



CryExporter 1.2 for Maya 5.0

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Introduction and Prerequisites

NOTE: The indoor building description in this document is obsolete; buildings are now created within the Sandbox editor. Read the editor manual for more information.

The main purpose of this document is to explain how to use the CryExporter plug-in for Maya. The CryExporter plug-in for Maya is used to export geometry and animation files from Maya to CryEngine.

This manual assumes you understand the following:

- Basics of 3D modeling and animation.
- Basic knowledge of Maya, CCF/CAF file usage with the CryEngine.
- What CGF and CAF files are used for, and what components they contain (generally, CGF contains the geometry with bone binding and material/shader data. CAF contains bone animation data).

This manual describes each operation in detail. If something is not clear please refer to the Maya manuals. We also strongly recommend you study the Maya Essentials book if you are not familiar with Maya.

This manual is divided into the following parts:

- **Introduction:** Contains information about manual organization and usage.
- **Installation:** Describes the necessary startup instructions for installing the plug-in and accompanying scripts.
- **CGF Export:** Explains how to model your scene and export it smoothly to a CGF file. It includes a description of how to accomplish non-trivial tasks such as assigning a sector to an object, CryEngine shader template, or a physics material to a Maya shader.
- **CAF Export:** Contains instructions for how to export CAF files.
- **User Interface:** Describes the steps to start the User Interface and how to accomplish a CGF/CAF export. Use this chapter as a Quick Start to export a few test models, but return to the previous chapters in order to accomplish more advanced tasks.
- **Examples of the User Interface :** A step-by-step tutorial for how to export sample scenes shipped with the plug-in. This chapter can be used as a Quick Start tutorial.

Often there are many ways to accomplish one task. In these cases, a few of the most common methods are described. Typically, to accomplish a task, the following facilities can be used:

- **Maya Interface:** This is the graphical interface that Maya natively uses, and is the most familiar to experienced Maya users.
- **Command Line:** In Maya, everything is scriptable, and an advanced Maya user may prefer entering one command instead of using the GUI. Some action can be scripted in MEL, which is why this method is described in this manual.
- **CryExport Shelf:** Several common commands are represented in a separate shelf that can be installed with the plug-in. Some tasks can be accomplished by using this shelf.

Installation

Manual Installation

Currently there is no automatic installation script for the plug-in, so you will have to copy all the necessary files yourself.

Copy the MayaCryExport.mll file to your `AW\Maya5.0\bin\plug-ins` directory.

Then copy the contents of `scripts` and `prefs` directories directly to the corresponding "`My Documents\maya\5.0`" directory subdirectories and copy the whole directory structure. For example, `scripts\CryExportUserInterface.mel` file goes to the "`My Documents\maya\5.0\scripts\CryExportUserInterface.mel`" location, and `prefs\shelves\shelf_CryExport.mel` file goes to "`My Documents\maya\5.0\prefs\shelves\shelf_CryExport.mel`"

Restart Maya 5.0 and a shelf named "CryExport" is created. This shelf contains buttons for loading/unloading the Cry Export plug-in for Maya and starts the User Interface similar to the user interface of the utility used in 3ds Max.

Loading

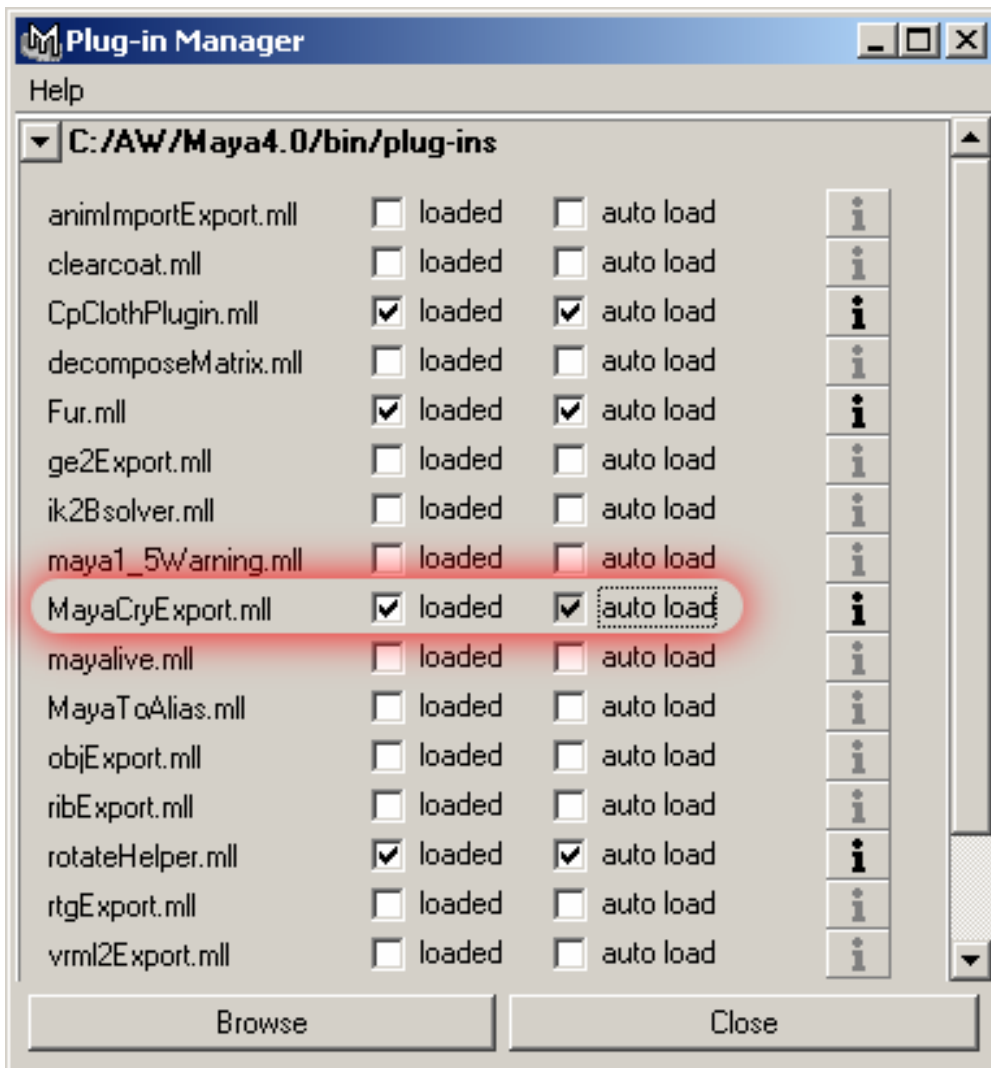


Note:

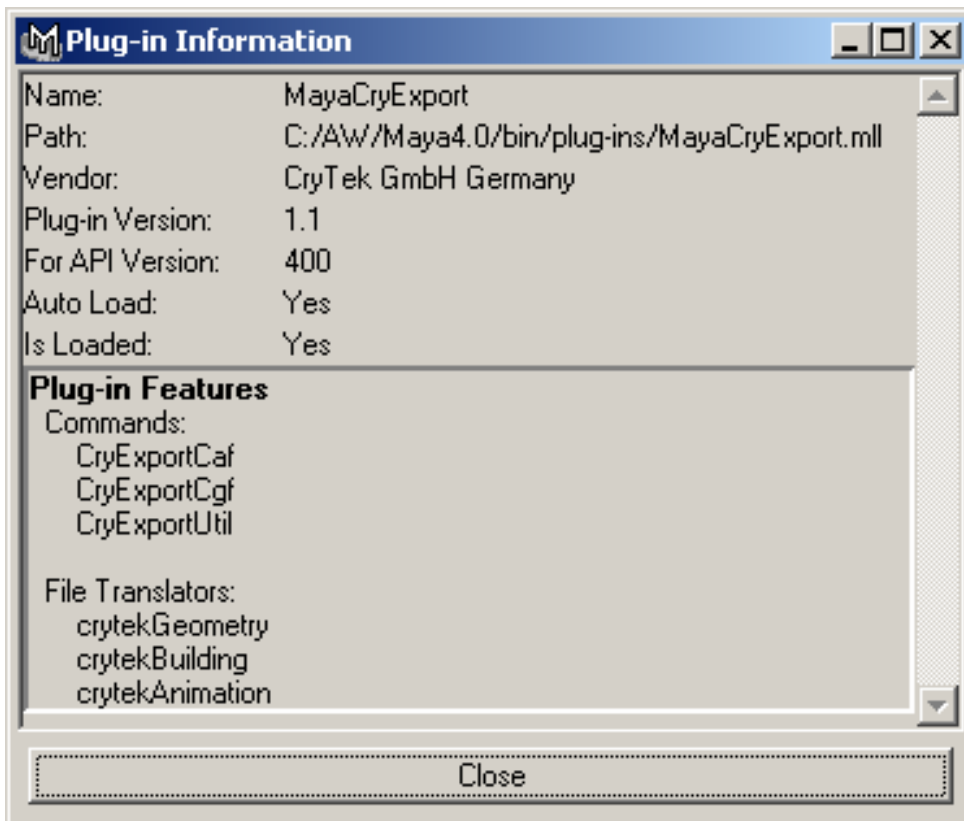
It is not necessary to load the plug-in if you use the User Interface MEL script. The User Interface script loads the plug-in automatically. To learn more about using the User Interface MEL script, you can jump directly to the [User Interface Usage](#) chapter.

Maya Interface

To load the plug-in interactively from the Plug-in Manager, use the Window->Settings/Preferences->Plug-in Manager menu item and find the `MayaCryExport.mll` entry in the list. Check the "loaded" and optionally "auto load" checkboxes.



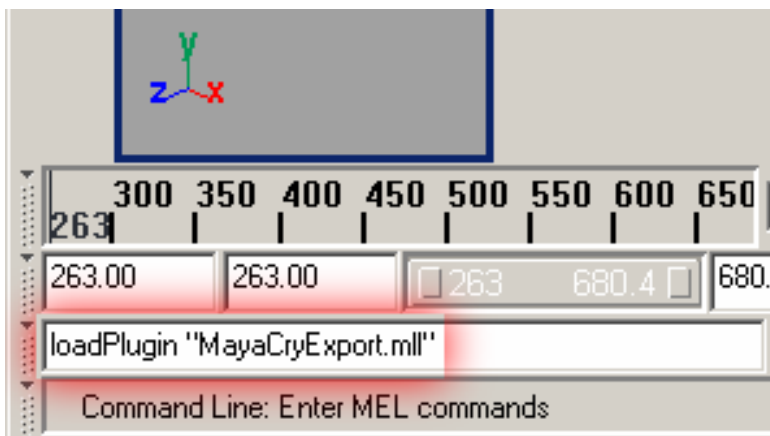
After loading the plug-in, if you press the "i" button next to the plug-in name and checkboxes, you should see a window similar to the following:



Command Line

To load the plug-in from the command line, enter the following command:

```
loadPlugin "MayaCryExport.mll"
```



CGF Export

Preparing Buildings for Export

For the export of a building, you must have the ability to assign sector numbers to different objects. A description of sector and portal technology used within the CryEngine is beyond the scope of this document. However, you will find an explanation how to assign sector numbers to different objects in this chapter. In 3ds max if you name an object like the following it will be assigned to sector N:

`$N_name`

Where `N` is the sector number, and `name` is the object name.

In order to assign an object to a sector in Maya, attach an integer extra attribute named "crySector" to its *transform* node and set its value to the sector number.



Note:

When you select an object in Maya, you actually select its *Transform* node, while the *Shape* Node represents the object itself. When you open the Attribute Editor, on the contrary, the *Shape* Node is usually highlighted.

Only smooth bound characters can be exported properly with the skin binding information. The exporter plug-in does not recognize rigid binding.

