

YEI Mocap Studio Quick Start Manual

Purpose

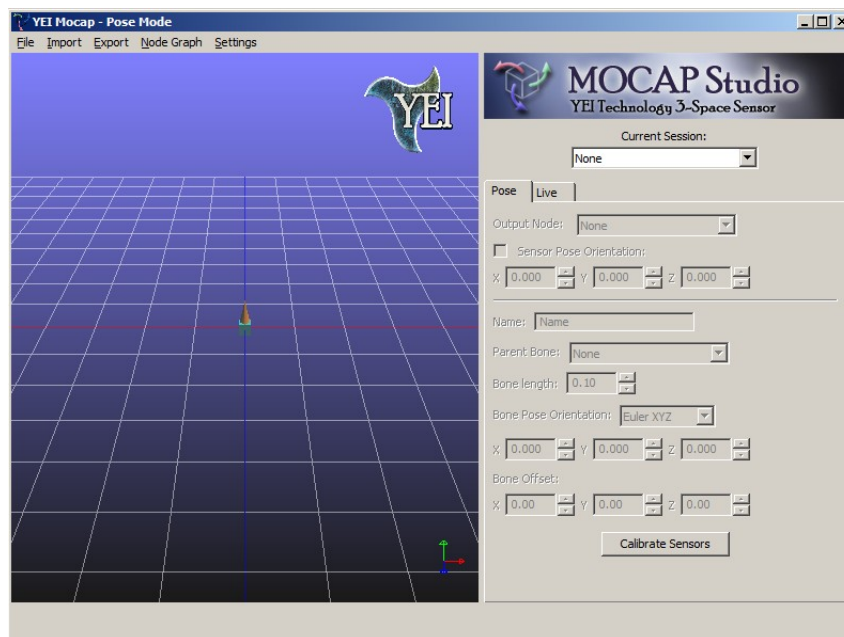
The purpose of this manual is to act as a starting point for new users of the YEI Mocap Studio, and to offer tips on how to operate it in a way that ensures it acts as desired. All keyboard commands will be **bold** and have **[]** around them.

Overview

The YEI Mocap Studio is a motion capture application that was created for interacting with the YEI 3-Space Sensor™ family. It can load/save motion capture data as BVH files, Biovision Hierarchy, or as our TSH files, Three Space Hierarchy. The interaction between the 3-Space Sensor Family is done in the Node Graph window. The Node Graph uses node configurations to communicate data from the 3-Space Sensor family to the YEI Mocap Studio. It also can load/save these configurations as XML files. For further detail, see the full manual document.

Basic Start-up Instructions

Make sure you have successfully installed the 3-Space Sensor installer, which can be found at tech.yostengineering.com/3-space-sensor/files/3-Space_Setup.exe. This will install the drivers needed to use the 3-Space Sensor units. Now run the YEI Mocap Studio installer, if have not so already. If you do not have the installer, it can be found at <http://tech.yostengineering.com/3-space-sensor-1/mocap-suite/MocapStudioSetup.exe>. Once the application has been installed, you may run the application.



Getting Started

Basic Commands

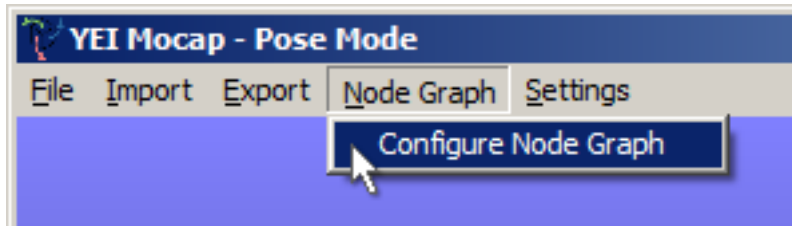
There are a few input commands to be aware of while using the YEI Mocap Studio application.

Left Mouse Button	Selects objects in the 3D view.
Right Mouse Button	Allows the user to rotate the 3D view while pressing and moving the mouse.
Middle Mouse Button	Allows the user to translate the 3D view while pressing and moving the mouse.
Scrolling	Allows the user to zoom in/out.
[T]	Enables/Disable the translation GUI when a bone is selected.
[R]	Enables/Disable the rotation GUI when a bone is selected.
[F]	Enables/Disable mouse translation when a bone is selected.
[←]	Snaps the 3D view to view down the positive X-axis.
[→]	Snaps the 3D view to view down the negative X-axis.

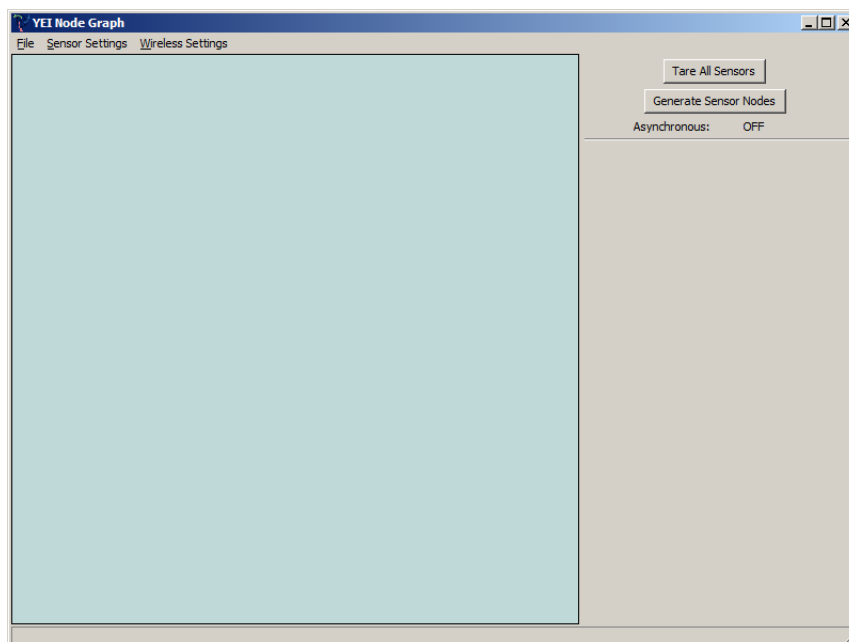
[↑]	Snaps the 3D view to view down the negative Y-axis.
[↓]	Snaps the 3D view to view down the negative Z-axis.
[Spacebar]	Allows the user to add/delete/copy bones.
[Shift]	Allows the user to select multiple bones.

