

Iktrix Impulse 3 Manual

Warning

- Motion control is dangerous when done incorrectly.
- Anyone using Iktrix Impulse must read this manual first.
- Anyone installing Iktrix Impulse must make sure all users read this manual.
- This software might contain bugs. You should backup data and run new moves slowly.
- Iktrix will not be held liable for any losses incurred.

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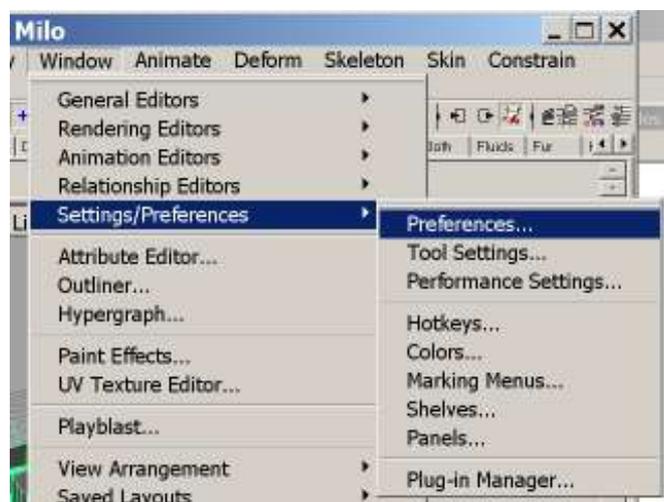
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Chapter 1

Introduction

This manual is task based. The chapters are arranged in approximately the same order as you will need to do the tasks.

Menus levels are referred to using arrows. Window → Settings/Preferences → Preferences... corresponds to the 'Preferences...' menu item in the 'Settings/Preferences' sub menu in the 'Window' menu in Maya's title bar.



Menus

Options in other menu bars, e.g. a panel will be indicated appropriately. Some tasks can be achieved in more than one way. This is indicated by an 'Option X:' heading. Read on to find an alternative way of doing things. Once you have finished an 'Option' you can pass over the other options to the next (non option) task.

Although this manual covers some of Maya's basic functions it is no substitute for learning Maya through the usual channels, i.e. manual, tutorials and training. That said, you don't need to be a Maya guru to create quite complicated rig moves.

A basic understanding of motion control is required to use this software.

You should learn how to use this software *before* going on set!

Chapter 2

Installation

- Download the installer.
- You can install Iktrix Impulse v3 without uninstalling Iktrix Impulse v2, but since version 3 supersedes version 2 in every way it is recommended that version 2 is uninstalled first.
- Backup any previous licenses and uninstall any old version of Iktrix Impulse 3.
- Double click on the setup file and follow the on-screen instructions.
- You must restart the computer before you can use the plug-in.
- Install the dongle driver. This is needed even if you are not using a dongle. Iktrix uses the DESKey DK3 USB dongle. The driver can be downloaded from:
http://www.deskey.co.uk/deskey_downloads.php

Chapter 3

Start

3.1 Start Maya

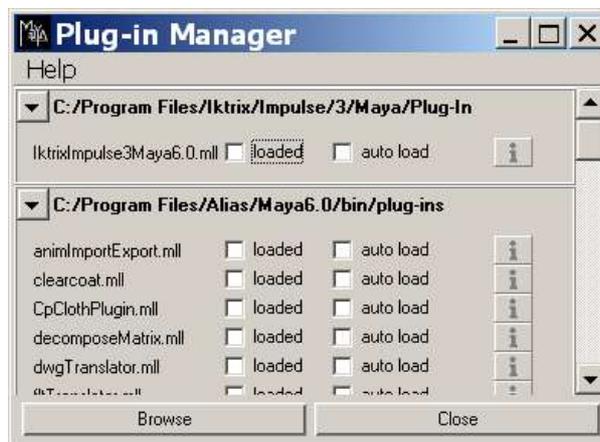
Start Maya and perform the following tasks once for each user:

3.2 Units

Maya should be set to work in units of meters and degrees for use with Iktrix Impulse. Check this after loading files incase they have been saved in other units. Scenes can be scaled by parenting everything to an empty group node.

3.3 Load Plug-In

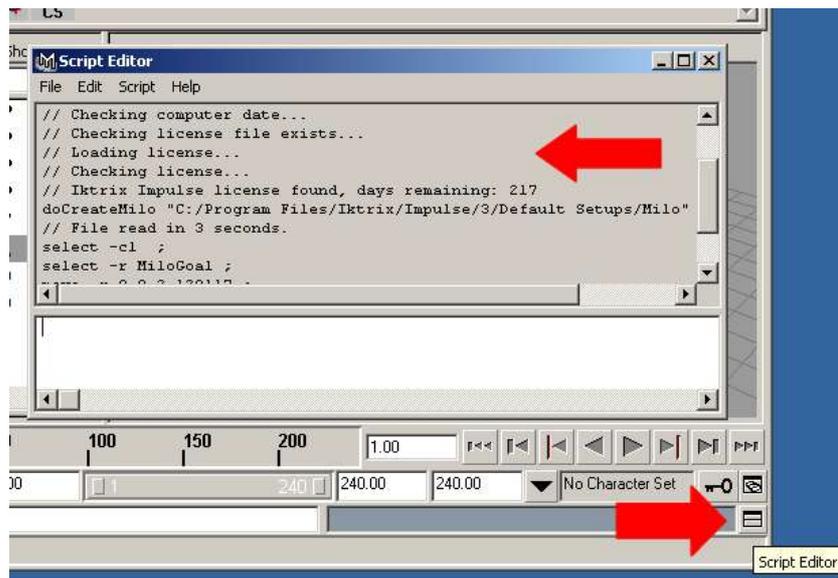
- Select Window → Settings/Preferences → Plug-in Manager...
- Make sure the loaded check-box next to the Iktrix Impulse mll matching your running version of Maya is ticked. If you don't have a *valid* license the plug-in will not load. Please read the next section on how to license Iktrix Impulse.



