StandaloneVariantSwitcher.exe.
6. Load  the new .3xf containing the updated variants.
7. Click the flyout next to the connect icon:

8. Select 3DEXCITE DIRECT MAYA®.

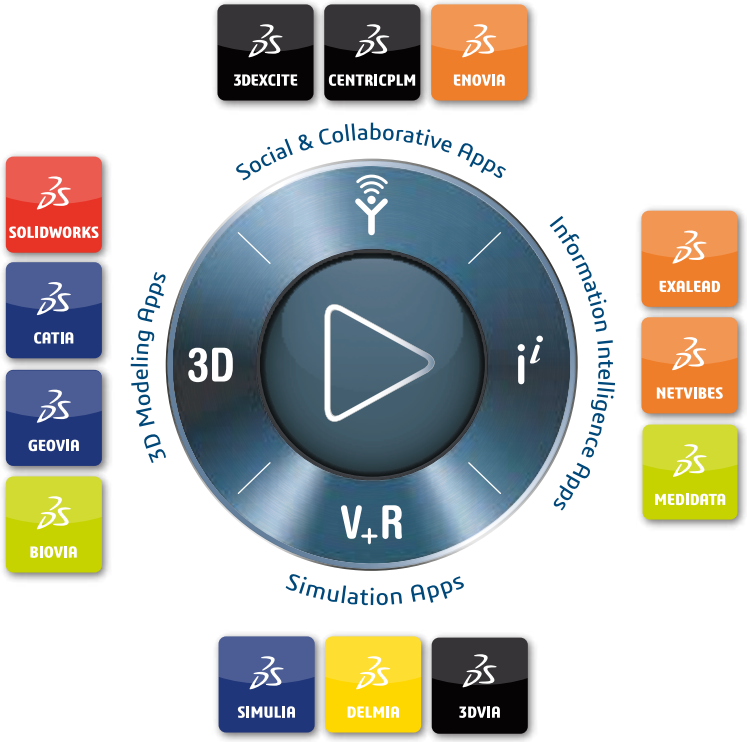
   STEP RESULT: A check mark appears next to the plug-in name and the connection icon turns green  when the linkage to the software has been created. However the new variants are not yet working together with the original scene file.

9. In Maya® go to FILE > IMPORT.
10. Choose 3XF_3DEXCITE as FILE OF TYPE.
11. Select the .3xf file with the updated variants.
12. Inside the import options select ATTACH VARIANTS ONLY.
13. Click IMPORT.

    STEP RESULT: The Maya® scene is updated so that the standalone variant switcher is able to control the added variant sets.

14. Inside the standalone VARIANT SWITCHER try switching the updated variants.

    ADDITIONAL INFORMATION: It is also possible to import missing geometry to the Maya® scene before updating the variants if needed.



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