Connecting Sensors

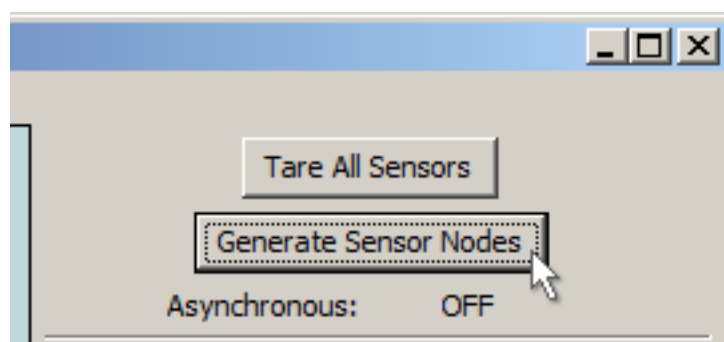
Upon running the application, there should have been a progress bar that searched for connected 3-Space Sensor units. Do not worry if you did not have any connected, we will still be able to use them. Now at this time connect any of the 3-Space Sensor units you wish to use, and click on “Node Graph” in the menu bar then “Configure Node Graph”.



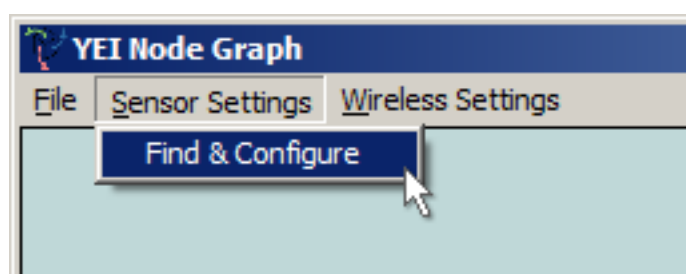
The YEI Node Graph window should be showing and we can now start interacting with the sensors.



Now if you had sensors connected before you started the application, all you should need to do is click the “Generate Sensor Nodes” button.

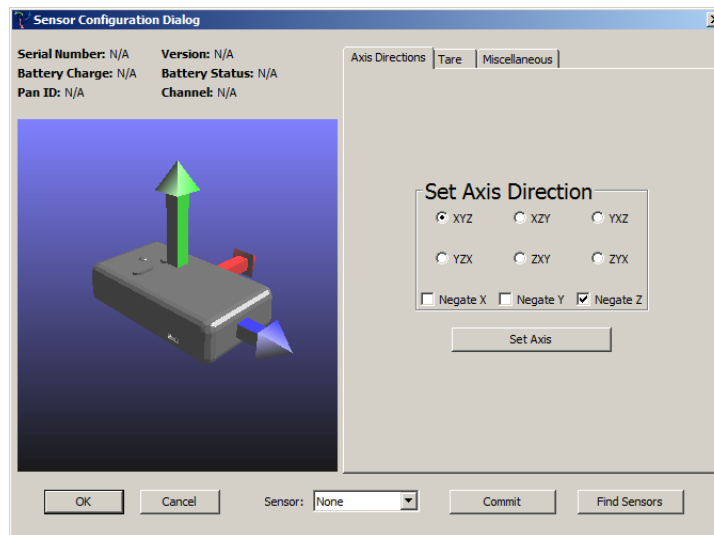


However, if you did not or just want to make sure you sensors are already connected, you can click the “Sensor Settings” in the menu bar and open up the Sensor Configuration dialog.



This dialog is used to find and configure 3-Space Sensor units. For now we only need to concern

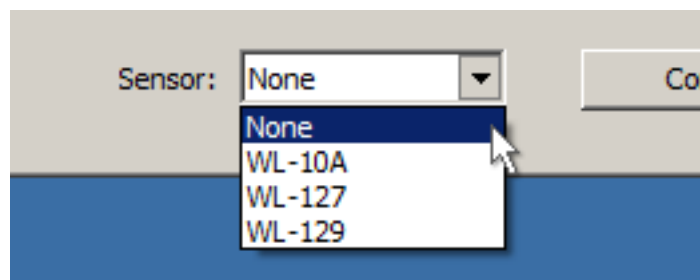
ourselves with the “Find Sensor” button. For a more in depth usage of this dialog, consult to the full manual.