- Optionally tick the 'auto' check-box to avoid having to automatically load Iktrix Impulse every time the user starts Maya.
- This must be repeated for each user.

3.4 License Iktrix Impulse

If you run Iktrix Impulse without a license it will display an error message along with any system IDs for you to email to Iktrix (support@iktrix.com). These are needed to get a license for the computer or dongle. The system IDs, license status (e.g. time remaining) and license errors are displayed in Maya's command history. This can be seen by opening the script editor.



Maya command history in the script editor.

Iktrix Impulse also checks that the system date and time has not been turned back. This check can sometimes produce false positives. If you think this is the case then please email support@iktrix.com.

Non dongle, system IDs are MAC addresses and unique to each network interface card (not modems). If there are no system IDs listed you need to get a network card or a dongle. If there is more than one system ID it is because you have more than one network card. If any of these network cards are used sporadically their ID should not be used. Send a system ID that corresponds to a network card permanently connected to the computer. Windows XP users should also make sure they are not sending the physical address of any network bridges. If in doubt consult your system administrator. Licenses are non transferable for the period of the license. If you have bought

a full license request short licenses with (free) renewals if you think you will need to change the computer or are likely to loose the dongle!

To get a full list of MAC addresses (system IDs) and their description enter:

```
ipconfig /all
```

At the windows command prompt. If in doubt send this information with every license request.

```
Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\tim>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : tim-win-desktop
    Primary Dns Suffix . . . . . : 
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection 3:

    Media State . . . . . : Media disconnected
    Description . . . . . : Marvell Yukon 88E8001/8803/8010 PCI
    Gigabit Ethernet Controller
    Physical Address. . . . . : 00-0F-EA-E1-BC-AC

Ethernet adapter Wireless Network Connection:

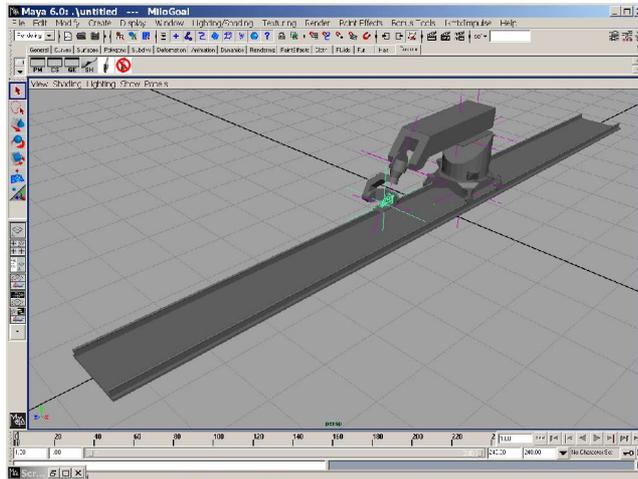
    Connection-specific DNS Suffix . . . . . : 
    Description . . . . . : NETGEAR WG511 54 Mbps Wireless PC Ca
rd
```

Output of ipconfig /all showing the system ID/physical address/MAC address

3.5 Create a Rig

- This can (optionally) be done later after creating a camera path.
- Select IktrixImpulse → Rig → Milo.
- Select the setups directory for the rig. This is the directory containing Mark Robert's Flair (v3+) AXIS.DBF and KINE.CYC files. Every rig is different and has a unique group of setup files. Creating moves with a different rig's setup file will produce incorrect moves, and may lead to the rig being damaged. If you just want to 'play' with the software or plan to setup the rig later you can use the default setup files from C:\Program Files\Iktrix\Impulse\3.0\Default Setups\- Click in a 3D view panel and hit key 'a' to frame the rig to the panel's view size.

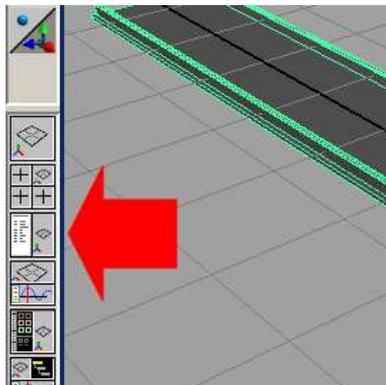
- If you want a good representation of the rig turn on smooth shading by selecting Shading → Smooth Shade All from the panel's menus.



3.6 Setup The Rig

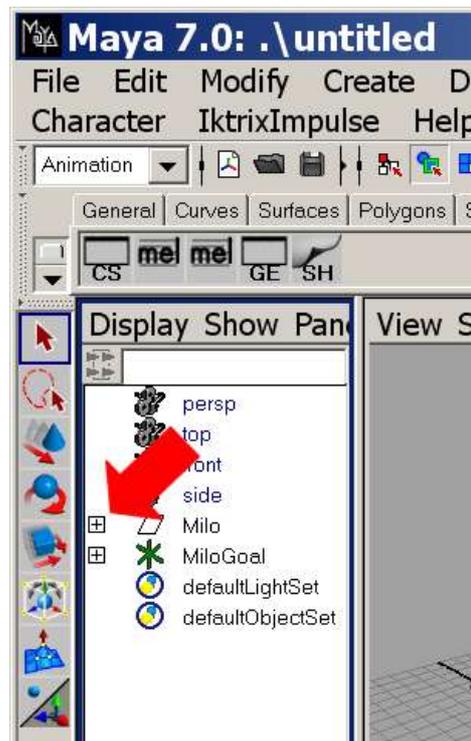
If you have the information you should setup the nodal point offset and your virtual camera(s). The nodal point offset is the position and rotation of the viewing frustum relative to the rig's pan-tilt-roll intersection (or camera mount point). The nodal point is changed by selecting its node (it is just before the rig camera in the hierarchy) and altering the translateX (and perhaps the other translate and rotate) in the channel box.

