

Autodesk®
Maya®

2011



Autodesk®

Translators

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Autodesk® Maya® 2011 Software

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Introduction to Translators

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Maya Translators

In addition to the translators provided in plug-in format with Maya (IGES, FBX, DXF, Alias wire, OpenFlight, and so on), Maya also supports a range of translation formats through the Autodesk DirectConnect plug-in.

For more information, see the Autodesk DirectConnect Help option in the Help menu of Maya.

Updates to the certain Maya translator plug-ins may be available. See the Autodesk support pages for Maya.

FBX file translator

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FBX file translator

The Autodesk® FBX® translator plug-in allows Autodesk® Maya® to read and write the latest version of FBX files. FBX allows all types of data to be packaged into one file format that can be used by most of today's 3D authoring software. With FBX, you don't have to worry about which supported software application the data came from, or how you are going to convert it. FBX acts as an interchange hub between most 3D software, regardless of software vendor or computer platform.

This lets you exchange complex data between Maya, Autodesk® MotionBuilder®, Autodesk® 3ds Max®, and Autodesk® Mudbox® while preserving the data's overall behavior, making it easier to integrate all these products into a single pipeline. For example, with FBX you can exchange animation data and character rigs between Maya and MotionBuilder, or point data between Maya and new versions of MotionBuilder and 3ds Max.

The FBX plug-in is installed automatically with Maya, and is loaded by default on startup. If you have previously unloaded this plug-in, you can load it by doing the following:

- 1 Select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the Load button for fbxmaya.mll.

NOTE

Development of the FBX plug-in is an ongoing process in order to provide you with seamless interoperability between all FBX-supporting products. The support for Maya functions and features is ever-growing and improving.

You should therefore check for the latest version of the FBX plug-in from the Autodesk website (www.autodesk.com/fbx) or by clicking the Check for web updates button in the FBX Importer or Exporter windows. The Maya FBX Plug-in is available for free download.

FBX plug-in documentation

For more information on the version of FBX installed with Maya, select Help > Autodesk FBX Help from Maya's main menu.

Importing into or exporting from Maya to FBX

In the Autodesk FBX Help, refer to sections Exporting from Maya to an FBX file and Importing FBX files into Maya for instructions on how to import or export .fbx files into or from Maya.

Limitations of FBX

When importing files into and exporting files from Maya, limitations may apply. Visit the Autodesk FBX Help for the most updated list of limitations, as well as the list of new functionalities that are supported in the latest version.

FBX Mel Scripting Commands

The following is a list of FBX Mel commands. For more detail on what these commands do, see the Maya FBX plug-in documentation.

FBXExport -f

FBXExportAnimationOnly -v

FBXExportApplyConstantKeyReducer -v

FBXExportAxisConversionMethod

Add FBX_Root node

FBXExportBakeComplexAnimation -v

FBXExportBakeComplexEnd -v

FBXExportBakeComplexStart -v

FBXExportBakeComplexStep -v
FBXExportCacheFile -v
FBXExportCameras -v
FBXExportCharacter -v
FBXExportColladaFrameRate
FBXExportColladaSingleMatrix
FBXExportColladaTriangulate
FBXExportConstraints -v
FBXExportConvert2Tif -v
FBXExportDxfTriangulate
FBXExportDxfDeformation
FBXExportEdgeSmoothing -v
FBXExportEmbeddedTextures -v
FBXExportFileVersion
FBXExportHardEdges -v
FBXExportInAscii -v
FBXExportLights -v
FBXExportQuaternion -v
FBXExportQuickSelectSetAsCache -q
FBXExportQuickSelectSetAsCache -v
FBXExportScaleFactor
FBXExportShapes -v
FBXExportSkins -v
FBXExportUpAxis
FBXImport -f [filename] -t
FBXImportAxisConversionEnable -v
FBXImportCacheFile -v
FBXImportCameras -v
FBXImportCharacter -v

FBXImportConstraints -v
FBXImportConvertDeformingNullsToJoint -v
FBXImportDxfWeldVertice
FBXImportDxfReferenceNode
FBXImportDxfObjectDerivation
FBXImportEdgeSmoothing -v
FBXImportFillTimeline
FBXImportHardEdges -v
FBXImportLights -v
FBXImportMergeBackNullPivots -v
FBXImportMergeAnimationLayers -v
FBXImportMode -v
FBXImportOverrideNormalsLock -v
FBXImportProtectDrivenKeys -v
FBXImportQuaternion -v
FBXImportResamplingRateSource -v
FBXImportScaleFactorEnable
FBXImportScaleFactor
FBXImportSetMayaFrameRate -v
FBXImportSetLockedAttribute -v
FBXImportShapes -v
FBXImportSkins -v
FBXImportUpAxis
FBXConvertUnitString
FBXGetTakeComment
FBXGetTakeCount
FBXGetTakeIndex
FBXGetTakeLocalTimeSpan
FBXGetTakeName