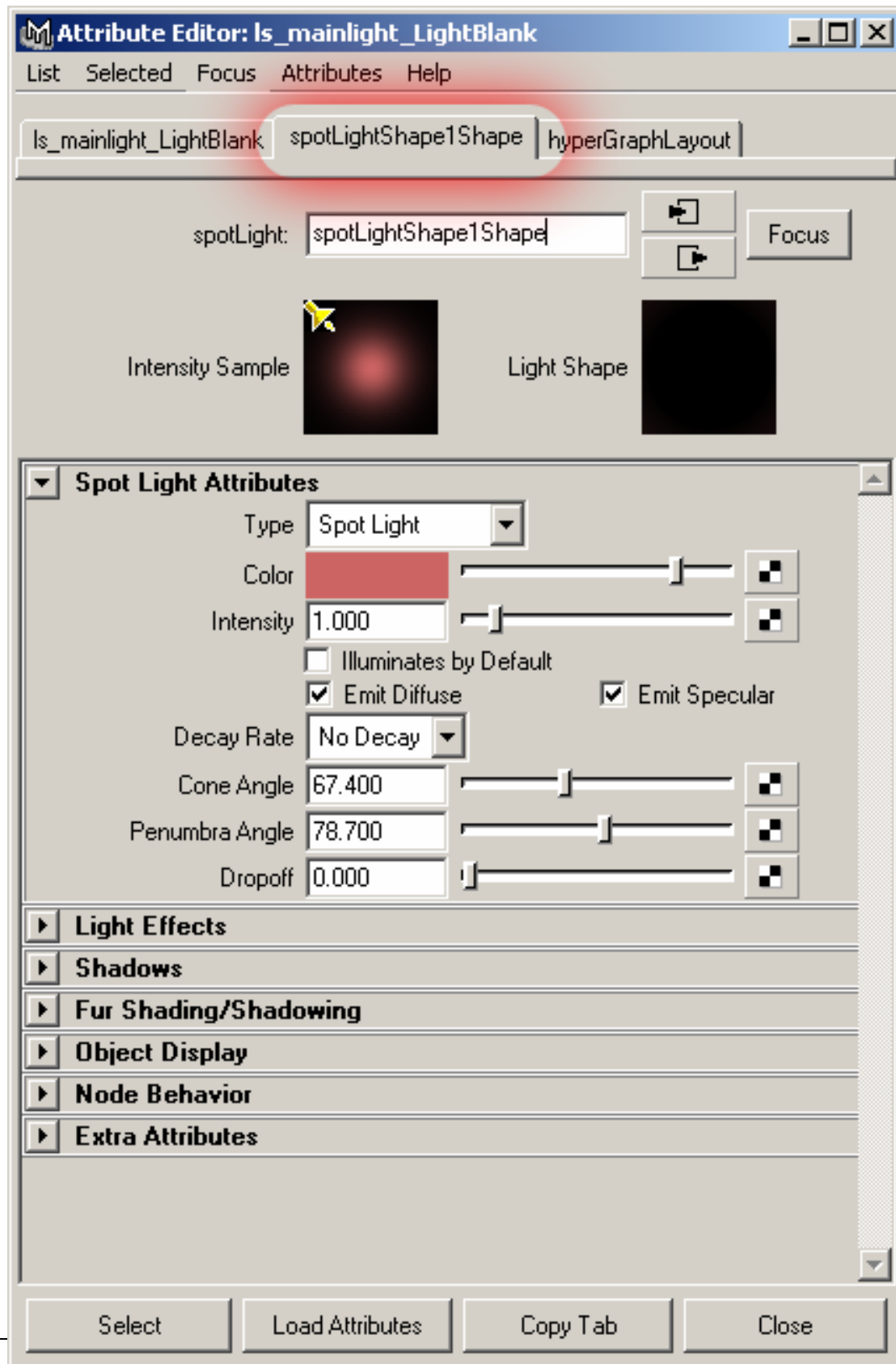
Before exporting a character, set it to the Initial (Bind) Pose.

Maya Interface

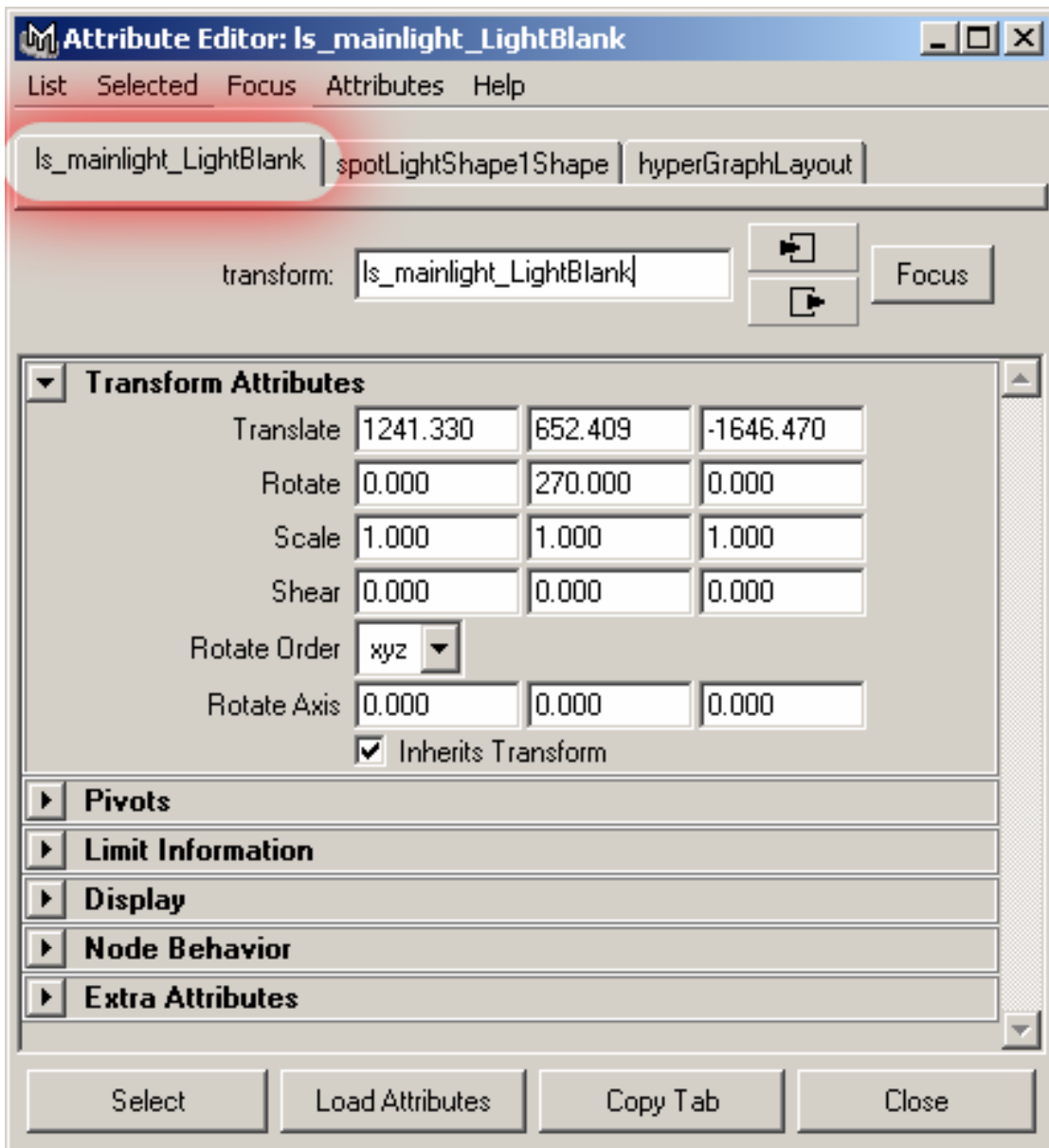
In order to assign the attribute crySector to the object's Transform Node, perform the following steps:

- Open the Attribute Editor with the transform node selected.

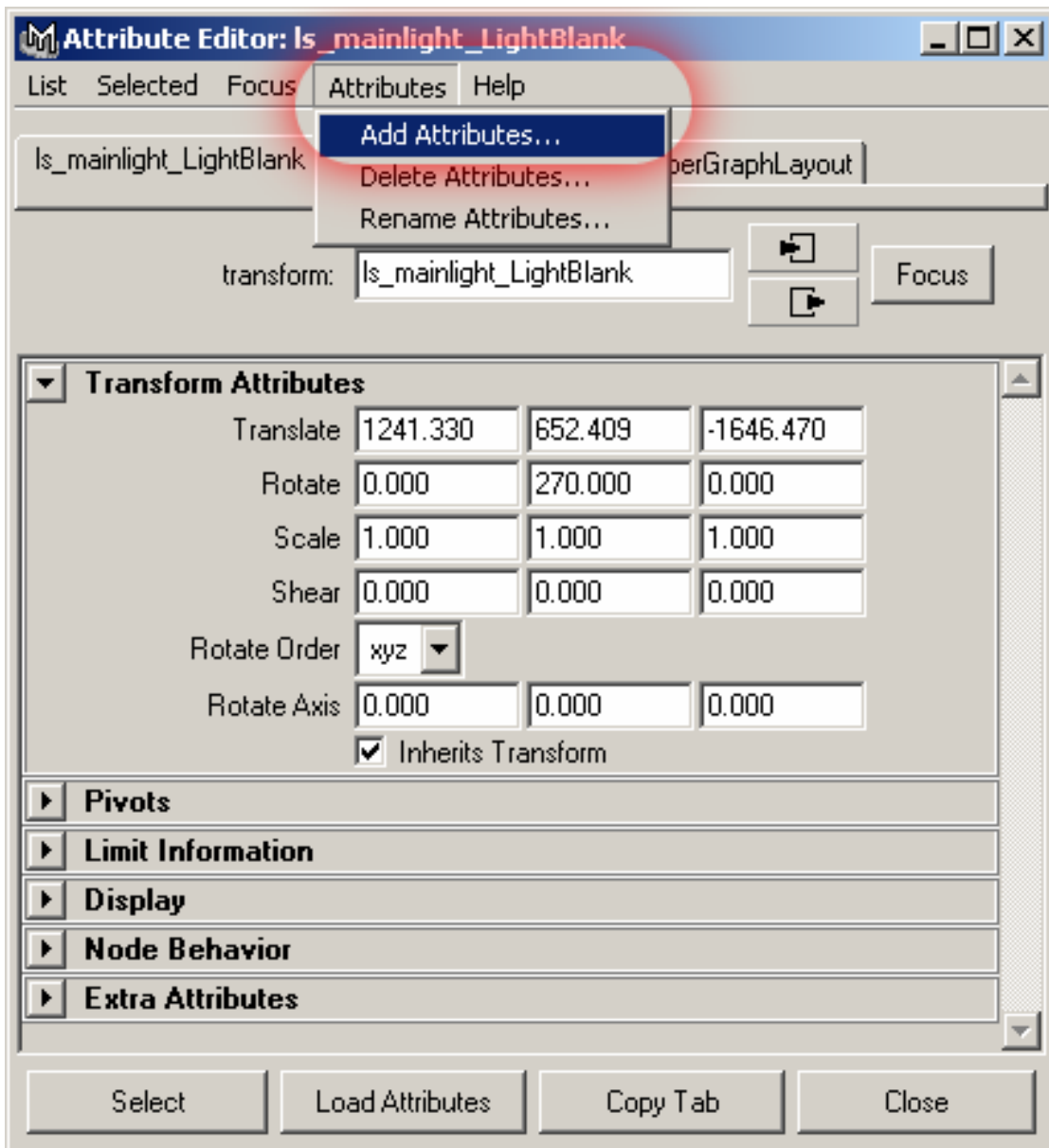
If you select an object and open the Attribute Editor, the object's shape tab is displayed first:



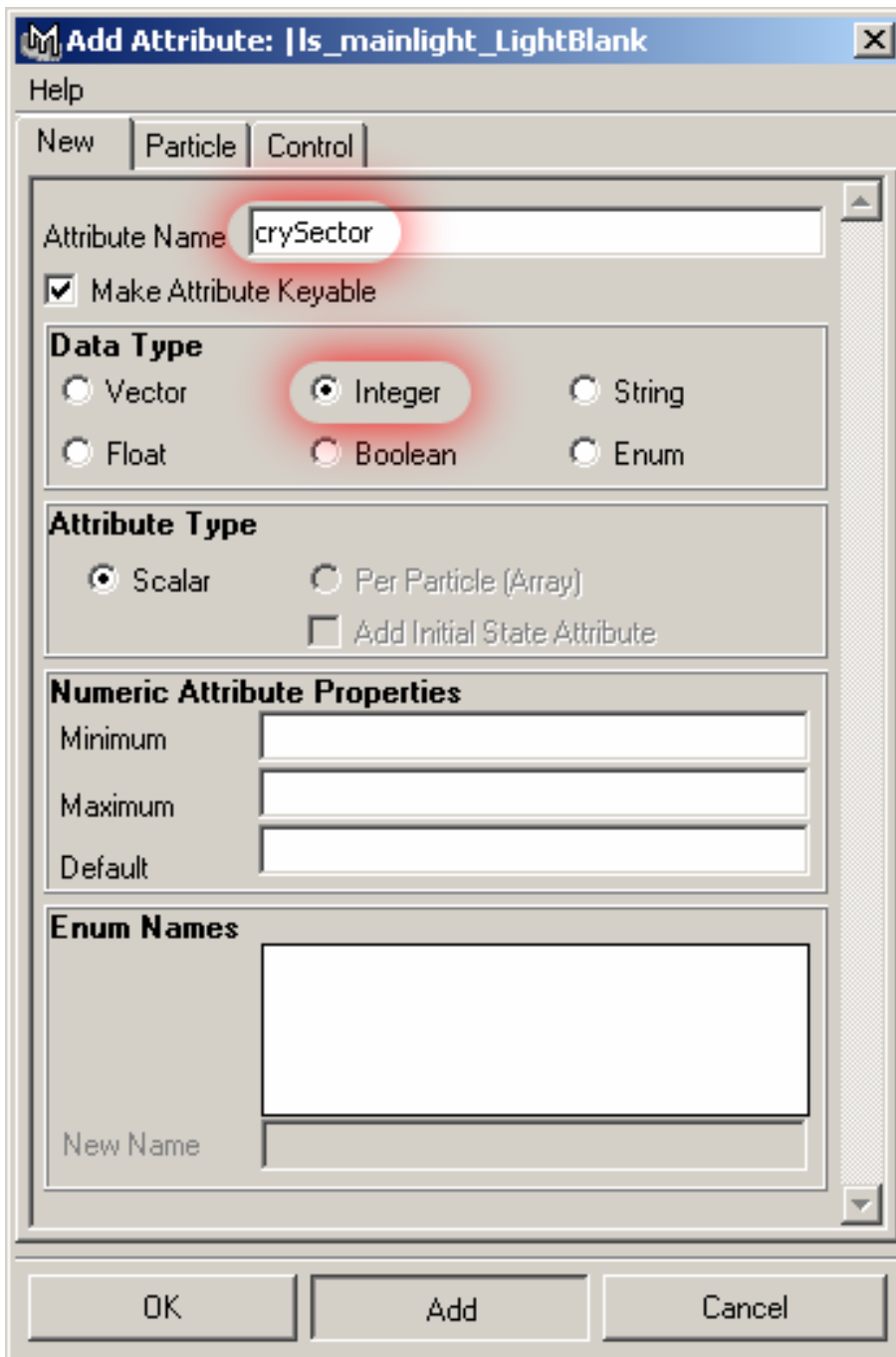
Select the transform node:



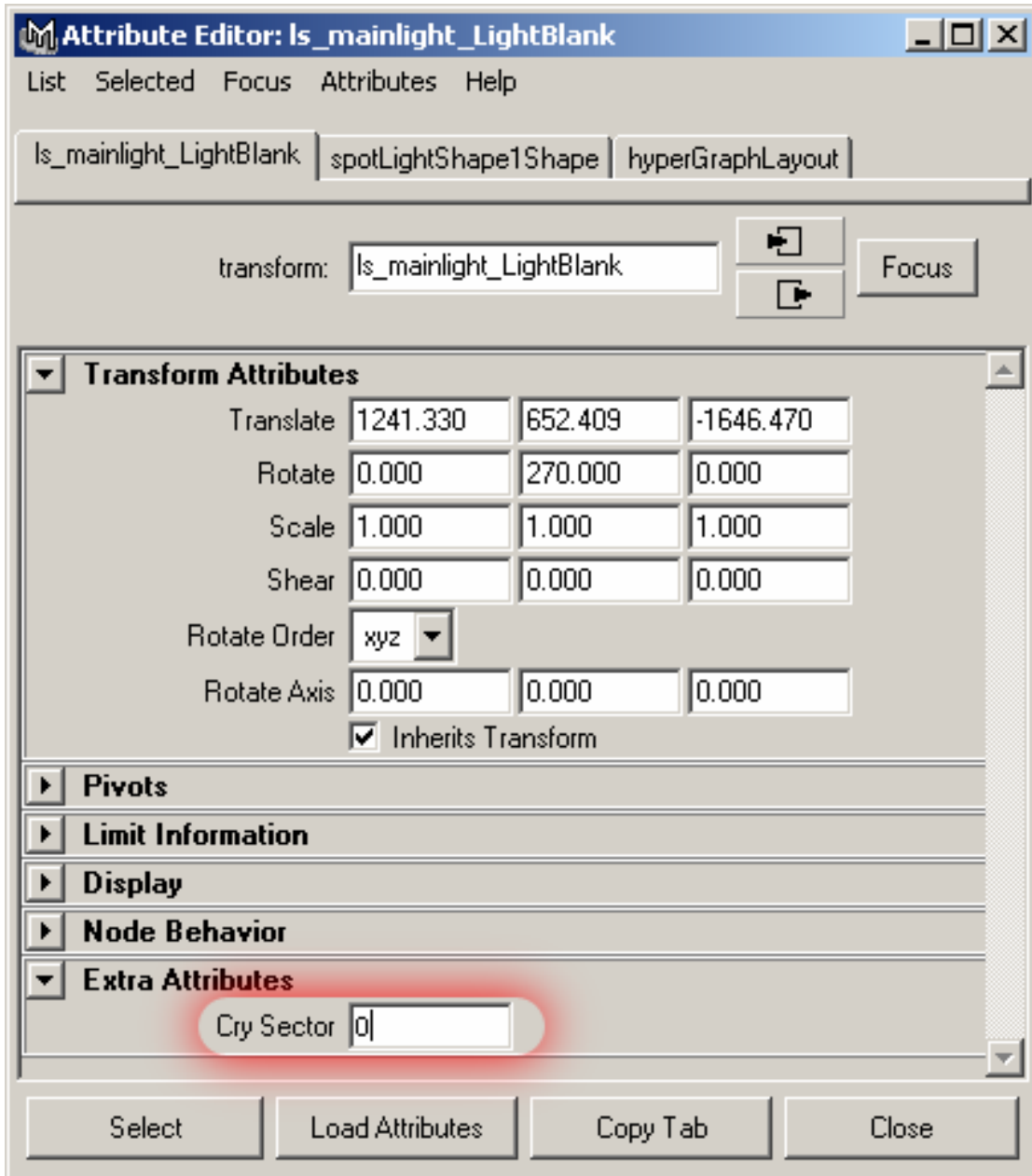
And choose the Attributes/Add Attributes menu item:



The Add Attributes window is opened. Enter the attribute name (crySector) in the Attribute Name field and click the attribute type radio button (Integer):



Then click the Add button. Now the transform node has the extra attribute crySector, and can be viewed and modified through the Attribute Editor:



You can now enter the sector number in the field "Cry Sector".

Command Line

To attach crySector attribute to a node, use the addAttr and setAttr MEL commands. For example, to attach crySector attribute to |pCube1 transform, use the following command:

```
addAttr -ln crySector -at long |pCube1;
```

To make pCube1 belong to the sector 1, use the following command:

```
setAttr "pCube1.crySector" 1;
```

Where pCube1 is the transform node of the shape, which belongs to a sector 1. According to the internal CryEngine naming conventions, this shape is exported with the node named "\$1_pCube1".

For an example, see the `ls_mainlight_LightBlank` light object with `crySector` attribute in the `borgShip.mb` sample scene.

For more information on [addAttr](#) and [setAttr](#) MEL commands, refer to the "[MEL Command Reference](#)" in Maya documentation.

Note: The link above works only if you have Maya installed on your computer and is located within the default directory `c:\aw`.

Preparing Shaders for Export

In order to achieve high rendering quality, CryEngine uses a Shader technology that is out of the scope of this document. Basically, many shaders (materials in 3ds max terminology) in the scene have a shader template associated with them. The shader template names usually begin with `Templ`. But the description of shader naming conventions is unfortunately also out of the scope of this document.

Like in 3ds max, all shader names must begin with symbols "`s_`", which means it's a shader that is exported as a shader to the CGF file (and CryEngine).

In this section, we explain how to assign different shader templates and physical materials to Maya shaders for them to be exported to the CGF file.

Maya Interface

In order to assign a template and/or physical material to a Maya shader, add two string extra attributes to the shader node: `cryTemplate` and `cryPhysicsMaterial`. The shader name must begin with `s_`, for these attributes to be parsed.

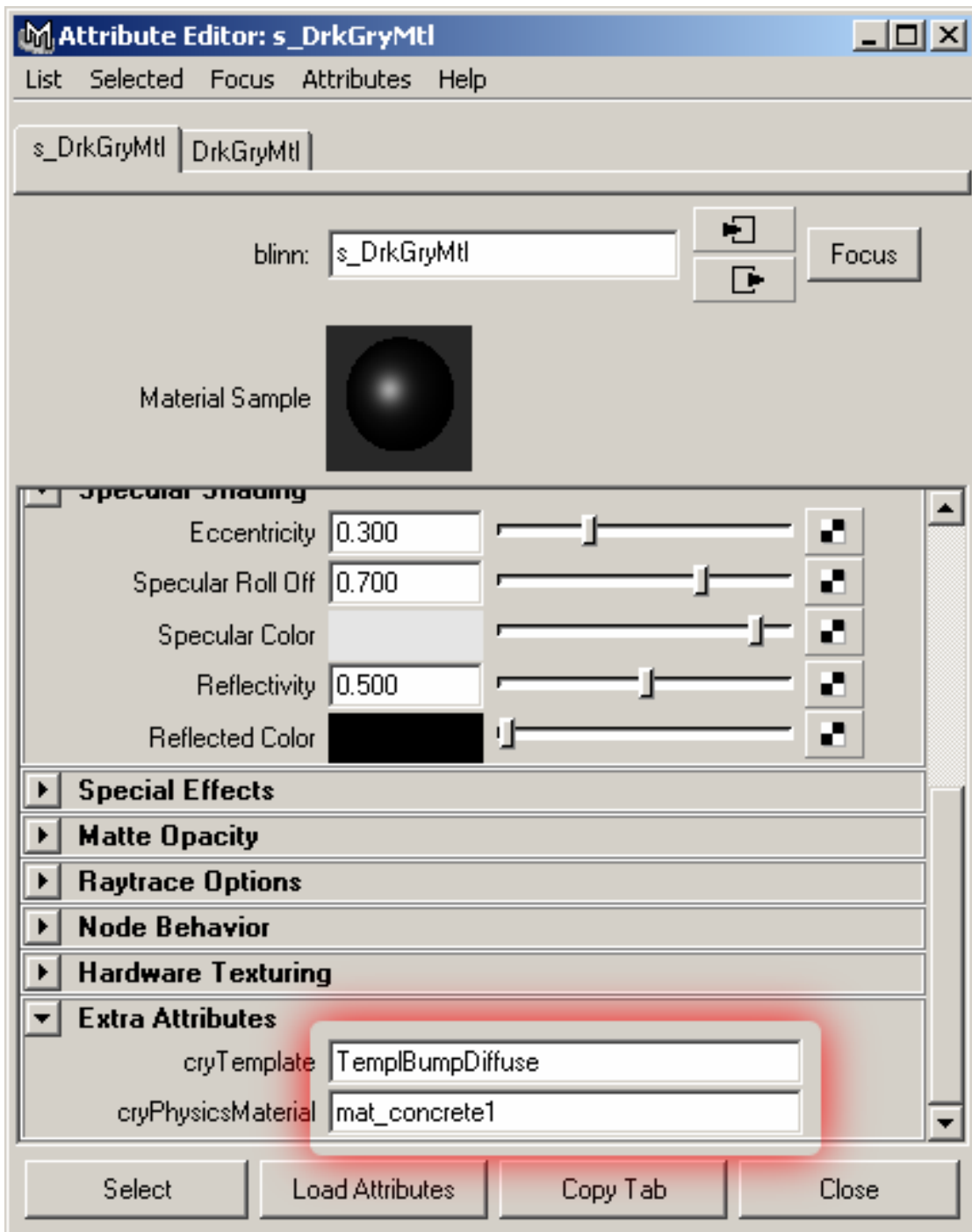
You can find the description of extra attribute adding and editing in the [Preparing Buildings for Export, Maya Interface](#) section.

In 3ds max, the material names are constructed in the special way instead of adding extra attributes:

```
S_name(Templ)/phys[SortValue]
```

Where `name` is the shader name, `Templ` is the shader template assigned, and `phys` is the physics material. `SortValue` is the new for the exporter version 1.2 attribute that is 0 by default (when there is no sort value at all). It's used to manually set sort order of materials for renderer. The surfaces with materials with the lowest sort value are rendered first, with the greatest sort value are rendered last. This may be useful for characters with transparent surfaces. Note that transparent surfaces don't cast shadows in CryEngine.

The picture below shows how the shader `s_DrkGryMtl` should look like in the Attribute Editor after adding and modifying the extra attributes `cryTemplate` and `cryPhysicsMaterial`. To set the sort value, add `crySortValue` integer attribute. It should not be negative.



For an example, see the `s_DrkGryMtl` shader in the `borgShip.mb` sample. It has `TemplBumpDiffuse` template and `mat_concrete1` physics material assigned.