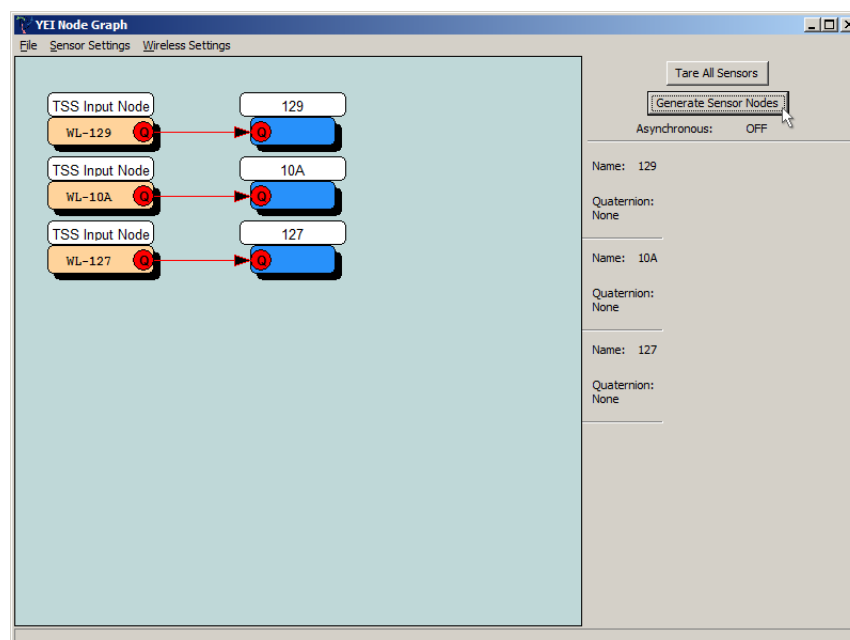
Now click the “Find Sensors” button, which will search for 3-Space Sensor units the application is unaware of.



To ensure that any 3-Space Sensor units were found, click on the drop-box to see if any 3-Space Sensor units are in there.

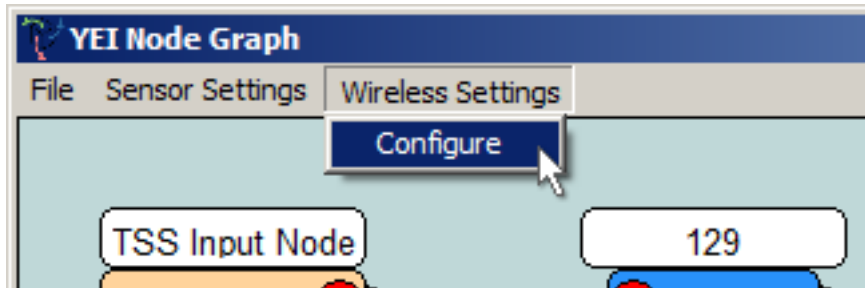


Now then click on the “Generate Sensor Nodes” button and you should see some nodes on the screen.

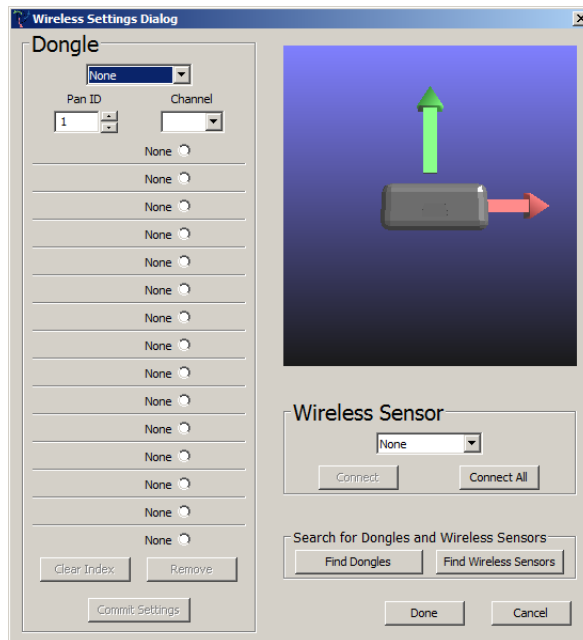


Connecting Sensors Wireless

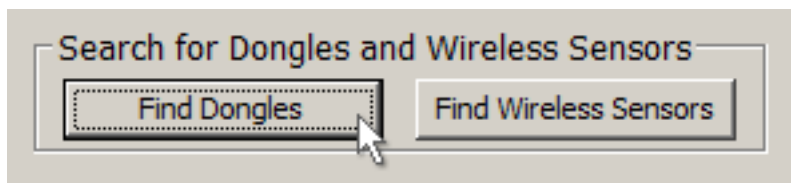
Now then to wireless connect to the 3-Space Sensor Wireless units, you must first have a 3-Space Sensor Dongle. If not, you may continue to the next section of the Quick Start, *Creating Bones and Building Skeletons*. If so, connect your 3-Space Sensor Dongle to your computer if not so already. Then in the menu bar click “Wireless Settings” and then “Configure”.



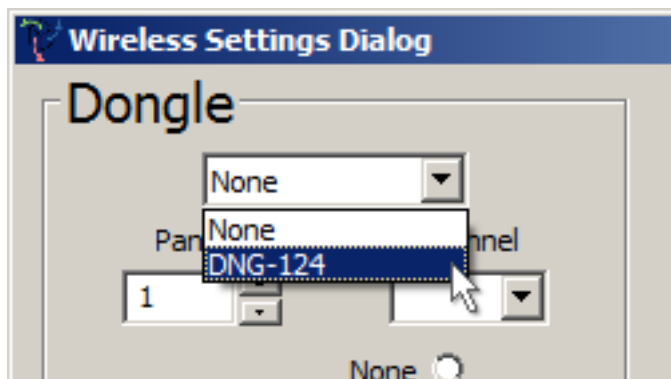
This opens up the Wireless Configuration dialog, where we can pair 3-Space Sensor Wireless units with 3-Space Sensor Dongle units, and find newly connected 3-Space Sensor Dongles and 3-Space Sensor Wireless units.