To quickly select a node in the hierarchy first open the Outliner. The Outliner can be started from 'Window...' menu or from the toolbox by clicking on the 'Persp/Outliner' layout button.

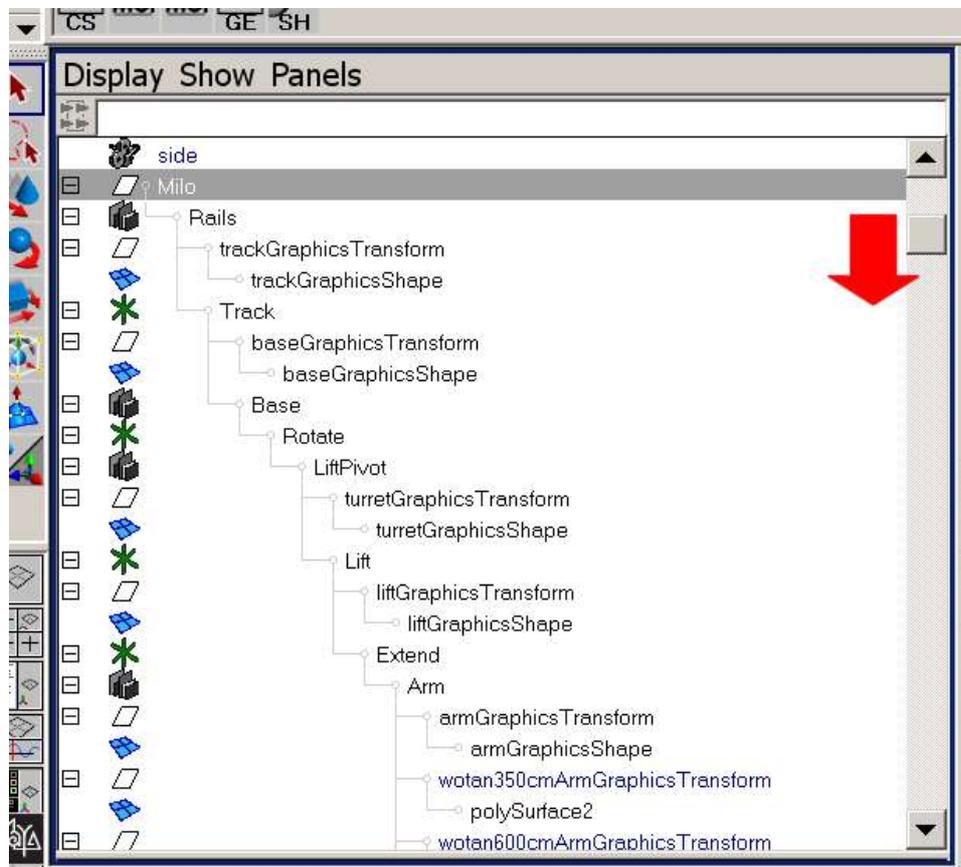


Persp/Outliner layout button.

To expand an entire hierarchy hold down the left Shift key and click on the root node whose hierarchy you wish to expand. Find the required node by scrolling down.



Left shift click on a node to expand it's hierarchy.



Be careful - Maya's cameras don't have nodal point offsets - in fact they *are* nodal points. They do provide editable attributes to match most of the other properties found in film cameras. This includes (but is not limited to):

- Shutter angle.
- F Stop.
- Focal Length.
- Vertical Film Aperture.
- Horizontal Film Aperture.
- Lens Squeeze Ratio.
- Angle (Field) of View.
- Film Gate.

- Camera Aperture.
- Film offset.

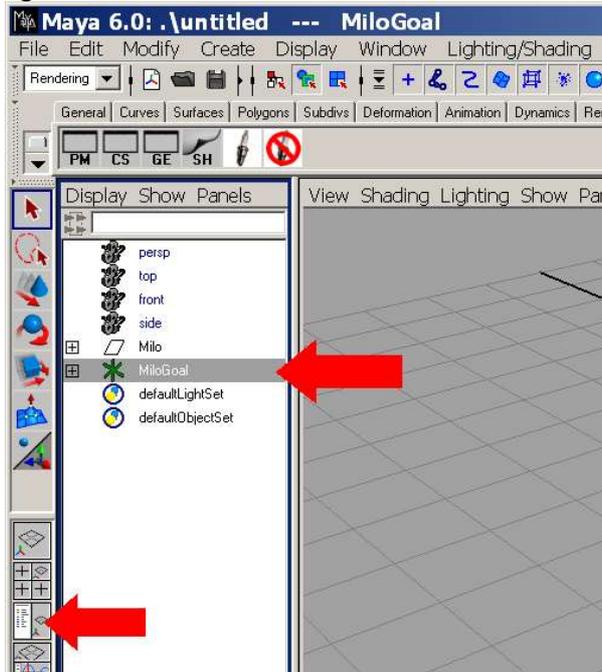
These can be set to match the real film camera by selecting the camera and opening its attribute editor.

Chapter 4

Create a Camera Move

4.1 Option 1: Key-frame The Rig's Goal

- Open the outliner (Window → Outliner...) and select the rig's goal, e.g. MiloGoal if not already selected. The goal is a locator with a child camera.