Command Line

To attach `cryTemplate`, `cryPhysicsMaterial` or `crySortValue` attribute to the shader node, use the `addAttr` and `setAttr` MEL commands. For example, to attach `cryTemplate` and `cryPhysicsMaterial` attributes to `s_DrkGryMtl` shader, use the following command:

```
// This is to create the attributes, if they do not yet exist
if (!attributeExists ("cryTemplate", "s_DrkGryMtl"))
    addAttr -ln "cryTemplate" -sn "cryT" -dt "string" -storable true
"s_DrkGryMtl";

if (!attributeExists ("cryPhysicsMaterial", "s_DrkGryMtl"))
    addAttr -ln "cryPhysicsMaterial" -sn "cryP" -dt "string" -storable true
"s_DrkGryMtl";
```

To assign the template `TemplBumpDiffuse` to the shader `s_DrkGryMtl`, use the following command:

```
setAttr -type "string" s_DrkGryMtl.cryTemplate "TemplBumpDiffuse";
```

To assign the physical material `mat_concretel` to the same shader, use the following command:

```
setAttr -type "string" s_DrkGryMtl.cryPhysicsMaterial "mat_concretel";
```

This shader will be exported as a material named `"s_DrkGryMtl(TemplBumpDiffuse)/mat_concretel"`, according to the internal CryEngine naming conventions.

For an example, see the `s_DrkGryMtl` shader with both `cryTemplate` and `cryPhysicsMaterial` attributes in the `borgShip.mb` sample scene.

Command Line

In order to export a CGF file, select the geometry you wish to export (one or more geometry, camera and/or light objects) and enter the following command:

```
CryExportCgf -file "file-path.cgf"
```

For example:

```
CryExportCgf -file "c:\\MasterCD\\Objects\\Test001.cgf"
```

Note the double-backslashes that are required by MEL string syntax.

You can export either `cgf` or `bld` files the same way, just use the `".bld"` extension to specify the file name in the `-file` option. The `CryExportCgf` command has the following options:

<code>-f/file</code>	This is the path used to write to the file. This option has one string parameter. Note: the backslashes must be escaped by backslashes.
<code>-ncs/dontConvertCS</code>	If this option is included, the model will be exported keeping the original coordinates and orientation (either Y- or Z-axis up, Y-up by default). If this option is not set, the plug-in will reorient the bones and nodes in such a way that the up-vector in Maya (Y) will be translated into the up-vector in CryEngine (Z). Generally, you would use it for testing, when exporting a model imported from

	somewhere, and when Maya is set up to use Z as the up-vector.
<code>-vc/vertexColors</code>	If this option is used, the model mesh will be exported with vertex colors. Be careful to assign the vertex colors first before using this option, otherwise the exported model will look darker.
<code>-id/ignoreDummies</code>	If this option is present, no helper objects (pure transforms, locators and cameras) are exported.
<code>-nmt/dontAllowMultiUV</code>	If this option is present, then the exporter outputs an error if there is no one-to-one correspondence between texture and coordinate vertices.
<code>-imt/ignoreMaterials</code>	If this flag is set, then the materials are not exported with the mesh.
<code>-wpl/maxWeightsPerLink number</code>	This sets the maximum number of links per vertex to export. If there are more than the specified number of influence objects (bones) assigned to one vertex in Maya, then the least influencing objects are ignored. If this number is 0, then no bone binding information is exported at all. By default, all information is exported (no limit)

Before exporting geometry, please set the skeleton (if any) to the bind pose.

If you select one or more bones, the mesh that they influence will be automatically added to the list of exported shapes. Bone influences are always exported if the mesh is smooth-skin bound.

CAF export

There are only a few considerations related to animation export from Maya.

In the current version, only linear keyframes are exported. The non-linear keyframes that Maya might have are sampled with a customizable interval, optimized (running key reduction algorithm) and saved in linear keyframe form.

Only a smooth skin binding is supported. The exporter will not recognize a rigid skin. Just like in 3ds max, no modifiers will work, only the skinning.

Command Line

In order to export a CAF file, select the root of the skeleton representing the motion to be exported and enter the following command:

```
CryExportCaf -file "file-path.caf"
```

The following options are applicable to this command:

<code>-f/file</code>	This is the path used to write to the file. This option has one string parameter. Note: the backslashes must be escaped by backslashes.
<code>-mrs/manualRangeStart</code>	If you set this parameter, the animation will be exported starting at the specified frame. Otherwise, the animation start will be determined by the timeline start.

<code>-mre/manualRangeEnd</code>	If you set this parameter, the animation will be exported ending at the specified frame (inclusive). Otherwise, the animation end will be determined by the timeline end.
<code>-ncs/dontConvertCS</code>	The same as in the CryExportCgf command. Reorients bones so that the up-vector in Maya (Y) translates into the up-vector in CryEngine (Z).
<code>-as/animationStep step</code>	<p>Sets the step of sampling the animation curves. The smaller the step is, the better the curves are sampled, but the bigger the animation file, the longer it takes to optimize.</p> <p>If you set this option to a very small value, the processing (keyframe optimization) time can be very long.</p> <p>If you set this option to a large value, then the resulting animation may be too coarse.</p> <p>If the animation consists of linear keyframes, the result is virtually independent on this setting, since the extra frames are always reduced.</p> <p>The default is 1 (frame). It is not recommended to change this value, unless the animation is too long and keyframes are too sparse (in this case, increase the value), or if there are more than one keyframe per 1 frame and they are not linear (in this case, make the value a fraction of the minimal distance between keyframes).</p>
<code>-rp/rotationPrecision precision</code>	<p>If the "<code>-disableKeyOptimization</code>" is not used, this option sets the max deviation of the rotational component of the Cry Engine keyframe from the real value.</p> <p>The precision can be thought of as the number of digits after the decimal point. I.e. $10^{-\text{precision}}$ is the maximum distance between the keyframe quaternion and the original quaternion in the animation curve. The distance metric used by the plug-in is 1-dot product of the quaternions and is close to the logarithmic metric commonly used in such cases. Floating-point precision is acceptable. The default is 5.</p>
<code>-pp/positionPrecision</code>	<p>If the "<code>-disableKeyOptimization</code>" is not used, this option sets the max deviation of the positional component of the Cry Engine keyframe from the real value</p> <p>The precision can be thought of as the number of digits after the decimal point. I.e. $10^{-\text{precision}}$ is the maximum distance between the keyframe position and the original position in the animation curve. Floating-point precision is acceptable. The default is 3.5.</p>
<code>-dco/disableKeyOptimization</code>	<p>This option, if present, disables keyframe optimization.</p> <p>After having been sampled with the sampling interval set by the <code>animationStep</code> option, the animation curve is optimized. The curve is first sampled with the regular interval defined by the command line <code>-as</code> option. Then the</p>

	exporter reduces extra keyframes that may have been introduced by over sampling.

You can select the mesh that is smooth-skin and bound to the skeleton you wish to export. In this case, all the bones that influence the mesh will be exported.

Exporting the default posture

To export the `character_default.caf` for a character, set the start and end of the range manually to 0 (or whatever time where the default posture is reached by the skeleton), for example:

```
CryExportCaf -file "C:\\MasterCD\\Objects\\Test\\Merc_default.caf" -mrs 0 -mre 0
```

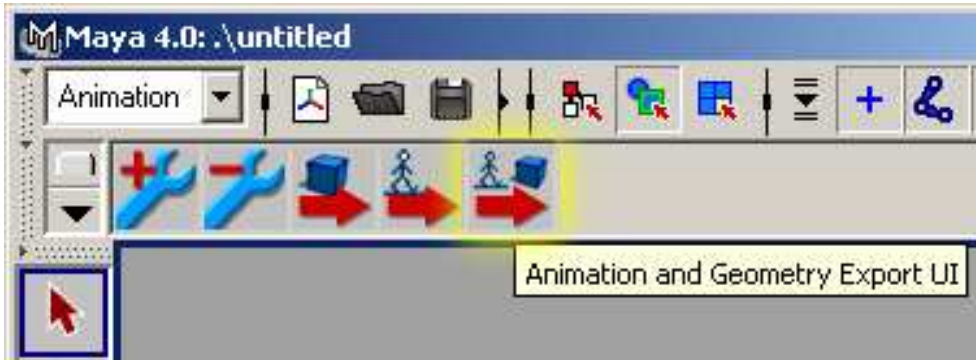
User Interface Usage

Starting the User Interface via CryExport Shelf

With MayaCryExport 1.1, you can optionally install the CryExport shelf with a few useful buttons on it.



One of the buttons (named "Animation and Geometry Export UI") starts the User Interface, which resembles the 3ds max CryExporter utility as close as possible:



Click that button (essentially, the click executes the command that is explained in the following section: [Starting User Interface via Command Line](#), which invoke the `CryExportUserInterface.mel` script), and the interface will be displayed.

Two other buttons can be used to open a Geometry-only export UI or an Animation-only export UI:



Cleaning Up the User Interface

When you close the User Interface window and then re-open it with the "Animation and Geometry Export UI" button, the window content remains the same. This is to facilitate multiple invocations of the exporter utility throughout an extended period of time.

To erase the window contents, click the "Unload CryExporter plugin" button:



The User Interface automatically closes and is reset. The plug-in unloads and memory is reclaimed. When you open the User Interface the next time, the plug-in is loaded again and a fresh copy of the User Interface window is opened.

Starting the User Interface via Command Line

MayaCryExport 1.1+ has a user interface MEL script shipped with it. It's the CryExportUserInterface.mel script.

Its main procedure is named after the script name:

```
global proc CryExportUserInterface (string $strFileType)
```

Executing this procedure, the user can create the CGF export, CAF export user interface or a combined dialog with both CAF and CGF export frames.

In order to create a user interface, call this procedure with the following argument:

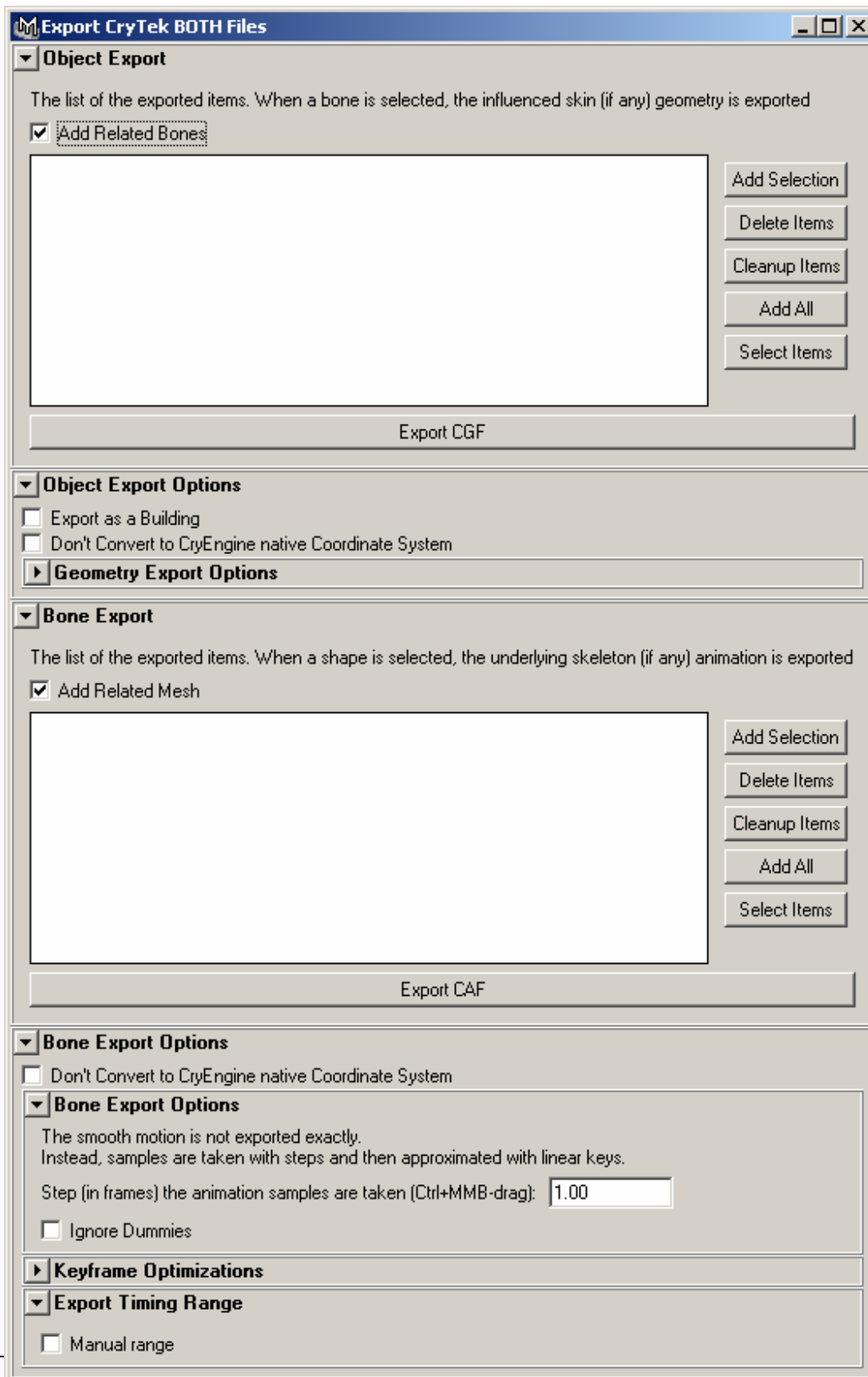
\$strFileType value	Description
"CAF"	Display the CAF export interface
"CGF"	Display the CGF export interface
"BOTH"	Display the combined interface, useful for exporting both CAF and CGF files