FBXGetTakeReferenceTimeSpan

FBXLoadExportPresetFile -f

FBXLoadImportPresetFile -f

FBXRead -f

FBXResetImport

FBXResetExport

FBXResamplingRate -v

IGES Translator plug-in

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IGES Translator plug-in

Overview of IGES Translator plug-in

The IGES file translator plug-in extends Maya to help address the needs of those customers familiar with files in the IGES format. This data translator is capable of both reading existing IGES files into Maya and exporting files from Maya to the IGES format.

Install IGES translator

This translator is installed with Maya.

Import/Export IGES files

To load the IGES file translator

- 1 Open Maya and select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the loaded button for the IGES file translator.

To import a IGES file

- Select File > Import and select the IGES file you want to open from the file browser selection.

To export an IGES file

- Select File > Export All (or File > Export Selection), and select IGESExport from File type drop-down list.

IGES import options

To access these options, the IGES translator plug-in must be loaded, and you must change the File Type drop-down box to IGES.

Default Trim Curves Select Parameter Space trimming (curves defined in the parameter space of the surface) or World Space trimming (curves defined in world space of the model). The default is to use parameter space trimming.

IGES Trim Flag. In IGES a trimmed surface can specify its preferred trimming method, either world space or parameter space. Choosing this option tells Maya to use whatever method is preferred in the file.

Scale Factor Scales all imported geometry by a common factor. This allows very large scenes to be viewed more easily.

NOTE IGES files often contain geometry that is very large. In order to view this geometry properly, the Scale Factor can be used to scale it down. Otherwise, in the viewing window, select View > Frame All to frame your selection, and if the geometry does not appear, it is beyond the camera's rear clipping plane. Select View > Camera Attribute Editor and set the "Far Clip Plane" to a value sufficiently large such that the geometry is visible.

Level Mapping Controls whether layers from a IGES file are imported. The default is to always import layers.

IGES export options

To access these options, the IGES translator plug-in must be loaded, and you must change the File Type drop-down box to IGES.

Scale Factor Determines the factor by which the resulting geometry in the IGES file is scaled upon export (default: 1.0000).

Known Issues

- If there is IGES created geometry in the scene then the plugin cannot be unloaded. Delete all data and unload plugin.
- The 500 Series (BREP) entities are unsupported.

IGES entity support

IGES entities supported in Maya

Type	Form	IGES Entity
------	------	-------------

100	0	circular arc
102	0	composite curve
104	0-3	conic arc
106	1	copious data
106	2	copious data
106	11	copious data
106	12	copious data
106	63	closed area
108*	0*	plane
108	1	plane
110	0	line
112	0	parametric curve
114	0	parametric surface
118	0-1	ruled surface
120	0	surface of revolution
122	0	tabulated cylinder
124	0	transformation matrix
126	0-5	rational b-spline curve
128	0-9	rational b-spline surface
130	0	offset curve
140	0	offset surface
141	0	boundary entity

142	0	curve on surface
143	0	bounded surface
144	0	trimmed surface
308	0	subfigure definition
402	7,9	associativity instance
406	1	property - definition levels
408	0	singular subfigure instance
406	15	name

StudioImport Plug-in and Translator

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StudioImport

StudioImport is a translator for Alias® Studio® wire files (previously known as Alias wire files).

NOTE Alias® StudioTools® v10 and later (Autodesk AliasStudio) uses a different file format for its wire files. This file format should cause no change in your everyday use of StudioTools because the file provides all of the same capabilities as the old wire file. This new file format is compatible with new releases of StudioTools, so you won't need a translator to use Version 10 files in future releases.

To load the StudioImport file Translator

- 1 Start Maya and select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the loaded check box for the StudioImport plug-in.

To open a Studio wire file

- Select File > Open Scene and select the Studio wire file you want to open from the file browser selection.

StudioImport conversion issues

The following are known issues for StudioImport conversion.

- Studio SID data is not supported in the StudioImport plug-in.