The Outliner

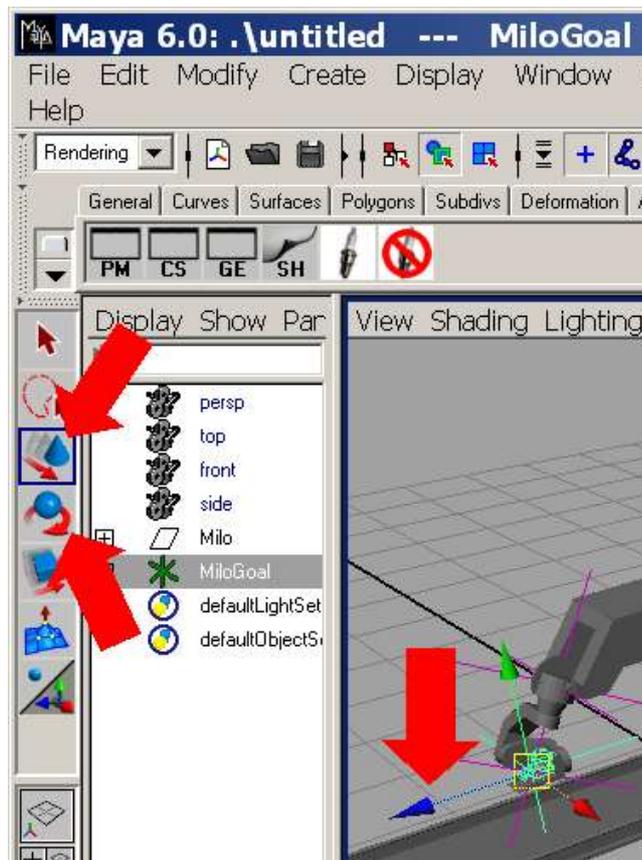
- Choose a frame number for when you want the pre roll to start (optional - you can let the motion control system add this in, *if it is able to do so*). Change frame by clicking on the 'Time Slider' or typing a number in the 'Current Time' text box.



Time Slider

- Use Maya's 'Move' and 'Rotate' tools to translate and rotate the rig's goal. The rig will

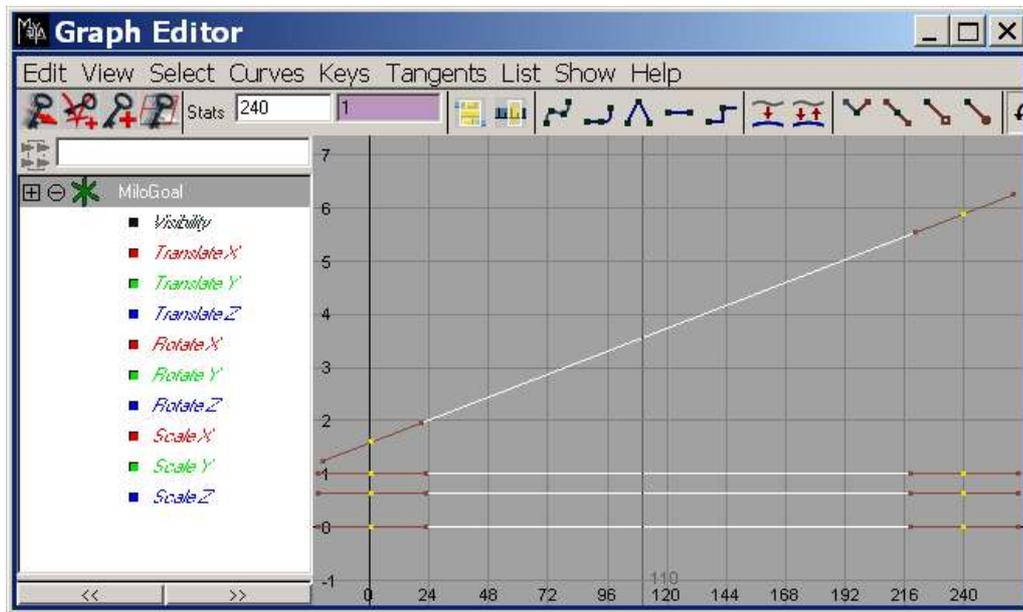
(always) *try* to match the goal's translation and rotation. Once you are satisfied with the translation and rotation hit the 's' key to key-frame the goal's translation and rotation at the current time.



Move and Rotate Tools

- Repeat these steps at different frame numbers for the start of the move, end of the move and end of the pre roll (optional).
- By default Maya creates key frames with spline tangents. This means that the initial speed of the rig will be non zero. If you are doing your own pre and post roll you don't want this to be the case. With the goal still selected choose IktrixImpulse → Tools → Zero Ends Speeds (this works on any selected object's keyframed animation).
- You can see the key frames and interpolated translation and rotation of the goal using the

Animation Graph Editor. With the goal selected choose Windows → Animation Editors → Graph Editor... then hit the ‘f’ to fit the curves to the panel.



Graph Editor

4.2 Option 2: Key-frame a Camera

- This is an example of an approach where the rig can optionally be loaded after the camera move has been created.
- Choose and create any type of camera from Create → Cameras or use IktrixImpulse → Tools → Camera, Aim and Roll. By default Maya creates cameras scaled for working in centimeters, i.e their iconic representation in the scene is very small. This can be corrected by making sure the camera is selected and choosing IktrixImpulse → Tools → Scale Camera.
- Choose a start time for your pre-roll (optional) by clicking on the ‘Time Slider’ or typing a frame number in the ‘Current Time’ text box.
- Use Maya’s ‘Move’ tool to translate the camera, aim (optional), and up points (optional). If you are using the camera produced by IktrixImpulse → Tools → Camera, Aim and Roll you must animate translation using the camera group instead. You can also use Maya’s ‘Rotate’ tool to