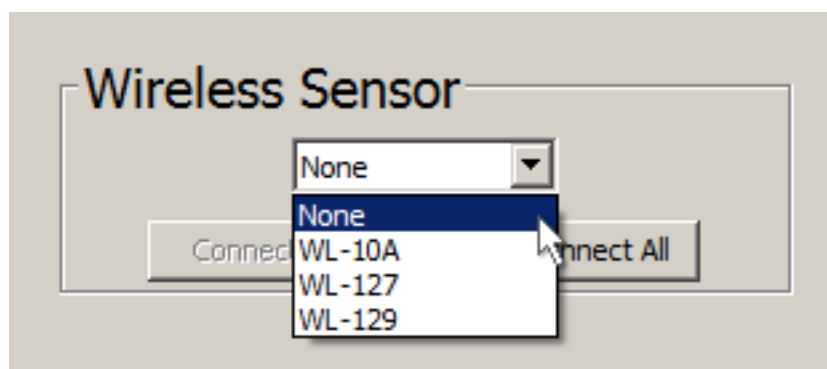
Now if you just connected a 3-Space Sensor Dongle you need to click the “Find Dongles” button so the application can be aware of it.



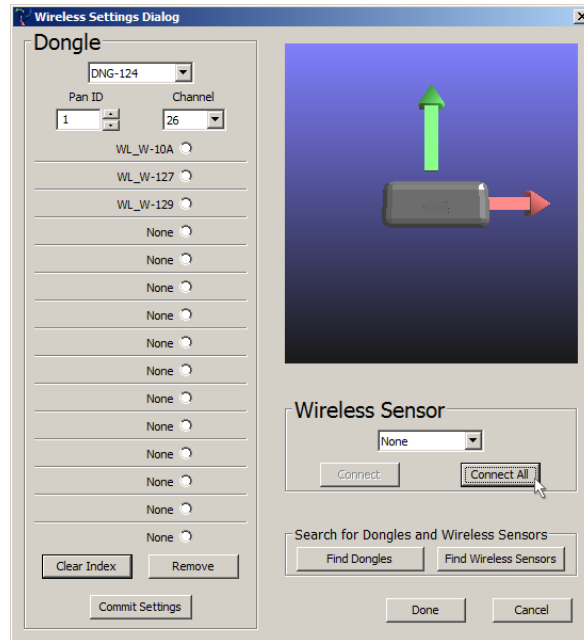
Now go to the dongle drop-box and select your connected 3-Space Sensor Dongle.



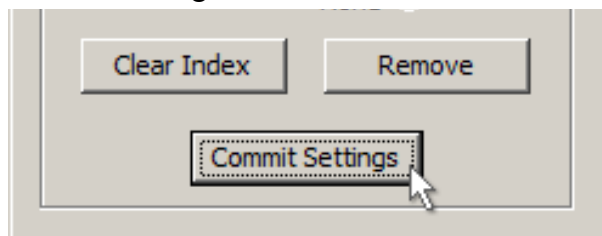
Now we are ready to pair our 3-Space Sensor Wireless units to our 3-Space Sensor Dongle. To see what 3-Space Sensor Wireless units we have, go to the wireless drop-box.



Now you may select one then click the “Connect” button, but you will have to do this for every 3-Space Sensor Wireless units you want paired with the 3-Space Sensor Dongle. Instead just click the “Connect All” button and the first fifteen 3-Space Sensor Wireless units in the list will be paired with the 3-Space Sensor Dongle. You are also able to unpair 3-Space Sensor Wireless units, so do not worry if you paired 3-Space Sensor Wireless units that you did not want to.



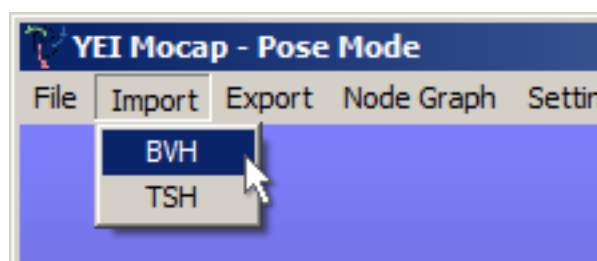
To ensure that we do not have to do this again, click on the “Commit Settings” button to save the current settings to the 3-Space Sensor Dongle.



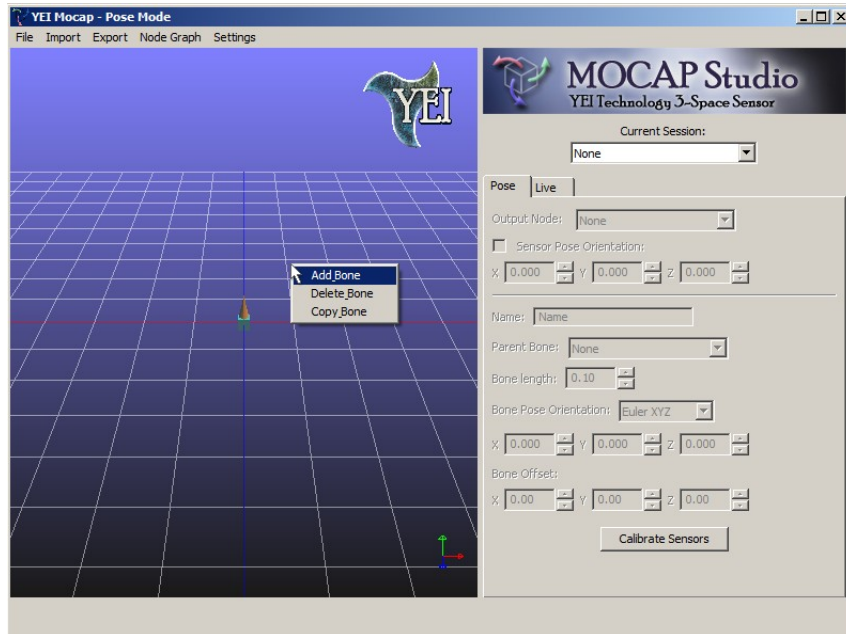
Now that we have our sensor nodes connected to 3-Space Sensor units, you can close the YEI Node Graph window and go back to the YEI Mocap window.