- Any paint data is not translated into Maya. SID shapes translate as Maya surfaces.
- Poly sets lose texture coordinates on translation to Maya.
- Area and Linear lights are not transferred correctly.
- DOF camera settings are different in Maya after translation.
- When Maya renders (or raytraces) light fog on a light with a colored texture channel, the fog receives that texture, whereas in Studio it does not. Importing Studio files with lights that have colored texture channels can cause confusing results because the default sampling rate is 1. Try using 20 to 30 samples.
- Ortho Cameras are not fully supported in StudioImport. Change Include cameras to false for import, or adjust the translation of ortho cameras manually after import.
- No refraction jitter in Maya renders after import from StudioImport.
- Only the simplest forms of Environment fog are translated correctly.
- Working with shells from Studio can cause problems with light linking and rendering. Unstitch in Studio before importing wire file into Maya.

MayaToAlias export plug-in

MayaToAlias is a Maya plug-in for Windows® 32-bit that uses OpenMaya API to get the scene information from Maya, and then exports it using OpenModel to one of the following, depending on which export file format is chosen:

- a wire file (version 9.7.3)
- IGES file

MayaToAlias exports the following from Maya to wire files:

- transform nodes
- hierarchy
- instanced objects
- NURBS curves
- NURBS surfaces
- trimmed surfaces
- meshes
- cameras

MayaToAlias exports the following from Maya to IGES format:

- transform nodes
- instanced objects (become copied objects in IGES)

- NURBS curves
- NURBS surfaces
- trimmed surfaces
- meshes

To load the MayaToAlias plug-in

- 1 Open Maya and select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the loaded check box for the MayaToAlias plug-in.
Now you can export Maya content to wire or IGES format through the usual export mechanism.

To export a Maya file to FBX or IGES

- 1 Select File > Export All or File > Export Selection.
- 2 Select a file name and file type, and then click Export All or Export Selection.
FBX and IGESexport are options in the File Type pull-down menu.

Troubleshooting

- If you get an error message when using MayatoAlias of the form “Creating surface fails - node [nodename], it is because Studio Tools and Maya have different requirements for a valid NURBS surface. Valid NURBS surfaces in Maya may not be valid in Studio Tools, hence they are not created. Usually the problem can be fixed by changing Open to Periodic in either U or V direction (this can be done by using the Edit NURBS > Open/Close Surfaces tool. Ensure that the Surface direction is set correctly by opening the option box).
- If you want to export a Maya mesh to a wire file and this mesh contains a face which has hole(s) in it, you need to triangulate this face first.

Wavefront (OBJ) export plug-in

The objExport plug-in lets you export Maya polygon data to the Wavefront OBJ ASCII file format. It successfully converts:

- Maya texture coordinate and vertex normal information.

- Maya renderable set information into material names.
- Maya component set information into groups.

For details on exporting to OBJ format, see *Basic Tools*.

NOTE **objExport** does not export OBJ formatted curves, surfaces, smoothing groups, or point group materials. It also does not support NURBS. Use the **MayaToAlias** plug-in for scenes that contain NURBS surfaces.

NOTE Autodesk provides the source code for the **objExport** plug-in as part of the Maya Developer's Toolkit. Ensure that you have installed the Toolkit, and you can find the source code in `.../files/devkit/plug-ins/objExport.cpp`.

To load the **objExport** plug-in

- 1 Open Maya and select **Window > Settings/Preferences > Plug-in Manager**.
- 2 Click the loaded check box for the **objExport** plug-in.

To export a file in **OBJ** format

- 1 Select **File > Export All** or **File > Export Selection**.
- 2 Select **OBJexport** as the file type and then click **Export**.

RenderMan (RIB) export plug-in

The **ribExport** plug-in adds the new file format **RIBexport** to the **File > Export All** options menu. This lets you export scenes created in Maya to the **RIB** (Pixar® **RenderMan**®) format.

NOTE This plug-in only supports the **Export All** file access mode. **RIB** file import is not supported.

NOTE This plug-in is supported on 32-bit Windows and 64-bit Linux only.

The **ribExport** plug-in supports ambient, directional, point, and spot lights. Simple non-textured shaders are supported, although only the shader color is exported. All other shading attributes are ignored. Phong and Blinn shaders are exported as “plastic”; Lambert shaders are exported as “matte.” Per-face shading groups are not supported; only shading groups that are assigned to objects or object instances are exported.

When exporting Maya scenes into RIB, note that the # character is a special formatting character in RenderMan image names. To include a real # character in a RenderMan image name, you must use “##”. (See section 4.1.10 of the RenderMan user manual for information on formatting.)