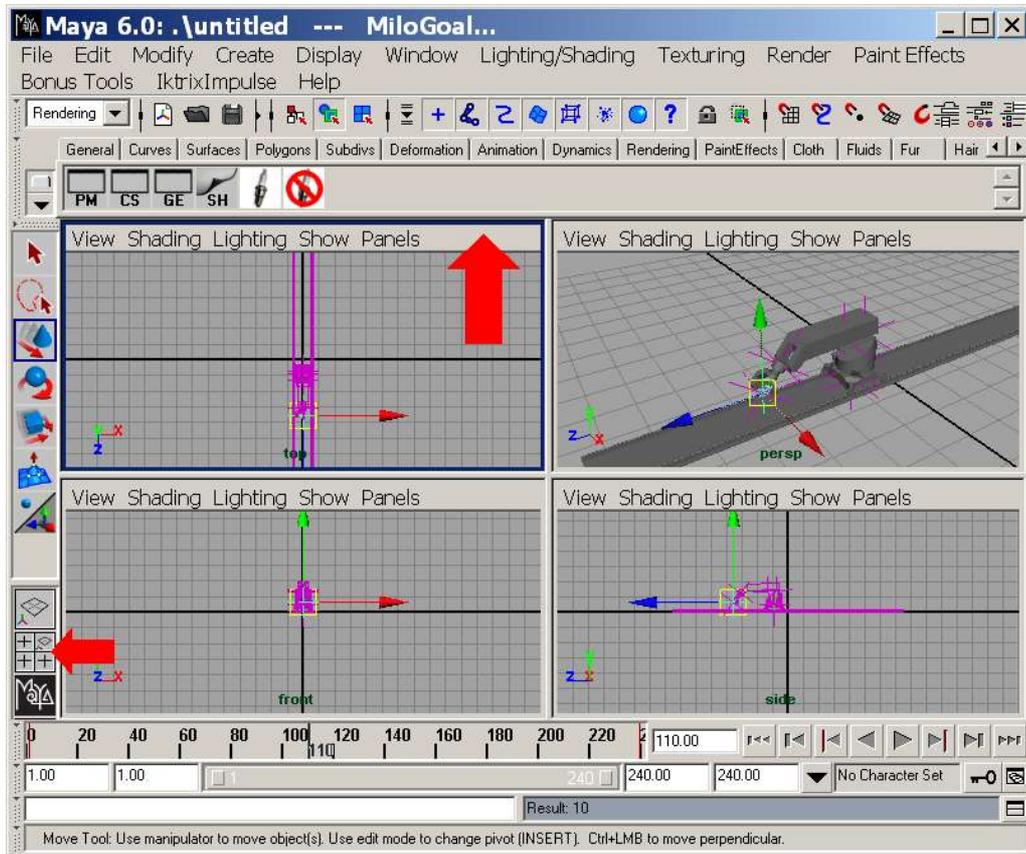
rotate an unconstrained camera (one without aim and up points or with aim and roll). Once you are happy with the camera position and rotation hit the ‘s’ key to add an animation key-frame on the *currently selected* object. Bear in mind you may need to do this three times for each keyed frame (camera object, aim object, and up object).

- Repeat these steps at different frame numbers for the start of the move, end of the move and end of the pre roll (optional).
- By default Maya creates key frames with spline tangents. This means that the initial speed of the camera and thus the rig will be non zero. You can either let the motion control system and a pre and post roll (*if possible*) or zero the start and end speed yourself. To do this select the camera and then choose IktrixImpulse → Tools → Zero End Speeds.
- Select the camera and the goal and select IktrixImpulse → Tools → Constrain Goal To Transform Node.

4.3 Option 3: Create a Motion Path

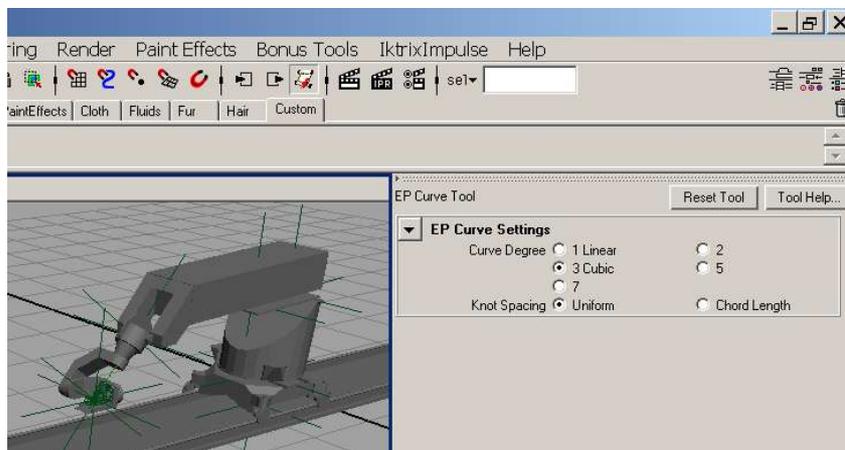
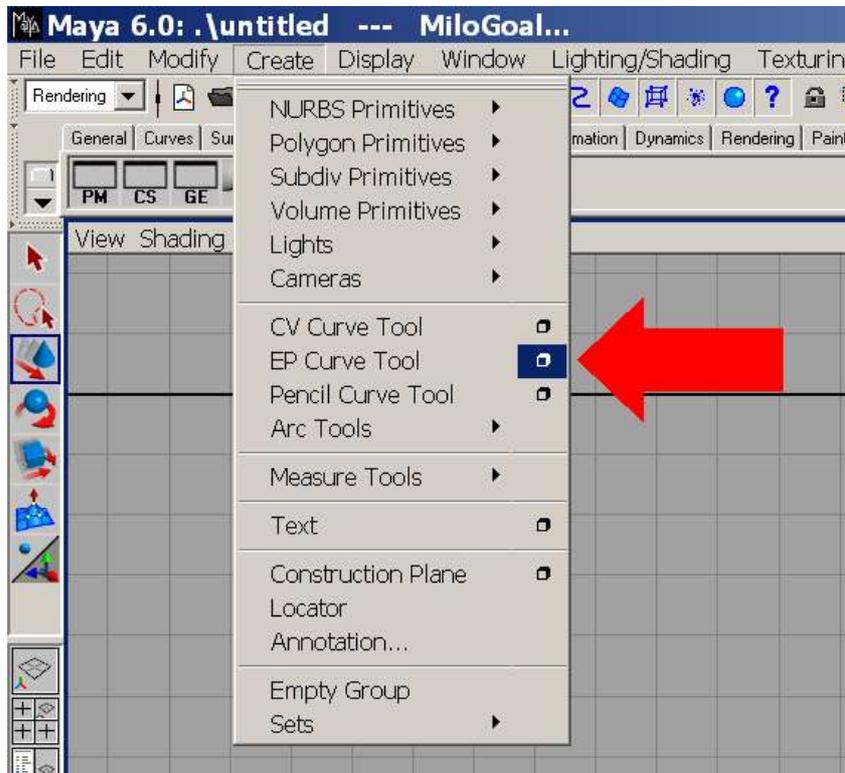
With this option you create one or more curves and then attach either a camera (with optional aim and up) to the curve or just the goal.