For example, to display the combined user interface (which most closely resembles the 3ds max CryExport plug-in), enter the following command in the Maya command line:

```
CryExportUserInterface( "BOTH" )
```

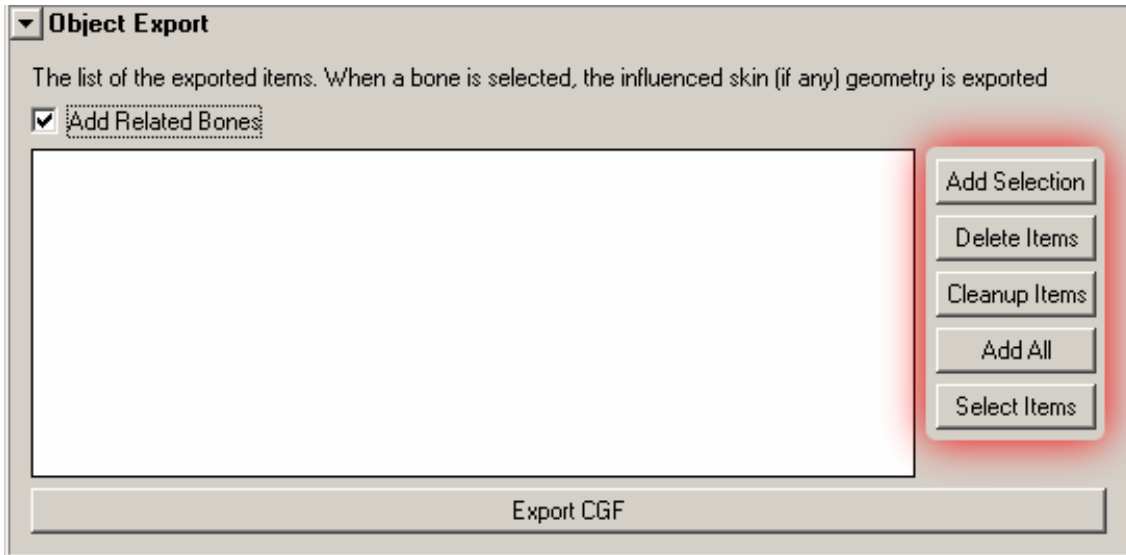
User Interface Options

CryExportUserInterface.mel script constructs the following user interface:



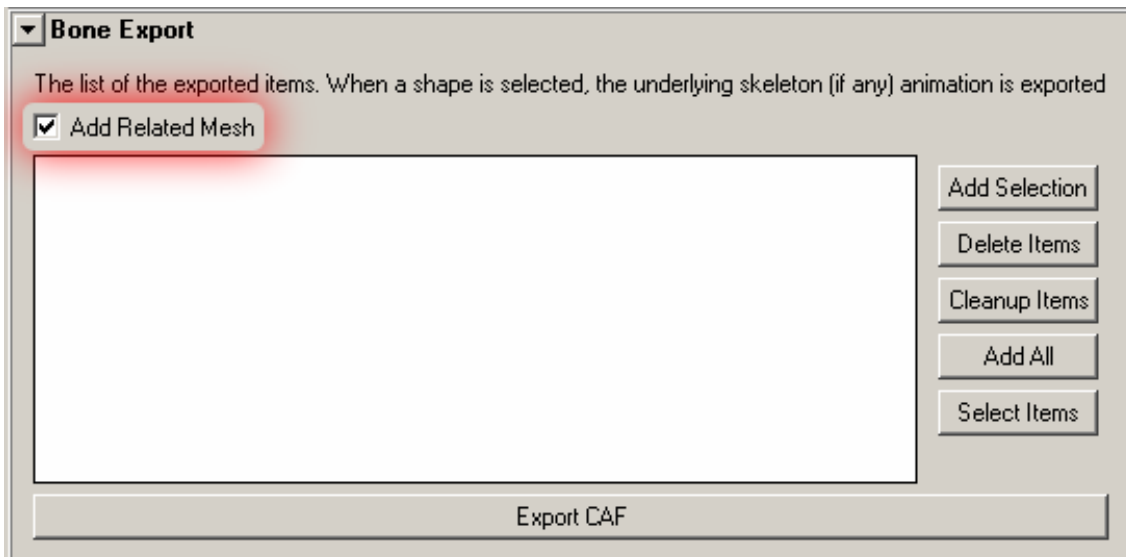
The list boxes in the Object Export and Bone Export frames are to collect the items to export to CGF and CAF files. The big buttons "Export CGF" and "Export CAF" are for exporting the cgf and caf files, correspondingly.

The buttons on the right of the list boxes are used to add and delete items from the list or select (in Maya) those items that are in the list. The buttons are self-descriptive:



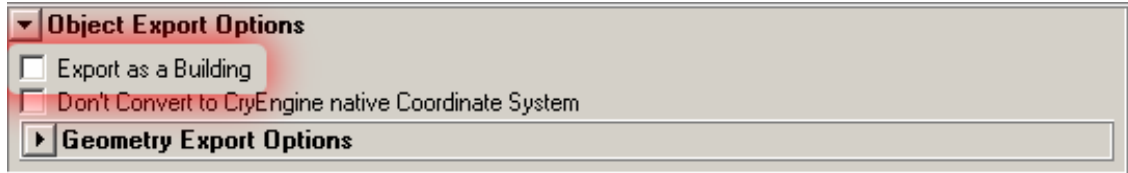
Add Related Bones/Mesh

If you check the "Add Related Bones" (and the corresponding "Add Related Mesh") checkbox above the listbox, the UI should add the corresponding items to the opposite listbox. For example, when you add a mesh to the upper listbox and this option (Add Related Bones) is checked, all the bones influencing that mesh will be added to the animation listbox. On the other hand, when you add bones to the animation listbox, and the "Add Related Mesh" option is checked, then the related (influenced by these bones) mesh will also be added to the upper (Geometry) listbox.



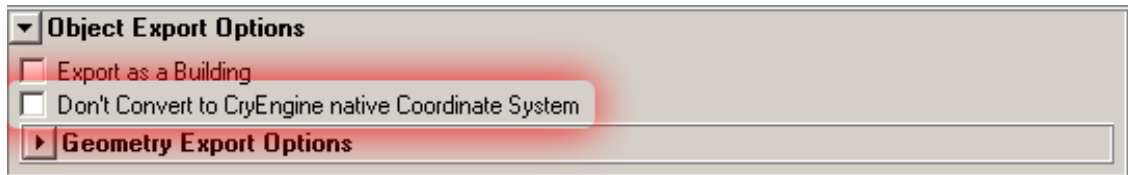
Export as Building

If you check the “Export as Building” option it changes the “Export CGF” button into the “Export BLD” button. When you click the Export BLD button, you can export a .blf file. .blf files are the same as CGF, but they carry building models rather than animated hero models. By their format, they are the same.



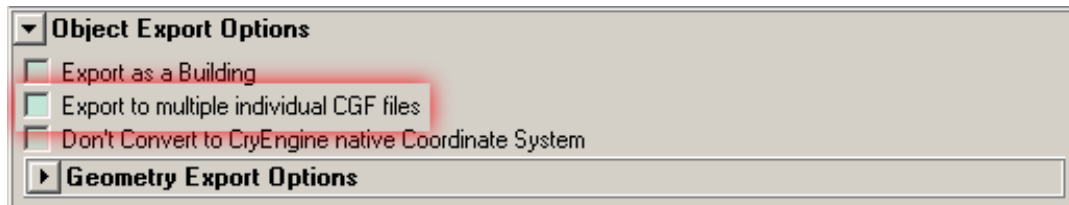
Don't Convert to CryEngine Native Coordinate System

According to the CryEngine internal conventions, when exporting from Maya, the geometry hierarchy roots and the bone hierarchy roots are rotated in such a way that the “up-vector”, which is by default “y” in Maya, becomes “z”. Check this option when you work in Maya in the “z-up” system or if you don't want the model or animation to be rotated.

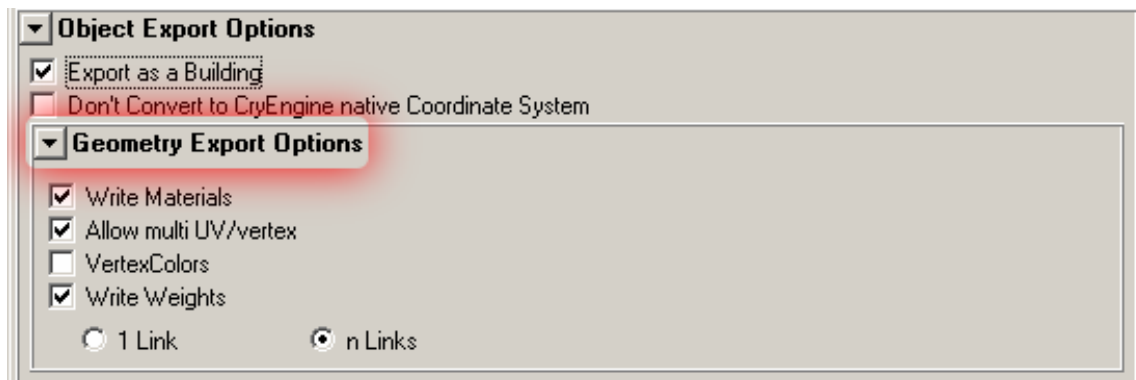


Export to multiple individual CGF files

If there are a lot of individual objects in the scene and you want to export them into separate files into the same directory, you can select those objects, add them to the list and export with the “Export to multiple individual CGF files” option turned on (new for Exporter 1.2). This will effectively create in the directory you choose a file per each object in the list, named after the object.



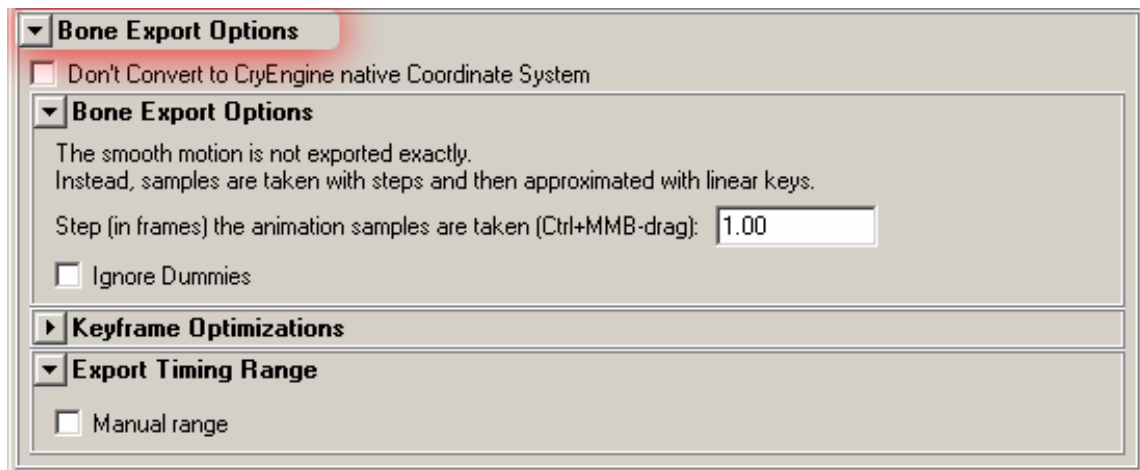
Geometry Export Options



The Geometry Export Options are essentially the same as in the 3ds max CryExport utility plug-in.

Write Materials	If this option is not checked, materials are not exported. By default, is checked.
Allow multi UV/vertex	If this option is not checked, meshes that don't have one-to-one correspondence between coordinate and texture vertex arrays are not allowed. By default, is checked.
Vertex Colors	If this option is checked, vertex colors are exported.
Write Weights	If this option is not checked, the bone linking info is not exported. If this is checked, and "1 Link" radiobutton is checked, then only one link per vertex is exported. In the case "n Links" radiobutton is checked, as many links as needed are exported.