The image name constructed by the ribExport plug-in includes the contents of the “imageName” attribute of the renderable cameras. If you want to include the special RenderMan formatting characters in an image, the imageName attribute is the place those characters should be placed.

NOTE Autodesk provides source code for the ribExport plug-in as part of the Maya Developer’s Toolkit. If you install the Toolkit, you can find the source code in .../files/devkit/plug-ins/ribExport.cpp.

To load the ribExport plug-in

- 1 Open Maya and select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the loaded check box for the ribExport plug-in.

To export a file in RIB format

- 1 Select File > Export All.
- 2 In the Files of type field, select RIBexport as the file type and then click Export All.

RIBexport Options

Single File Output If Yes, all frames is written to a single .rib file. If No, all frames are written to separate .rib files.

Extension Padding If the Single File Output option is off, this option specifies whether the RIB file extensions is padded with 0’s.

Geometry Motion Blur Specifies if geometry motion blur information is written to the RIB file.

Pixel Samples Specifies the number of samples taken for each pixel. This value is used for both the X and Y directions.

Maya OpenFlight Importer/Exporter

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Overview of OpenFlight

The OpenFlight® file translator plug-in provides extended functionality to Maya to help address the needs of the Visual Simulation customer. This is done by providing a data translator to read the currently existing OpenFlight databases into Maya. Accompanying the OpenFlight database importer is an OpenFlight Exporter. Functionality that was found to be missing from Maya was added in the form of new node types that can be created and edited from within the Maya modeling environment.

OpenFlight is installed with Maya.

Import/export OpenFlight files

To load the OpenFlight file Translator

- 1 Open Maya and select Window > Settings/Preferences > Plug-in Manager.
- 2 Click the loaded check box for the Open/Flight plug-in, **fltTranslator**.

OpenFlight is a 3D file format. The file importer/exporter is an OpenMaya plug-in. Any of the Beads that can be imported into Maya can also be exported (see [Supported OpenFlight Beads](#) on page 32).

The exported file contains a subset of the imported data. External file or texture references point to the referenced files in their current directories. Should it be necessary to move an exported file to a location that does not allow access to

the original file references, these referenced files can be copied into the same directory as the target OpenFlight file and the references read correctly.

To open an OpenFlight file

- Select File > Open Scene and select the OpenFlight file you want to open from the file browser selection.

To export an OpenFlight file

- Select File > Export All (or File > Export Selection), and select OpenFlight from File type drop-down list.

Version compatibility

You can read (import) versions from 14.2 up to 15.7, but only export 15.7 files.

User Interface

OpenFlight Menu

An OpenFlight menu is added to the main window when the OpenFlight plug-in is installed. The menu contains the following menu items:

- [OpenFlight > Create Light Points](#) on page 20
- [OpenFlight > Create Lights on Curve](#) on page 21
- [OpenFlight > Edit Light Point Colors](#) on page 21
- [OpenFlight > Edit Light Point Normals](#) on page 22

OpenFlight > Create Light Points

Invokes the `fltLightPoints` command to create a new set of light points in the scene.

OpenFlight > Create Light Points >

Number of Light Points Sets the number of light points.

Distance Between Light Points Set the distance between light points.

Light type Select one of Omnidirectional, Unidirectional, or Bidirectional.

Light Normal Only active when the light type is unidirectional or bidirectional. Set the light normal.

Light Color Set the light color.

NOTE The light colors only appear in shaded mode. Turn on Smooth Shading to see the colors.

OpenFlight > Create Lights on Curve

Invokes the fltLightsOnCurve script to create light points along a selected curve.

OpenFlight > Create Lights on Curve >

Number of Light Points Sets the number of light points.

Light type Select one of Omnidirectional, Unidirectional, or Bidirectional.

Light Color Set the light color.

NOTE The light colors only appear in shaded mode. Turn on Smooth Shading to see the colors.

OpenFlight > Edit Light Point Colors

Used to change the color of selected light points.

To change the color of selected light points

- 1 Select the light points to modify.
- 2 From the OpenFlight menu, select Edit Light Point Colors.
The Light Point Color Editor appears.
- 3 Select the color to apply to these light points in the color slider.
- 4 Press the Apply (or Apply and Close) buttons to apply the color to the selected light points.

This dialog box works with light points selected in object mode and with light points selected in component mode.

OpenFlight > Edit Light Point Normals

Allows you to change the normal of any selected light points.