You will find it easiest to draw a curve using one of the orthographic views, usually the top view. This can be displayed by clicking on the ‘four view’ button and clicking on the panels menu bar. You can expand the currently selected view to the whole window by hitting the ‘space’ key.



Orthographic Views

- Choose Create → EP Curve Tool (actually you can use any type of curve e.g. a nurbs circle or even a square - obviously you'll have to slow down at the corners!). You may want to click on the 'Tool Options' box to the right of the menu item to choose the type of curve to draw, we recommend you use cubics. The EP Curve Tool (as opposed to the CV Curve Tool) means the curve will pass through the points.



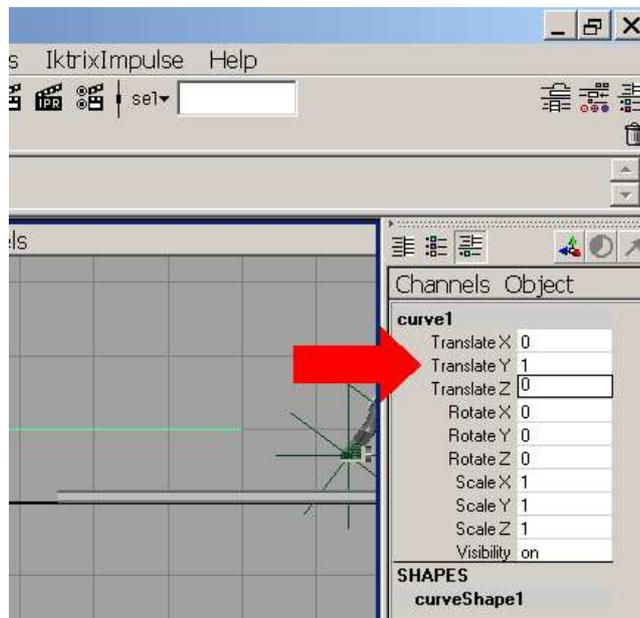
EP Curve Tool Options

- For less ‘organic’ shaped curves you can switch on ‘Snap to grids’ in the status line.



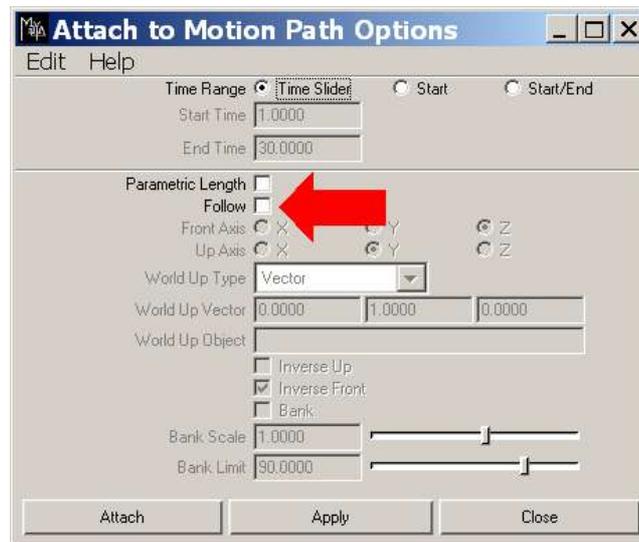
Snap To Grids

- Create the curve by clicking out points and hit the 'Return' key to finish.
- You may want to translate the curve out of the plane you created it in. If you created it in the top view it will be in the plane of the floor. Obviously this doesn't represent a very good camera move! You can translate the curve using Maya's move tool or more accurately by typing a value into the translate channel.



The Channel Bar

- Once you have created your curve(s) attach your object(s) (goal/camera, aim and up) to the curves. This is done by first selecting the object then the curve and then choosing **Animate** → **Motion Paths** → **Attach To Motion Path**. Make sure that the 'follow' option is switched off using the Tool Options icon to the right of the 'Attach To Motion Path' menu item. With the option on Maya will make the camera look along the path which is generally not wanted.



Turning off Follow

- By default this will animate the object along the path between the current start and finish times. The aforementioned tool options window will let you choose a different range.

Chapter 5

Check The Move

Iktrix impulse will not exceed axis value limits but any solution will have a limit to how *fast* it can be run. To find out how fast you can run a move select all the rig's axes and select IktrixImpulse → Tools → Max Playback Rate. A quick way to select an entire rig's axes is to select the rig's root group node in the outliner and then choose Edit → Select Hierarchy.

A progress bar will appear whilst Iktrix Impulse checks the move and dialog will appear specifying the *approximate* max playback frame rate. Iktrix Impulse takes the current Maya frame rate into account when calculating this figure. Please be aware that this figure is approximate, the real move may be able to run a little bit faster or slower depending on the condition of the real rig and how well it is setup. It is worth leaving a 5% room for change in the speed.

It may be possible to increase the maximum playback by adjusting the solution. See the chapter 'Adjusting The Solution' on how to do this.

Chapter 6

Adjusting The Solution

Unfortunately Iktrix Impulse can not read your mind! It must make assumptions about what type of result you want and solve the inverse kinematics problem accordingly.