Creating Bones and Building Skeletons

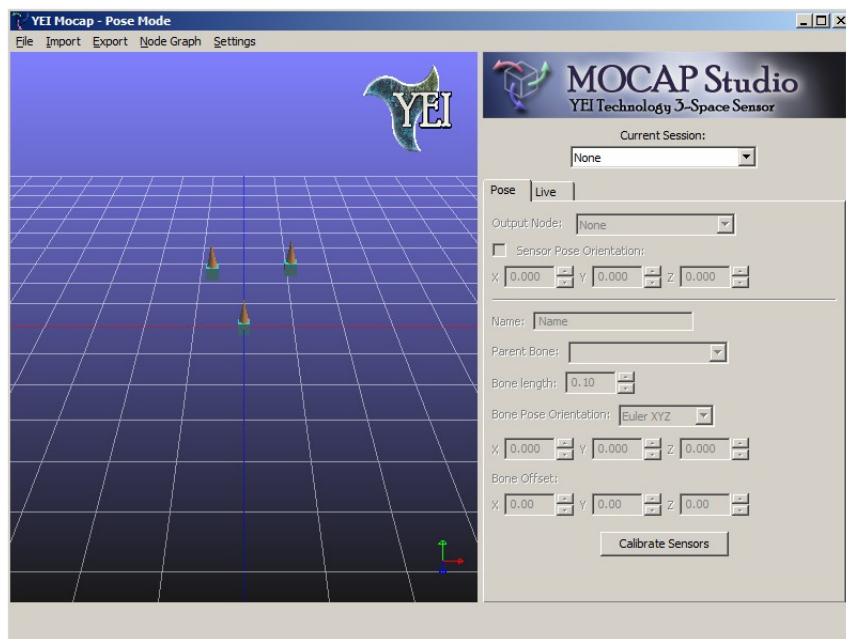
Upon returning back to the YEI Mocap window, we can now create a skeleton for motion capturing. For this Quick Start, we will just create a three bone skeleton (e.g. an arm). For a more advanced skeleton consult the full manual. As mentioned previously the YEI Mocap Studio application can load in previously recorded motion captures in the form of BVH files and TSH files. So if you just want to load in a skeleton, go to import and choose either “BVH” or “TSH” and select “demo_arm” from our “demos” folder.



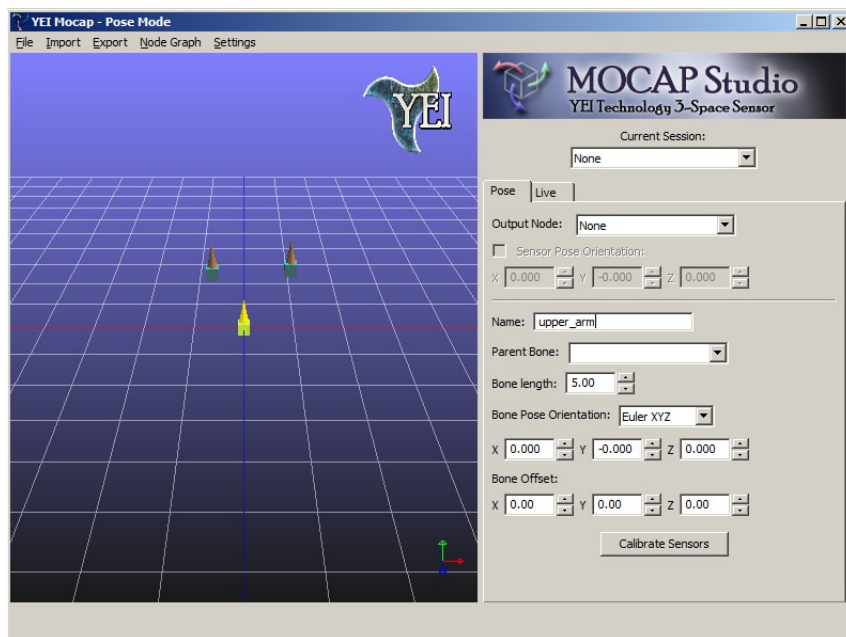
Be sure to change the “Current Session” drop-box to “None” before continuing or you will not be able to edit the skeleton. Or you can manually create the arm by having the mouse in the 3D view and press [Space] to add a new bone.