To change the normal of any selected light points

- 1 Select the light points to modify.
- 2 From the OpenFlight menu, select Edit Light Point Normals.
The Light Point Normal Editor appears.
- 3 Enter the value of the new normal to apply to these light points.
- 4 Press the Apply (or Apply and Close) to apply set the normal of the selected light points.

This dialog box works with light points selected in object mode and with light points selected in component mode.

OpenFlight workflow considerations

The following are workflow issues you should consider when working with OpenFlight files in Maya.

When importing files

OpenFlight models are built with a Z-up axis up orientation. When a model is read into Maya using File > Open Scene, the default orientation in Maya is repositioned so that Z is the up vector (normally Maya's Y axis is oriented as the up vector).

When files are read into Maya using File > Import, the orientation is not affected by the import. You must correctly orient the imported data yourself.

When exporting files

Here are some of the limitations to consider when exporting an OpenFlight file from Maya:

- Models are always exported in color RGB mode.
- The units are always meters.
- No animation can be exported.
- No cameras can be exported.

- The exporter only supports a single texture map per face. Layered textures results in only the first texture being exported.
- 2D and 3D procedural textures are not exported.
- Many Maya rendering parameters have no direct equivalent in OpenFlight.
- Degree of Freedom Beads are only created when Limits are set on a Maya group/transformation node.
- No transformations on externally referenced nodes are saved out to OpenFlight format. To transform a referenced file from within the current scene, the DAG root objects in the referenced file should be grouped, and any transformations should be applied to the group node.

Shading Models

Flat Shading

OpenFlight objects have a flat shading flag, which specifies whether the object is to be drawn with flat shading or Gouraud (smooth) shading. This flag is now connected with the "Smooth Shading" attribute of polygons in Maya (as found in the Render Stats tab of the Attribute Editor for the shape).

While OpenFlight supports the flat shading flag at the object level as well as at the face level, Maya only supports the flag at the object level. Thus, the flat shading flag of any object imported into Maya must be set identically for the object and all its faces.

Illumination

The illumination flag of OpenFlight objects specifies whether the object is to be illuminated by nearby lights or whether it is exclusively self-illuminating.

When importing a self-illuminating object, the following attributes of the corresponding Maya object are turned off: "Casts Shadows", "Receive Shadows", "Visible in Reflections" and "Visible in Refractions". When the imported object is not self-illuminating, all these attributes are turned on.

When exporting a Maya object to OpenFlight, the self-illumination flag is set if and only if the "Receive Shadows" attribute of the Maya object is turned off.

When using Switch Nodes

Support has been added to Maya for OpenFlight Switch nodes. Switch nodes allow for an array of visibility masks to be applied to a group transform node.

Each child node's visibility is represented by one bit in the visibility mask. (Current implementation only supports up to 32 children.)

The switch node is implemented as a helper node that is applied to a group transform node and can be viewed and selected through the Hypergraph. The currently selected mask can be modified through the Attribute Editor associated with the switch node.

Switch Nodes are created automatically when an OpenFlight database with Switch Nodes is read into Maya. They may also be created using the `fltSwitch` command from within the Maya modeling environment.

Switch node attributes

Name Long (Short)	Type	Default	Flags
outputVis (out)	Tint32	0	R
curMask (in)	Tint32	0	RWSK
maskWidth (mkw)	Tint32	0	RWS
numMasks (nmk)	Tint32	0	RWS
masks (mks)	Tint32	0	ARWS

fltSwitch Command

Synopsis `FltSwitch [flags]`

Return Value `[string[]]` (object name or node name on create)

Description This command is used to create, edit or query Switch Nodes from within Maya.

Flags `-p (c)` The parent group transform node.

`-cm (eq)` Set or query the current switch node mask.

`-n (ceq)` The name of the node to be operated on.

`-am (e)` Append a mask based on the current object selection.

`-em (e)` Edit the currently active mask based on the current object selection.

`-dm (e)` Delete the current mask.

Example

```
// Create a Switch node
fltSwitch -n sw1;
// After some geometry has been added under sw1, masks maybe cre
ated by selecting the geometry to be visible under the switch for
the mask and and then using the fltSwitch command as follows.
fltSwitch -e -am -n sw1;
// Setting the current mask to the desired switch will enable that
mask.
fltSwitch -e -cm 0 -n sw1;
```

When using Light Points

Support has been added to Maya for OpenFlight Light Points. Light Points allow for an array of lights to be created that have no render properties.