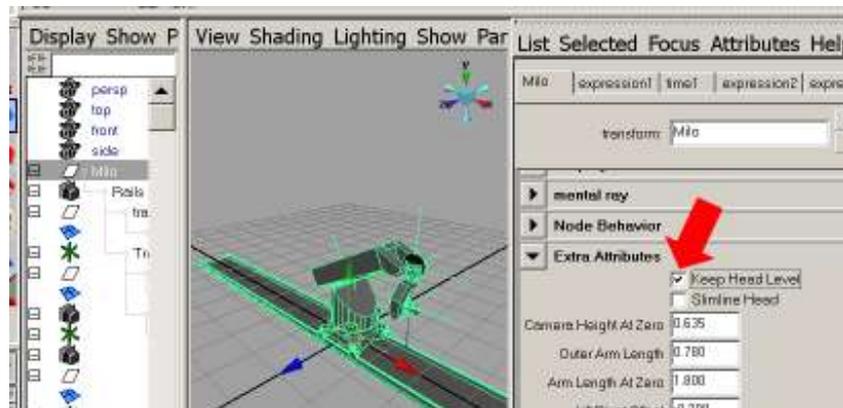
It is possible to change the way Iktrix Impulse behaves to get solutions that better meet your requirements, e.g. less flex, faster camera motion, avoid pieces of set, etc.

Iktrix Impulse allows you to specify preferred axis values for extend and angle. It is also possible to override the extend and angle axes so that each axis does exactly what you tell it to. With override Iktrix Impulse uses the rest of the axes to compensate and solve the inverse kinematics problem.

It is possible to change the axes value, speed and acceleration limits although we do not recommend you do this unless you really know what you are doing. If you get this wrong you could damage the rig, set or other people.

6.1 Keep Head Level

By default Iktrix Impulse keeps the outer arm of Milo rigs vertical. This reduces camera shake but does restrict the rig's range of movement. To turn it off select the Milo root node and open the attribute editor (Ctrl+A or Window → Attribute Editor). Find the 'Keep Head Level' check box and (de)select as required.



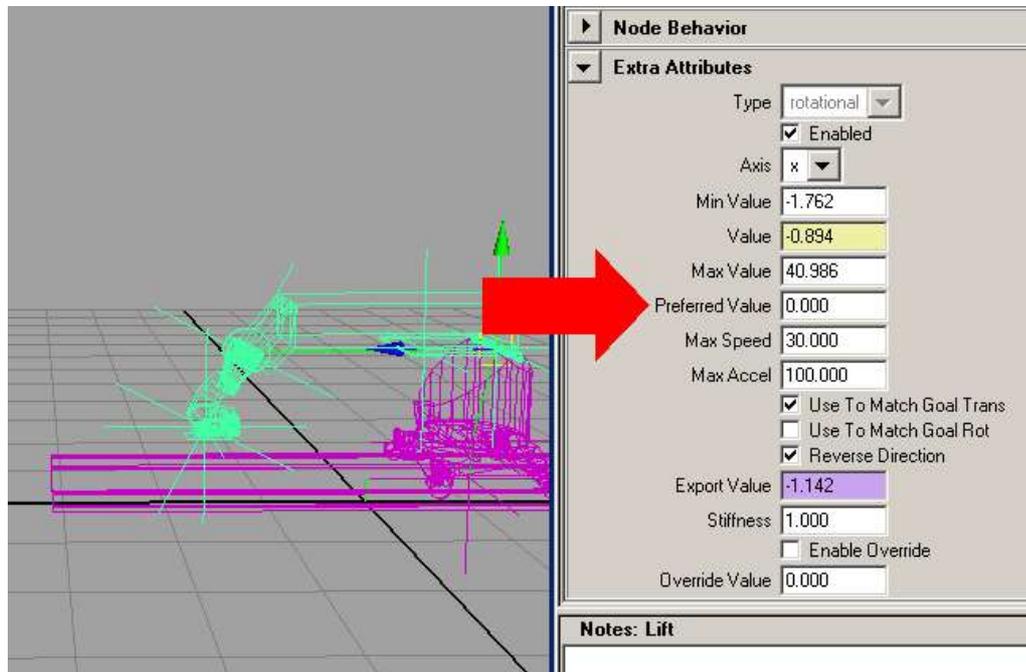
Keep head level attribute.

6.2 Preferred Axes Values

Think of preferred axis value as a suggestion to Iktrix Impulse that it will bear in mind when solving the inverse kinematics problem. It is not a 'command' and it may occasionally *appear* that Iktrix Impulse has completely ignored it, e.g. you would prefer the outer arm of a Milo to be down but Iktrix Impulse lifts it up when stretching for a very high move. There was no other way to achieve the result so Iktrix Impulse lifted the outer arm up – although it may well do this as late as possible if the rest of the move is nearer the floor. The preferred value can be changed in the extend and angle axes' attribute editor. Note: This is the axis transform node not the axis shape node.

If you always want the arm down you are better off using override (see the later section). Preferred axis values can be constant for the whole move or key-framed so they change over the playback range, e.g. at the start I would prefer the arm up and at the end I would prefer the arm down.

You can use the angle and extend preferred axis values to avoid tilt 90 problems where the pan axis has to flip because the pan and roll axes have lined up.



Axis Preferred Value Attribute

6.3 Override Values

Angle and extend override values are entered in much the same way as preferred values and can similarly be key-framed. Once you have entered an override value you must switch it on using the enable override check-box. Iktrix Impulse will always obey an enabled override value and will use any other non overridden axes to try and solve the problem.

6.4 Dsiable Axes

You can disable unwanted axes. If angle and/or extend are dsiabled the rest of the axes can compensate. Disabling other joints will severly limit the rig's ability to solve the problem. If you are doing a vertical move through camera at rig zero you may want to disable the pan axis to stop it from flipping as it goes through tilt 90. Of course you wont be able to pan the camera is you do this. This unfortunately a limitation of the rig.