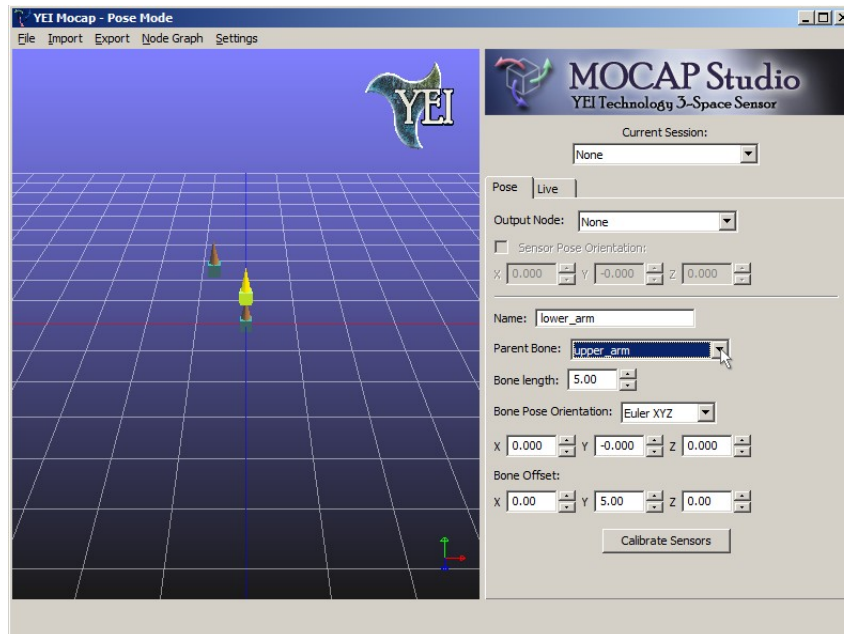
Do this two times so that you will have three bones.



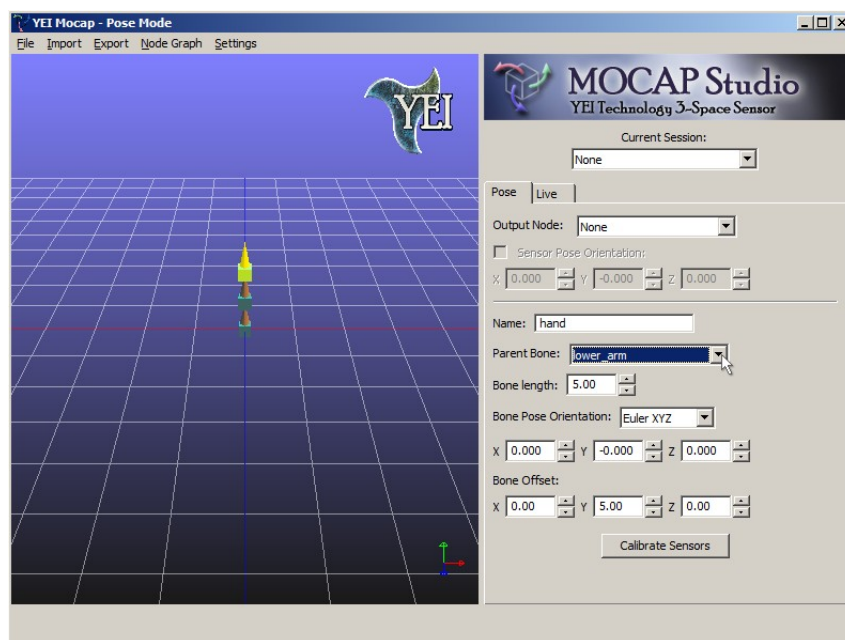
Now click on any one of the bones. The bone will be highlighted in yellow and the “Pose” panel will become enabled so you can start editing the bones properties (e.g the name, bone length, pose orientation, offset position, and parent). Change the selected bone's name to “upper_arm”.



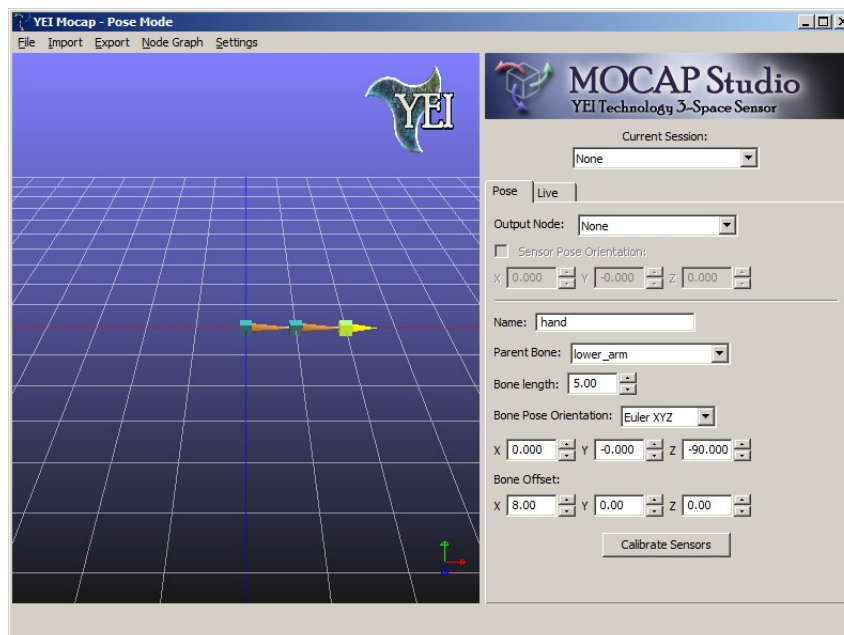
Now select another bone and change its name to “lower_arm”. Then go to the “Parent Bone” drop-box and select “upper_arm”. The bone will immediately snap itself to the end of the “upper_arm” bone.