They can be imported & exported into OpenFlight files, with the following restrictions

Import

- Modeling lights are not supported
- OpenFlight Infinite lights are imported into Maya as directional lights
- OpenFlight Local lights are imported into Maya as ambient lights
- OpenFlight Spot lights are imported into Maya as spot lights

Export

- Directional lights are exported as infinite lights
- Ambient lights are exported as local lights
- Spot lights are exported as spot lights
- Light types not supported by OpenFlight (area lights, point lights) are exported as infinite lights
- Modeling lights are not supported

NOTE

- One light palette is created for each light source
 - The orientation of the light palette is always Yaw = 0, Pitch = 0
-

Light Points are implemented as a shape in Maya. They are created automatically when an OpenFlight database with Light Points is read into Maya. Additionally, Light Points can be created from within Maya using the OpenFlight menu commands or the MEL command, *fltLightPoints*.

Each LightPointShape can contain any number of Light Points. By selecting a LightPointShape and opening its Attribute Editor, all Light Points attributes are available. Many of these attributes have no visible effect within Maya but can still be edited, saved, and exported.

Light Point attributes

Name Long (Short)	Type	Default	Flags
LightPointsMin (lpmn)	double3	0	RWS
LightPointsMax (lpmx)	double3	0	RWS
SurfaceMaterial-Code (smc)	Tint16	0	RWS
FeatureId (fid)	Tint16	0	RWS
BackColor (bc)	Tint32	0	RWS
DisplayMode (dm)	Enum	0	RWS
Intensity (ity)	Float	0	RWS
BackIntensity (bit)	Float	0	RWS
MinimumDefocus (mndf)	Float	0	RWS
MaximumDefocus (mxdf)	Float	0	RWS
FadingMode (fm)	Tint32	0	RWS
FogPunchMode (fpm)	Tint32	0	RWS

DirectionalMode (drm)	Tint32	0	RWS
RangeMode (rm)	Tint32	0	RWS
MinimumPixelSize (mnps)	Float	0	RWS
MaximumPixelSize (mxps)	Float	0	RWS
ActualSize (aps)	Float	0	RWS
TransparentFalloffPixelSize (tfps)	Float	0	RWS
TransparentFalloffExponent (tfe)	Float	0	RWS
TransparentFalloffScalar (tfs)	Float	0	RWS
TransparentFalloffClamp (tfc)	Float	0	RWS
FogScalar (fs)	Float	0	RWS
SizeDifferenceThreshold (sdt)	Float	0	RWS
DirectionalType (drt)	Enum	0	RWS
HorizontalLobeAngle (hla)	Float	0	RWS
VerticalLobeAngle (vla)	Float	0	RWS
DirectionalFalloffExponent (dfe)	Float	0	RWS

DirectionalAmbientIntensity (dai)	Float	0	RWS
AnimationPeriod (ap)	Float	0	RWS
Animation-PhaseDelay (apd)	Float	0	RWS
AnimationEnabled-Period (aep)	Float	0	RWS
Significance (sig)	Float	0	RWS
Calligraphic (call)	Tint32	0	RWS
Flags (flgs)	Tint32	0	RWS
XanimRotateAxis (xra)	Float	0	RWS
YanimRotateAxis (yra)	Float	0	RWS
ZanimRotateAxis (zra)	Float	0	RWS
LightColors (lc)	Double3	0	ARWS
LightNormals (ln)	Double3	0	ARWS
InputLightPoints (ilp)	0x58000014	0	RW
OutputLightPoints (olp)	0x58000014	0	RS
WorldLightPoints (wlp)	0x58000014	0	ARS
CachedLightPoints (clp)	0x58000014	0	RWS

<i>DisplayNormals (dn)</i>	Boolean	false	RWSK
<i>DisplayLobe (dl)</i>	Boolean	false	RWSK

Light point functionality has been extended to display the effects of several more attributes of light point shapes:

- Light Directionality > Type
- Light Directionality > Front Intensity
- Light Directionality > Ambient Intensity
- Light Directionality > Back Intensity
- Lobe Angle > Horizontal
- Lobe Angle > Vertical
- Lobe Angle > Roll
- Display > Normals
- Display > Lobe

Both Display > Normals and Display > Lobe have no Creator equivalent. They are used to control the visibility of the normal and lobe of light points as you develop your scene inside of Maya. Note that you cannot display lobes of omni-directional lights.