Chapter 7

Export The Move

You should use Maya scene files to transfer pre-visualised motion control to other computers that are running Iktrix Impulse 3. Only export the move when you want to run it on a real rig.

You must only run moves on the rig for which they were solved in Iktrix Impulse (which requires the virtual rig to have been set up using that rig's setup files). If you don't bad things will happen.

Iktrix Impulse will export all selected axes values for every frame in the current Playback range. To do this select all the axes and then IktrixImpulse → Export → Flair. A quick way to select an entire rig's axes is to select the rig's root group node in the outliner and then choose Edit → Select Hierarchy. The move is exported as a flair raw axis move in units of centimeters.

You can use IktrixImpulse → Export → Move Kinematics to export a file for viewing in a spreadsheet like Microsoft Excel. You can use this to plot graphs of the axis positions, speeds and accelerations.

Chapter 8

Running The Move

Motion control rigs are potentially very dangerous pieces of equipment. At the very least they can be expensive to fix! Rigs should only be operated by qualified personnel. This manual is not a manual on how to operate a rig.

Import the move into Flair using CGI import. You can either import the move as mimic or a list of frames (non mimic). That advantage of mimic is that it does not adversely tax Flair, the disadvantage is that flair does not perform speed and acceleration limit checking when pre calculating the move. For long moves you will have to use mimic. For shorter moves (<1000 frames) turn it off. You *must* zero all the axis fairings and set them to prevent curve reversal to stop flair changing the motion paths. Otherwise you may get a jolt at the beginning and end of the move and limit errors. Make sure that you run any new moves very slowly the first time, *watch the rig* and check for collisions.

Chapter 9

Import A Move

You can import a cartesian camera (path) move exported from Flair. The move must have been exported in metres using the Maya Y up coordinate system. This function will produce a Maya camera with animated position, aim and roll. To import the move select IktrixImpulse → Import → Flair Carts...

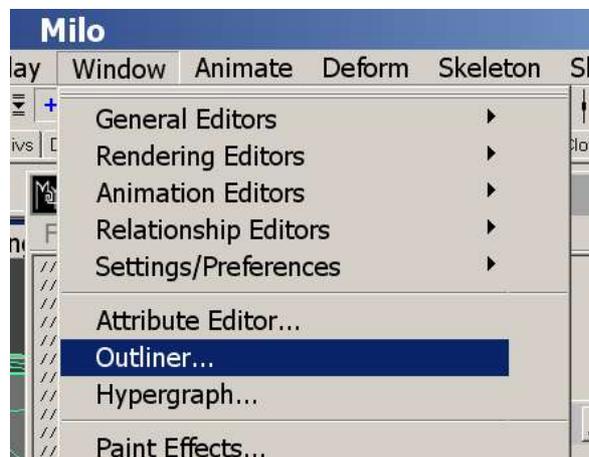
Chapter 10

Non Standard Milo Configurations

10.1 Slimline Head

By default the Milo model shows a Guinness head, but it is possible to show a slimline head instead. The following procedure changes the graphics only. It is still up to the user to make sure the correct nodal point offset is entered as explained earlier. The rest of the head setup is in the setup files used to configure the rig.

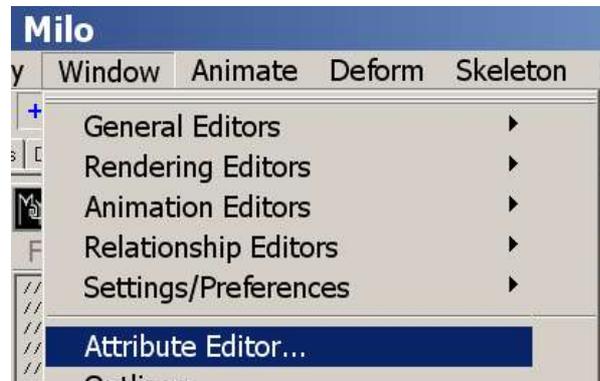
From the window menu select the 'Outliner..' menu item.



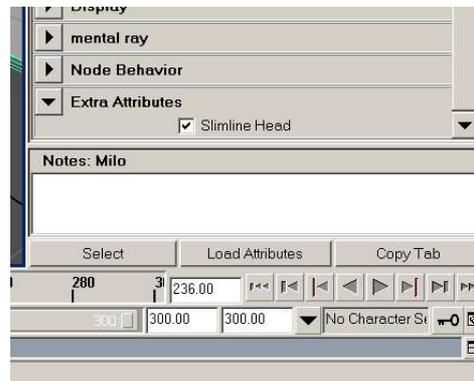
In the outliner click on the 'Milo' node.



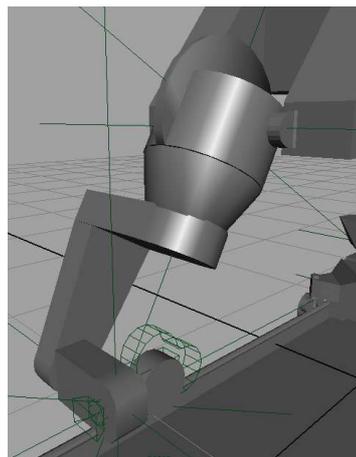
Open the attribute editor using the 'Window' menu.



In the attribute editor scroll down to the bottom and expand the extra attributes section. Click on slimline head.



The Guinness head should turn into a slimline head.



10.2 Wotan Support

A Wotan is a long arm Milo with a locked off extend axis.

Just load the correct Milo setups, the graphics will adjust accordingly - depending on the length of the arm in the setup file. There are three arms lengths represented by the graphics, 3.6 meters, 6 meters or 8.5 meters. Disable the extend axis in the attribute editor.