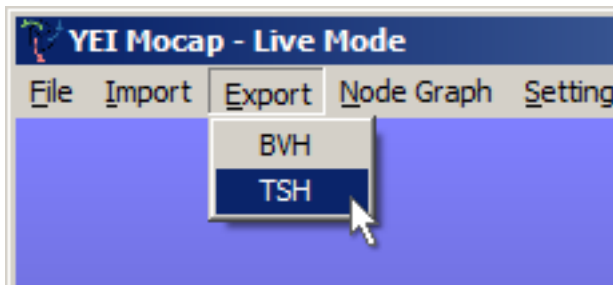
Do the same thing with the last bone but name it “hand” and parent it to the “lower_arm” bone.



Now you may go ahead and change the bones' length and pose orientation as you see fit. Keep in mind though pose orientation is not inherited so you have to set the pose orientation for each bone.



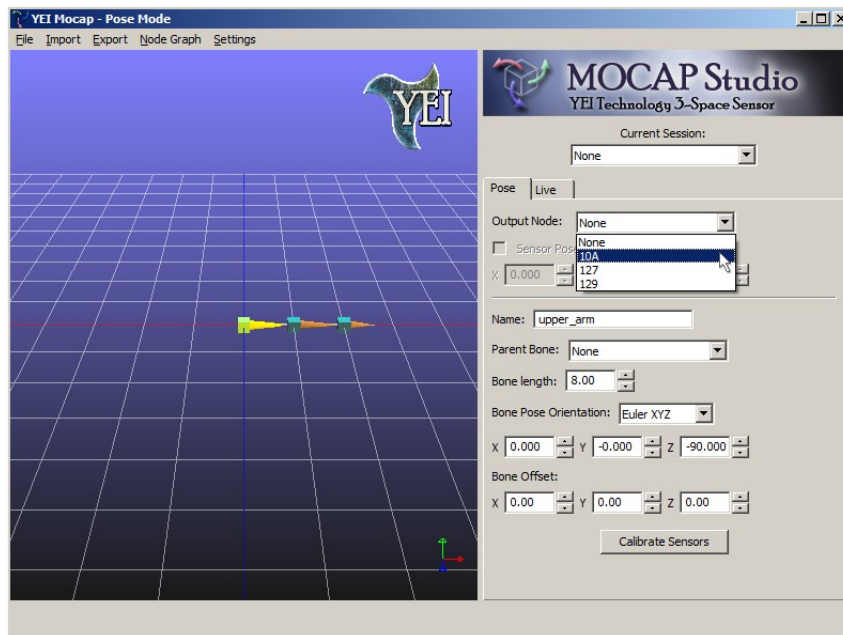
At this point, it might be good to save our work in case something happens. Just click on “Export” in the menu bar and select “TSH”. Name the file and save it wherever you want. Now if anything goes wrong, you can just import the file back into the application and continue from where you left off.



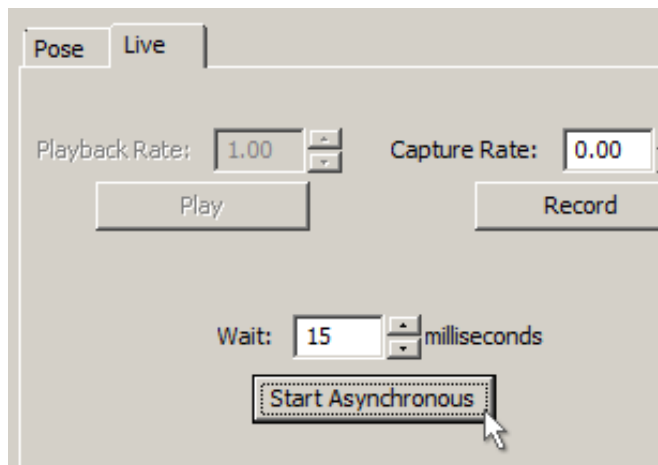
Okay now we are ready to bind 3-Space Sensor units to the bones. Now depending on how many you have, you may only be able to do part of the following steps.

Binding 3-Space Sensors to Bones

Let's start by selecting the “upper_arm” bone. Now go to the “Output Node” drop-box and select any one of the nodes. Do this for other two bones, giving them each a different node if you can.



There is no problem if you give two or more bones the same node. The bones will just all have the same orientation. Now let's check to see if the 3-Space Sensor units are connected and working. Click on the “Live” tab and click on the “Start Asynchronous” button.

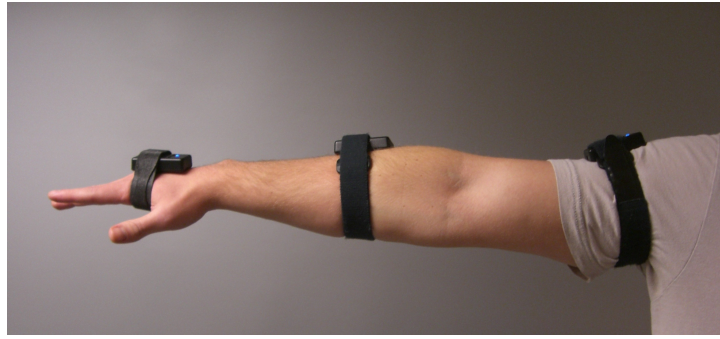


If everything goes well, you should see the bones rotating when you move around a 3-Space Sensor that was bound to that bone. If asynchronous failed to start, there should have been an error message that would suggest possible issues and solutions. If nothing is happening, consult the MocapStudio.log file to find what went wrong or restart the application and import the saved file and rebind the 3-Space Sensor units.