Currently the back color only displays as red regardless of the actual value set. This default color does respond to the back and ambient intensities to enable more sophisticated simulation.

fltLightPoints **Command**

Synopsis *fltLightPoints* [flags]

Return Value [string[]] (object name or node name)

Description This command is used to create Light Points from within Maya.

Flags -d (c) The distance between light points.

-c (c) The number of light points to be created.

-n (c) The node name to be created.

-p (c) The parent group transform node.

- nt (c) If specified, then no parent transform is created. In this case a parent must also be specified with the `-p` flag.
- clr (ce) The RGB color value to be applied to all created light points. Each value should be in the range from 0.0 - 1.0. In edit mode if no light points are selected then the light point shape name must be specified using `-n`.
- nml (ce) The Normal to be applied to all created light points. In edit mode if no light points are selected then the light point shape name must be specified using `-n`.
- dt (ce) Type must be one of: "OMNIDIRECTIONAL", "UNIDIRECTIONAL", or "BIDIRECTIONAL". By default, light points are omnidirectional.
- dnml (ce) Enable or Disable the display of normals (true/false)

Example

```
// Create 3 light points spaced 0.5 UI units apart
fltLightPoints -c 3 -d 0.5/
/ this creates a light point string with 5 light points and visible
  normals
fltLightPoints -c 5 -dnml true;
// this makes the normals of the selected light points string in
  visible and
// changes the light type to be Unidirectional.
fltLightPoints -e -dnml false -dt UNIDIRECTIONAL;
```

fltLightsOnCurve Script

Synopsis `fltLightsOnCurve` [arguments]

Return Value None

Description This script uses an existing curve and creates a given number of Light Points using the currently selected curve as a placement guide. The Light Points are evenly spaced along the curve.

Note—The curve is used for construction purposes only and *is* modified by this script.

To use this script

- 1 Create a curve to use as a placement guide for the Light Points.
- 2 Select the curve and then execute the script.

Example

```
// Create 3 Red Light Points equally spaced along the selected  
curve  
fltLightsOnCurve 3 1.0 0.0 0.0;
```

Arguments Arg1 An integer that specifies the number of Light points to be created.

Arg2 A float that specifies the Red component of the assigned color for the Light Points (0.0 – 1.0)

Arg3 A float that specifies the Green component of the assigned color for the Light Points (0.0 – 1.0)

Arg4 A float that specifies the Blue component of the assigned color for the Light Points (0.0 – 1.0)

Degree Of Freedom (DOF) Nodes

All transform nodes in Maya can represent DOF nodes. They each have limit information available and by default work within their own co-ordinate space.

To create a DOF from a Maya transform node

- Set a limit on a group transform node from the Attribute Editor.

Level Of Detail (LOD) Nodes

Maya's LOD nodes work slightly differently from the OpenFlight LOD nodes. To simulate the behavior of OpenFlight LOD nodes, all children of an OpenFlight LOD node are grouped together under a single group transform node that is controlled by the LOD node. A null transform node can also be inserted before and/or after the controlled LOD node to satisfy Maya's switch in/switch out requirements.

NOTE Deleting these nodes cause the LOD to behave incorrectly.

Maya's LODs are also tied to a particular camera. When importing an OpenFlight file, a camera named *fltLOD* is created. To activate the LOD behavior, you must use this camera. If new LOD nodes are created from within Maya, they should likewise be associated with the LOD camera.

Supported OpenFlight Beads

The following table provides comparisons between OpenFlight and Maya.

OpenFlight Beads	Maya equivalent/comment
Control Records	
Instance Definition	Instanced geometry
Instance Reference	Instance group node
POP	Changes move up to the previous parent in the DAG
PUSH	Creates a child under the current parent
<i>Unsupported Control Records</i>	
Extension	
POP Subface	See PUSH Subface
PUSH Subface	Maya cannot support hierarchy on co-planer surfaces. Instead the next face to be created is offset by 1 mm in the direction of the normal.
Pop Attribute	Reserved for MultiGen
Push Attribute	Reserved for MultiGen
Primary Records	
Degree-of-Freedom Record	Maya transforms are used to represent DOF's. See OpenFlight workflow considerations on page 22 for more information.
EXTERNAL REFERENCE	File reference to another OpenFlight database.
FACE	Shape node for a face. Faces are part of a polymesh within Maya.