Bone Export Options

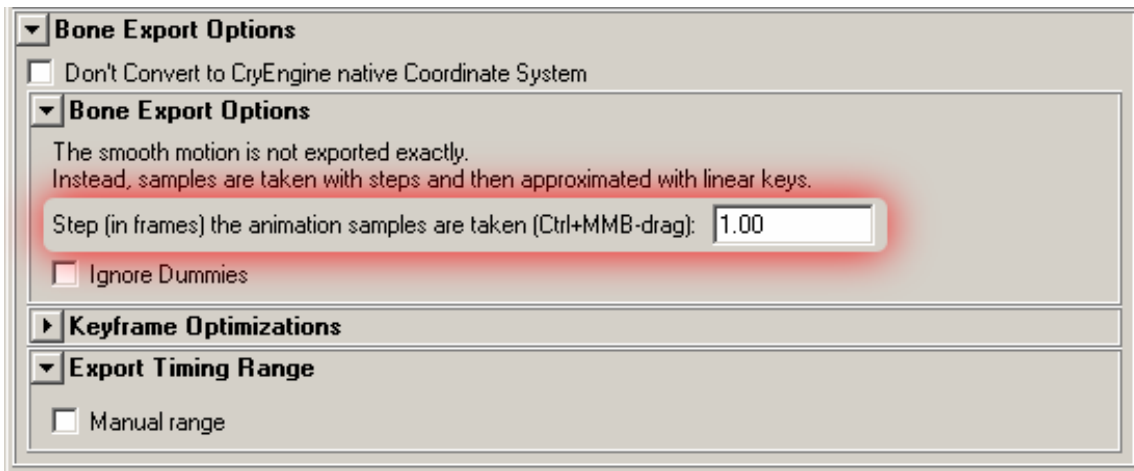


"Don't Convert to CryEngine Native Coordinate System" option is used for the same reason as in the geometry export options. If it is checked, the root of the skeleton hierarchy isn't rotated in order to adjust the coordinate system to the internal CryEngine conventions.

Ignore Dummies

If this option is checked, then helper objects (non-joints) are not exported.

Animation Step

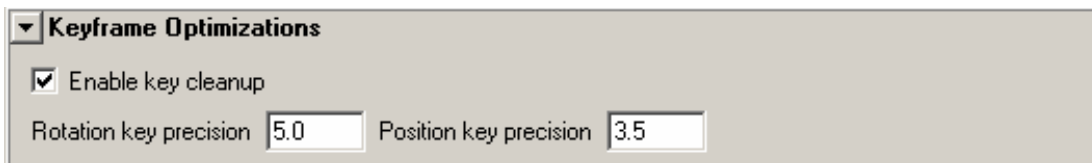


Sets the step of sampling the animation curves. The smaller the step is, the better the curves are sampled, but the bigger the animation file, the longer it takes to optimize.

This option actually mimics the `-animationStep` command-line option. For more information, see the [-animationStep option](#).

Keyframe Optimizations

In order to export animation curves, Maya CryExporter samples them with the step given by the animation step parameter (default is 1 frame). Then, linear regions of the animation curve are detected and extra keys are deleted. Internally, linear animation keys exported.

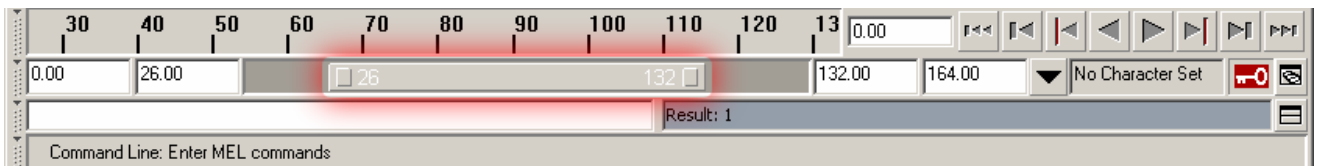


These options control the tolerance of keyframe reduction algorithm. The more the precision values are, the less the tolerance (maximum acceptable error) is. If the "Enable key cleanup" checkbox is not checked, then the reduction is not run at all. Therefore, it is not recommended to turn this option off.

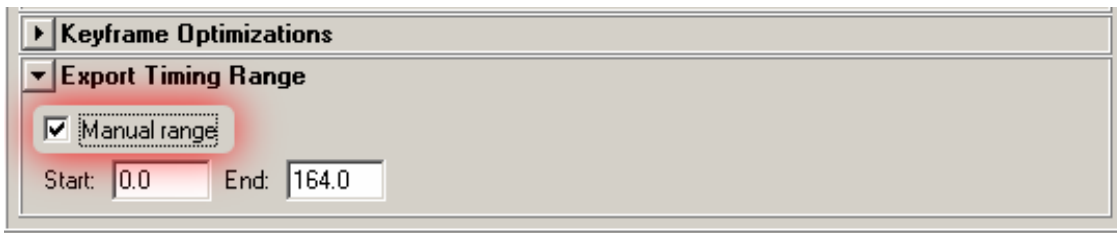
These options actually mimic the `-rotationPrecision`, `-positionPrecision` and `-disableKeyOptimization` command-line options. For more information, see the corresponding hyperlinks above.

Export Timing (Manual) Range

By default, the time range set by the time slider (highlighted in the picture, 26...132) is exported.



You can manually set the animation range by checking the Manual range option in the "Export Timing Range" frame (shown below):

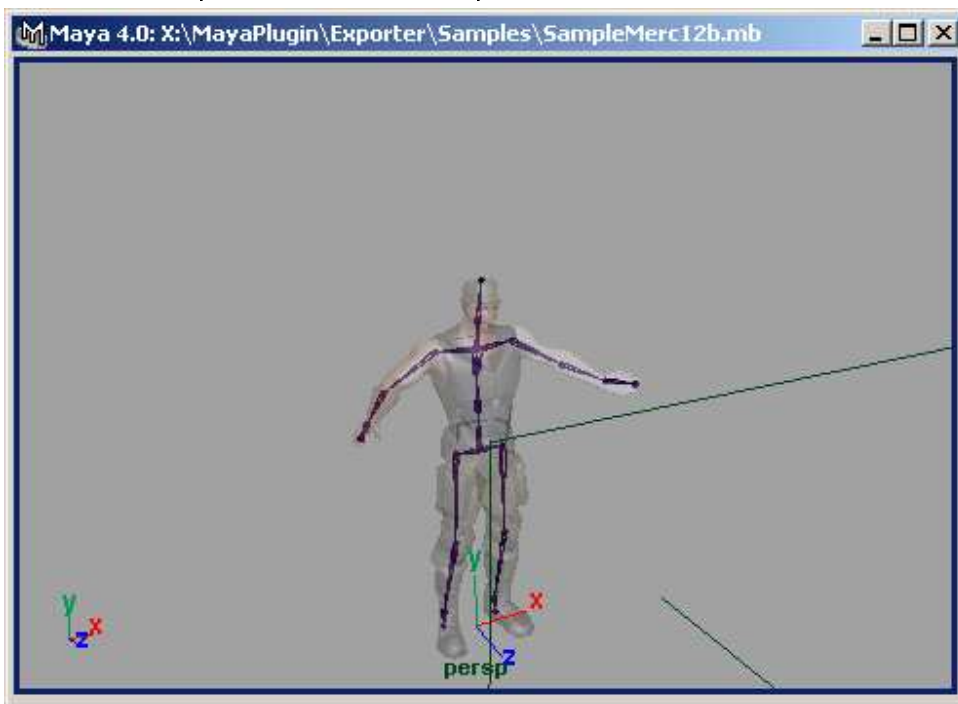


Then, if you set the start and end (like all the other edit fields, you can modify these by Ctrl+MMB drag), they will be used to determine the boundaries of the animation to export.