GROUP	Group transform node.
HEADER	Header record for an OpenFlight file. Sets orientation, field of view, etc. Sets the appropriate orientation and UI units.
Level-of-Detail	Level of detail group node.
Light Source	A Light.
Light Point	A special node type associated with the OpenFlight translator. See When using Light Points on page 25” for more details.
OBJECT	Transform node.
SWITCH	A special node type associated with the OpenFlight translator. See “Switch Nodes” under “Work Flow Considerations” for more details.
<i>Unsupported Primary Records</i>	
Binary Separating Plane	Allows for the modeling of databases without Z information
Curve	B-spline, Cardinal, also known as Catmull-Rom, and Bezier.
CAT	Continuously Adaptive Terrain Skin. A triangle mesh for high fidelity, real-time viewing.
Clip Region	
Extension Node	User defined node information.
MESH	Poly mesh. (This is not widely supported and may not be available in the first release)

Morph Vertex List	Works in conjunction with LOD node to morph geometry depending on the distance from the camera.
Road Segment	
Road Construction	
Road Path	
Sound	Sound emitter position
Text	
Ancillary Records	
Continuation	Not a node but simply a continuation of a vertex list. Records are limited to 64K in size.
LONG ID	A node name greater than 7 characters to be applied to the previously read node. Maya node names do not have this restriction so the name is applied directly to the node.
REPLICATE	Multiple instances of the current transform node.
TRANSFORMATION MATRIX	Transform matrix to be applied to the current transform node.
<i>Unsupported Ancillary Records</i>	
Bounding Volume	
CAT Data Header	
CAT Data Key	
CAT Data Face	
Extension Attribute	3rd party support.

Local Vertex Pool	
<hr/>	
MESH PRIMITIVE	
<hr/>	
MultiTexture	Allows support for up to 8 textures per vertex (May not be in first release).
<hr/>	
Road Zone	(Pointer to a file that contains grid elevation data)
<hr/>	
UV List	Follows Vertex List and contains texture layer information.
<hr/>	
Vector	(Only used for light point faces).
<hr/>	
Palette Records	
<hr/>	
Color Palette	A collection of color entries. Maya does not use a color palette. Each vertex holds the corresponding RGB color.
<hr/>	
LIGHT PALETTE	Lights are DAG node entries in Maya.
<hr/>	
MATERIAL PALETTE	Material become Shaders within Maya. See Texture Palette
<hr/>	
TEXTURE PALETTE	Textures are applied to shaders within Maya. Shaders have an associated shading group that all nodes using this texture are connected to.
<hr/>	
Eyepoint and Trackplane Palette	Implemented as Cameras in Maya. (See Known Issues on page 36.)
<hr/>	
Light Source Palette	
<hr/>	
VERTEX PALETTE	Vertices are part of a polymesh in Maya.
<hr/>	
VERTEX LIST	See Vertex Palette.
<hr/>	
Vertex Palette Header	Followed by vertex data.
<hr/>	
Vertex with Color	Polymesh vertex data.
<hr/>	

Vertex with Color and Normal	Polymesh vertex data.
Vertex with Color, Normal and UV	Polymesh vertex data.
Vertex with Normal and UV	Polymesh vertex data.
<i>Unsupported Palette Records</i>	
Key Table	
Linkage Palette	
Line Style Palette	Maya has only 1 line style.
Name Table	
Sound Palette	
Texture Mapping	

Known Issues

The following outlines the known issues in OpenFlight Version 1.1.

- It is not possible to change the Maya display color of a unidirectional or bi-directional light. This color always defaults to red. It is expected that future releases will have the ability to map back colors to RGB display.
- UI-based tools are missing to support Switch nodes, and LODs.
- The only export type supported is OpenFlight 15.7.
- OpenFlight geometry will only accept textures assigned to the color channel.
- Light Sources cannot be exported. Currently, a single ambient light is always exported.
- An attempt is made to map Eye Points to Cameras in Maya; however, the mapping appears incorrect in some cases. Eye points are not exported from Maya.
- Track Planes are not supported.

- The only way to freeze a DOFs co-ordinates from within Maya is to export the scene as an OpenFlight file and then read it back in.
- Articulations on group nodes are not supported.
- Maya's LODs need to be extended to better handle the flexibility of the OpenFlight LODs.
- If you perform a Freeze Transformations on a translated Light Point, Maya versions older than 4.0.3 will crash. This can be fixed by updating to Maya 4.0.3 or higher.
- File textures may only be applied to the color attribute of a Maya shader. Textures applied to other attributes are ignored.
- Normals on faces are ignored on import. Maya regenerates the normals based on the vertex ordering. However, edge settings are preserved.

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