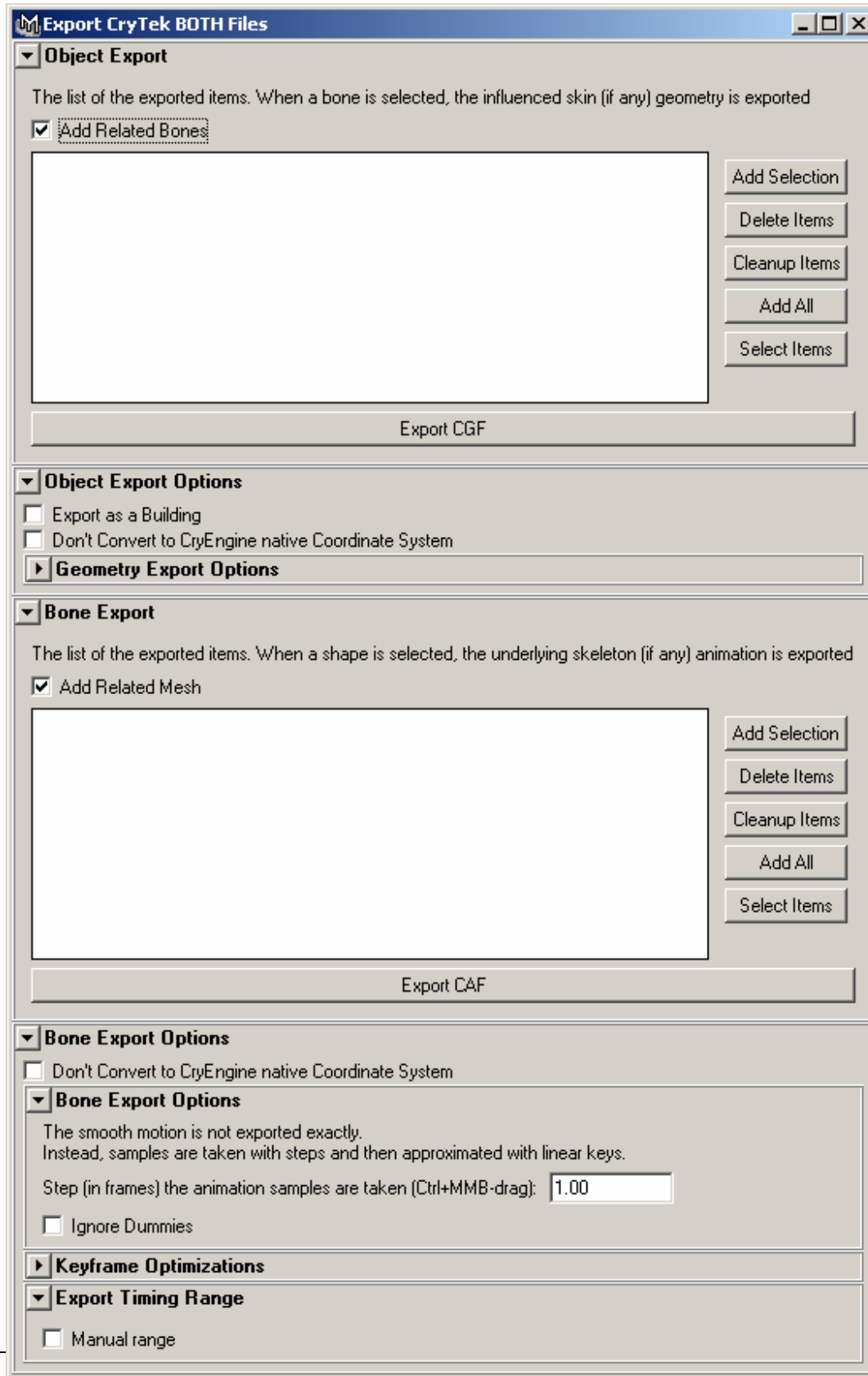
Examples of the User Interface Usage

Exporting a Character

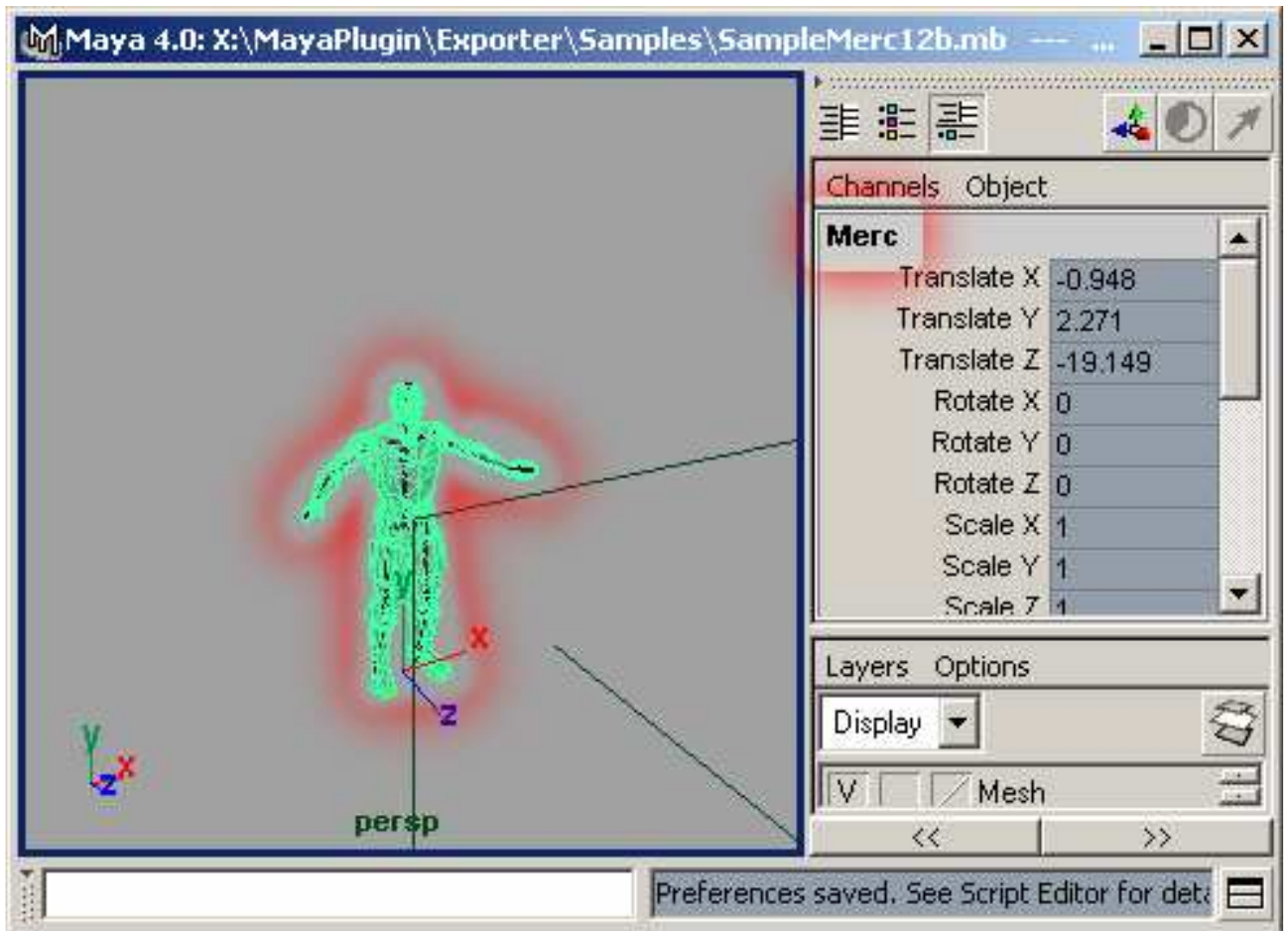
Load the "SampleMerc12b.mb" sample.



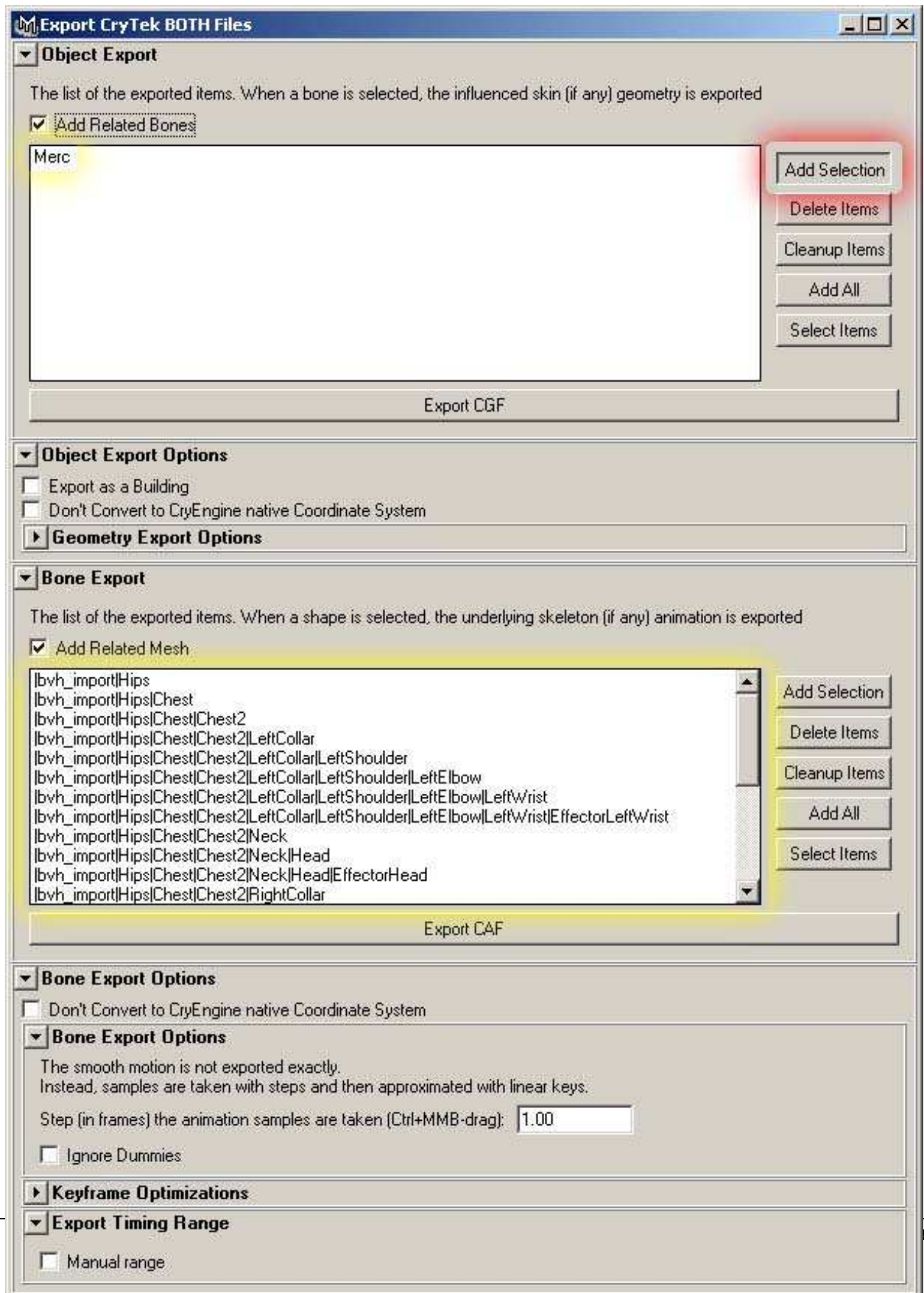
Using one of the ways described in [Exporting Geometry](#) section, start the UI.



Select the Merc object.

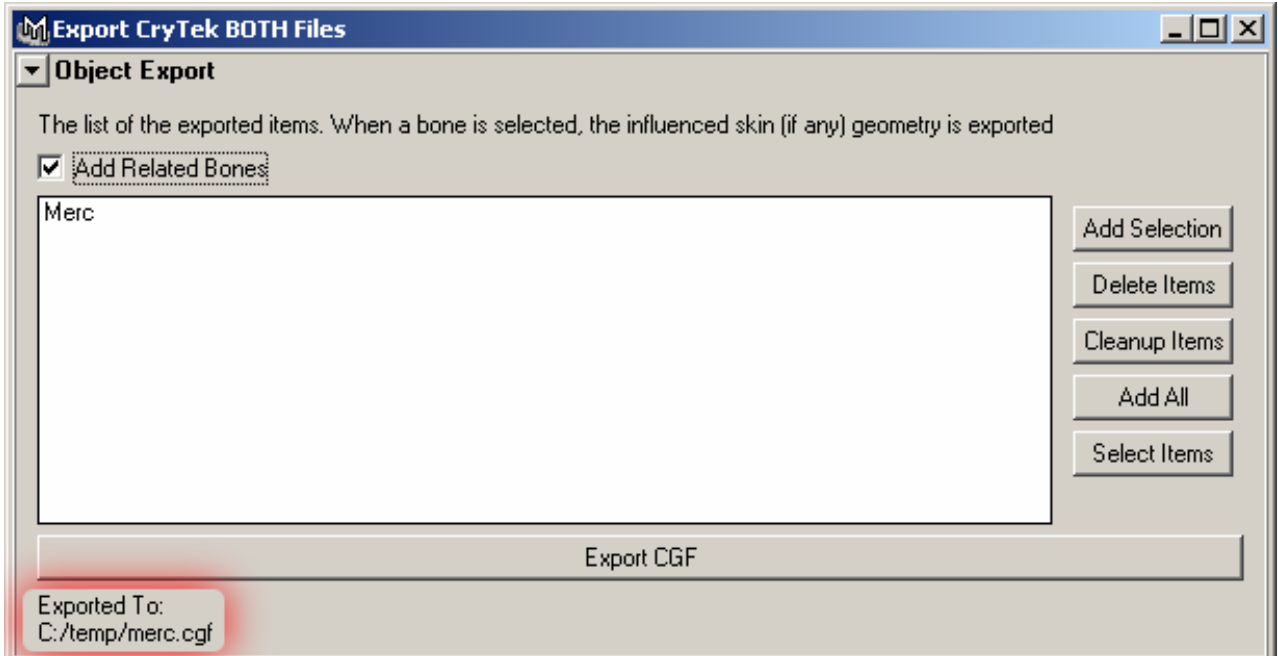


Hit the "Add Selection" Button in the "Object Export" frame (highlighted with red on the following picture) and watch the mesh added to the upper (geometry) listbox and the corresponding bone hierarchy to the lower (animation) listbox. The added items are highlighted in yellow.



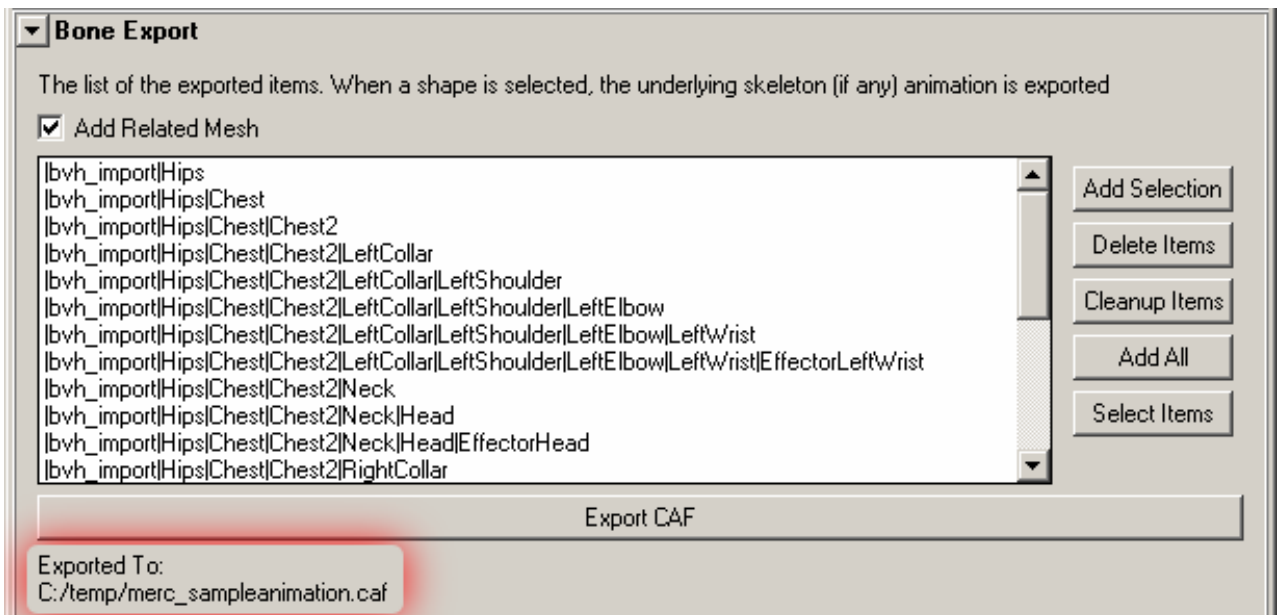
Click "Export CGF" and save merc.cgf file to a directory.

If the export was successful, then the "Exported To:" field will appear under the "Export CGF" button:



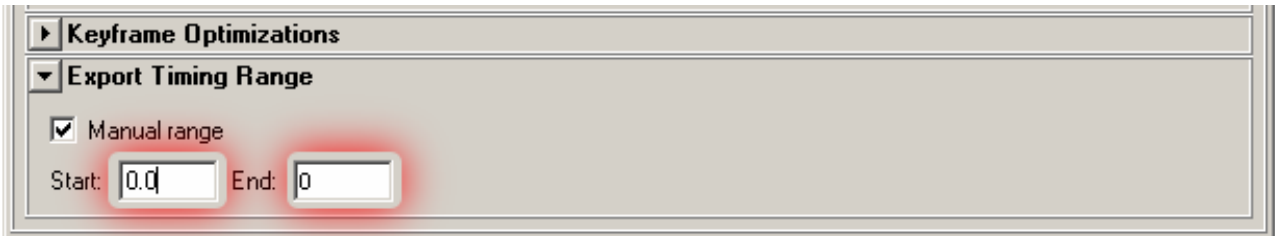
If this field has not appeared, there was some problem during the file save operation. In this case, an error message box also appears.

If the cgf was successfully saved, save merc_samplemotion.caf file by clicking the Export CAF button. If the CAF was exported successfully, then the same "Exported To:" field will appear under the "Export CAF" button:



After that, you can view the merc.cgf file with the editor, just double-click the merc.cgf file in the Windows Explorer (command-line: Editor.exe merc.cgf, with the corresponding paths, Editor.exe must start in the MasterCD folder).

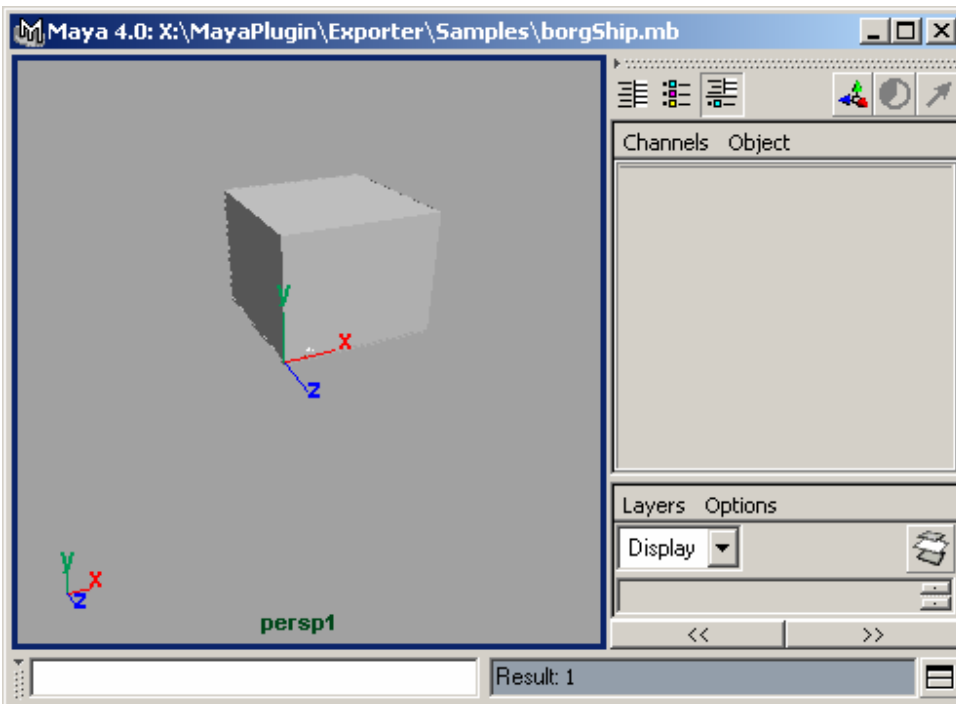
In order to export the default posture animation (merc_default.caf), you will need to set the manual range to 0 frames:



Then export the merc_default.caf file using the "Export CAF" button.

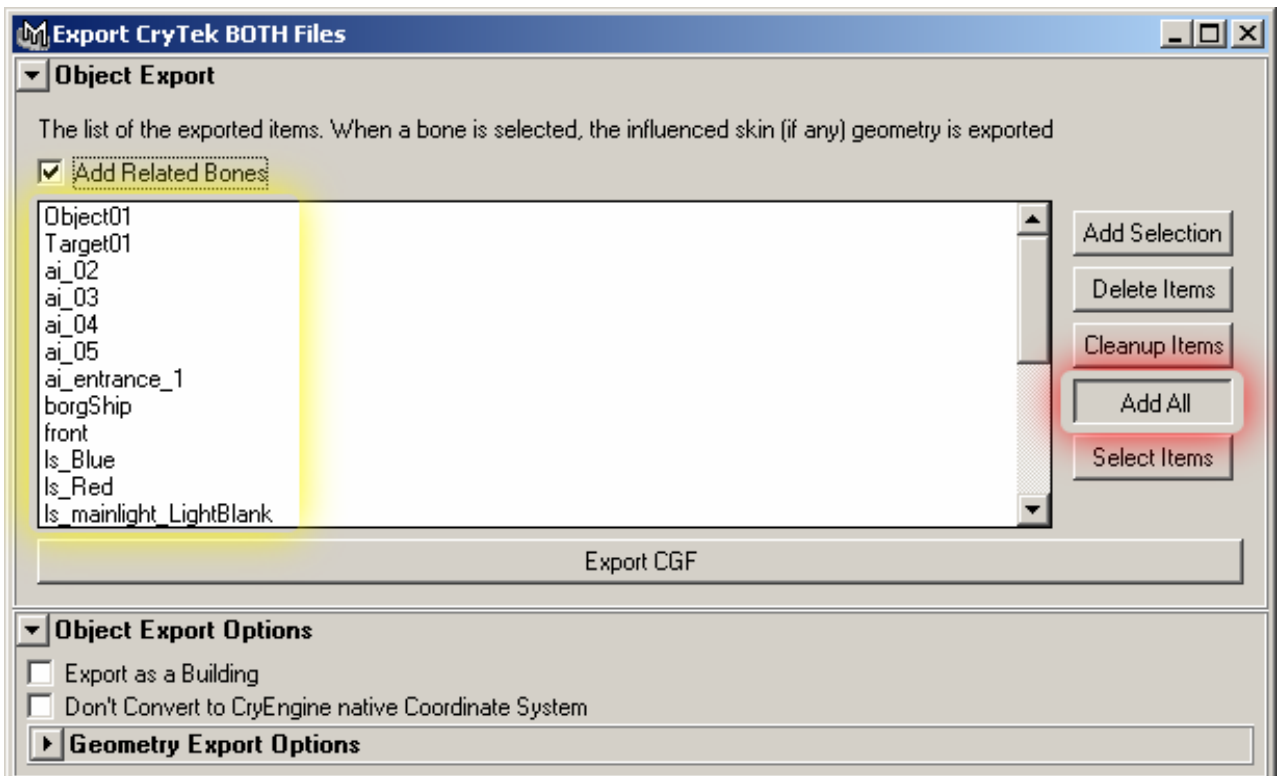
Exporting a Building

Load the borgShip.mb sample.

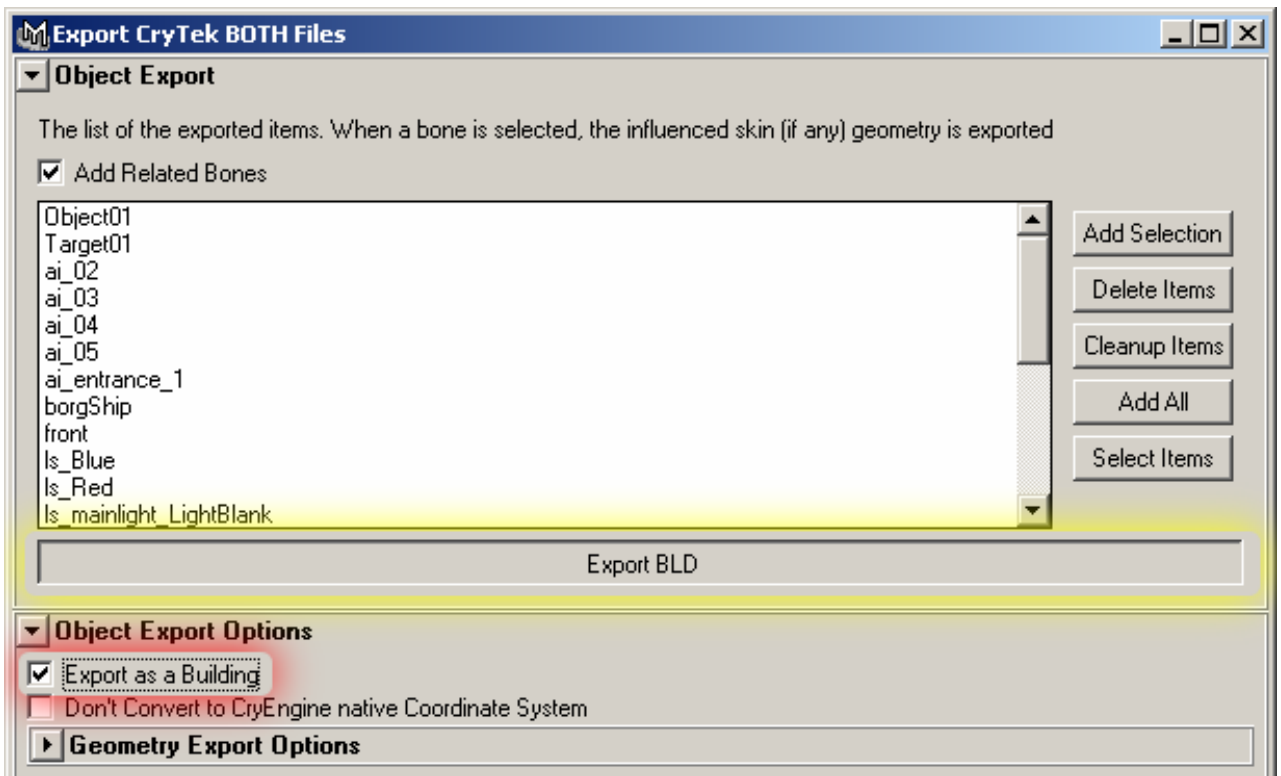


Start the User Interface (see [Starting the User Interface via CryExport Shelf](#))

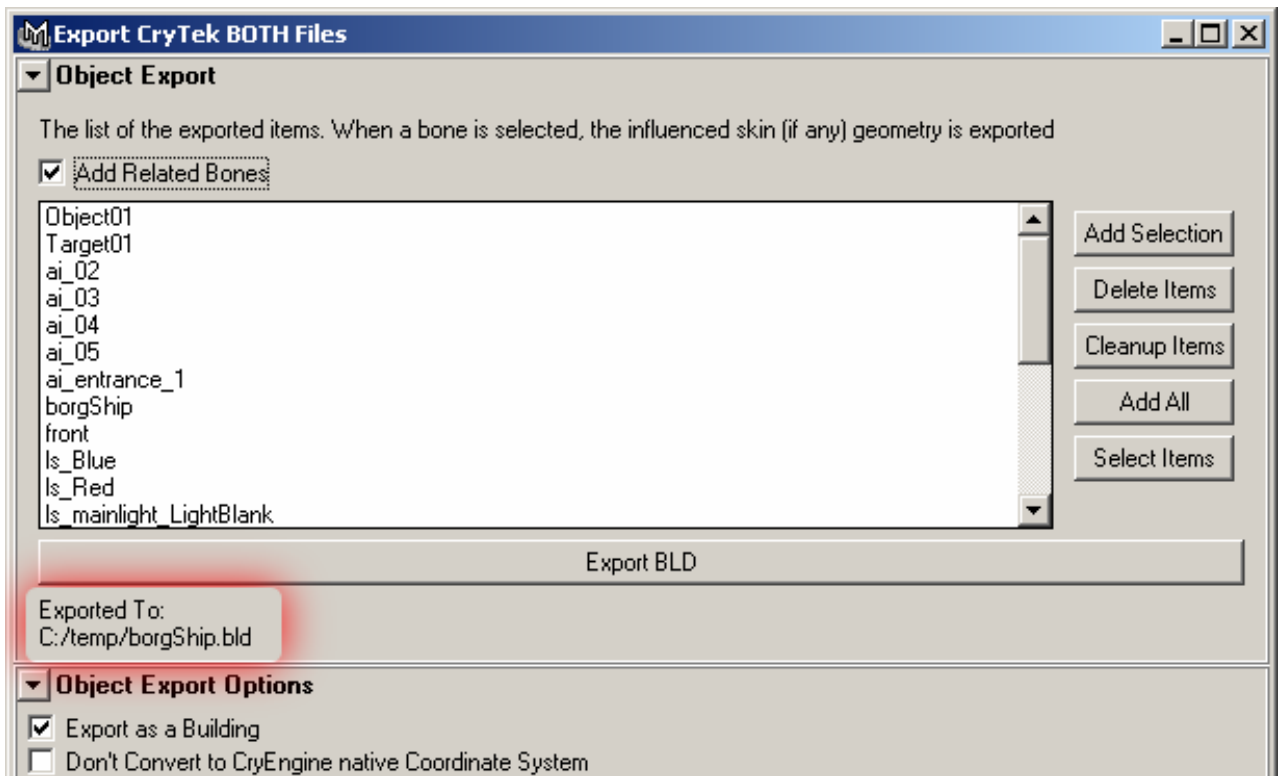
Click the Add All (highlighted with red) button next to the geometry list box (In the Object Export frame). You can view the objects added to the list box (highlighted with yellow). We need all objects, including helpers (ai_02, ai_03, etc.), lights (ls_*) etc.



Then, check the "Export as Building" option (highlighted with red), the "Export CGF" button changes to "Export BLD". Click the "Export BLD" button (highlighted in yellow).



When you exported your building successfully, you should see the "Exported To:" field under the "export BLD" button.



Then, you can test your building in the CryEditor.