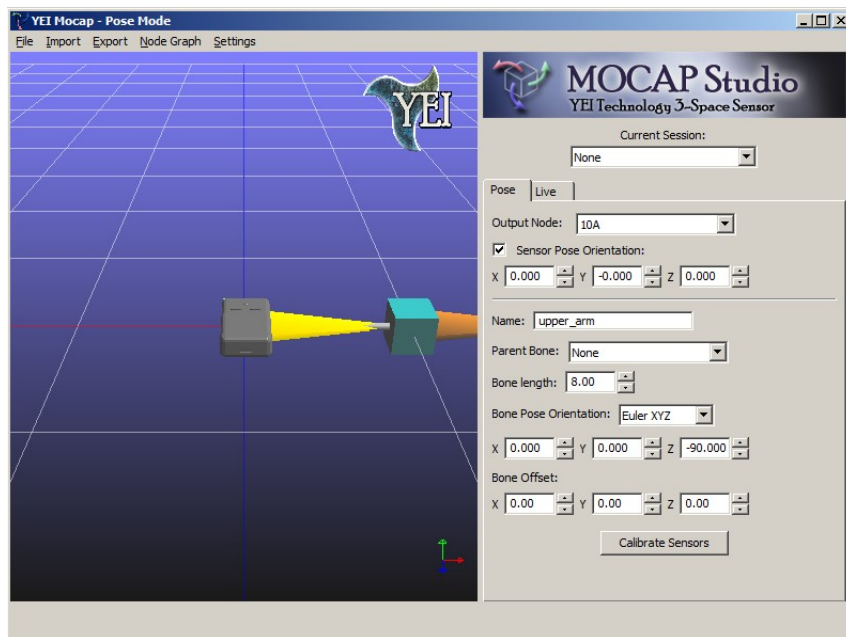
Capturing Motion Data

Now you can start to record data if you wanted, but it probably will not be as accurate as you would want. So in order to have proper motion capturing, we need to calibrate the sensors. To do so go back to the “Pose” panel. Now if you was able to pair our 3-Space Sensor Wireless units with our 3-Space Sensor Dongle units, we can turn on the 3-Space Sensor Wireless units and unplug them from the computer. The application will automatically switch to using wireless data. Then somehow strap the 3-

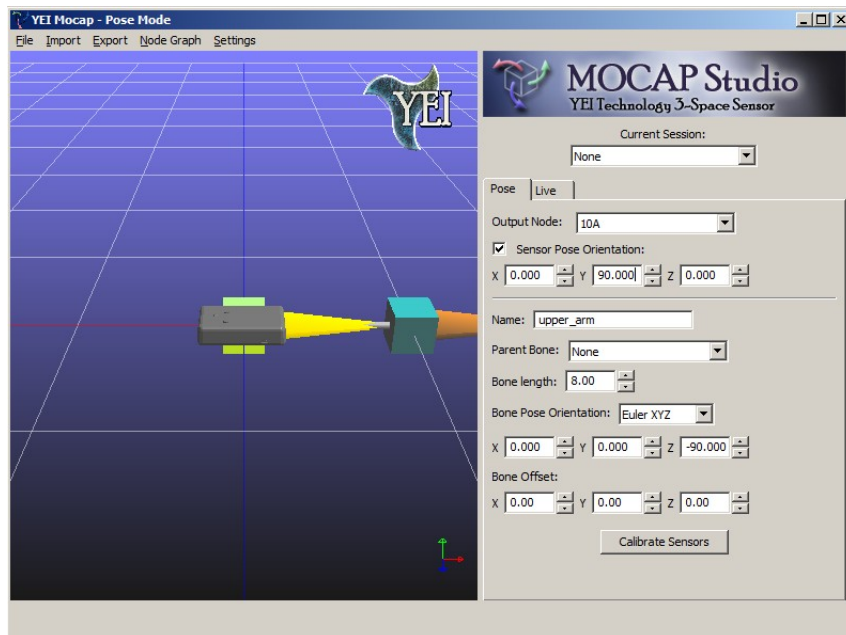
Space Sensor Wireless units to an arm. In this example, I used Velcro and Velcro straps but you may use whatever you want. Also make sure you strapped the 3-Space Sensor units according to what bone they are bound to.



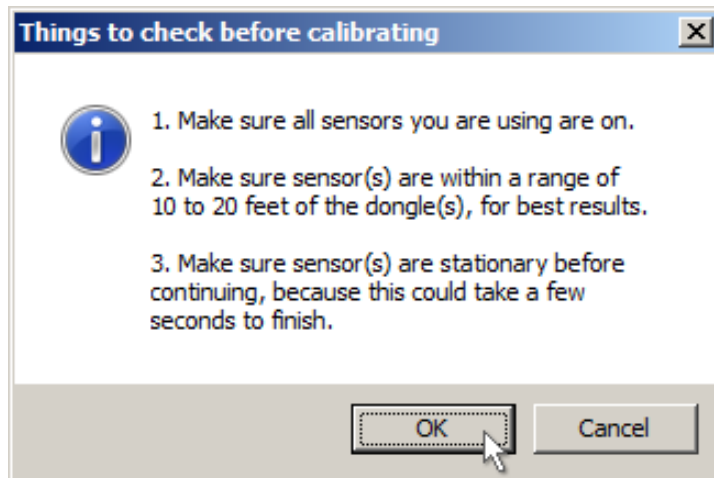
In order to properly calibrate the 3-Space Sensor units, we need them to have the correct axis directions. This can be done in two ways, in the Sensor Configuration dialog or by checking the check-box on the “Pose” panel and changing the “Sensor Pose Orientation” values. We are going to be using the second way because it is easier to do. Now select the “upper_arm” bone and click on the check-box to enable the “Sensor Pose Orientation”.



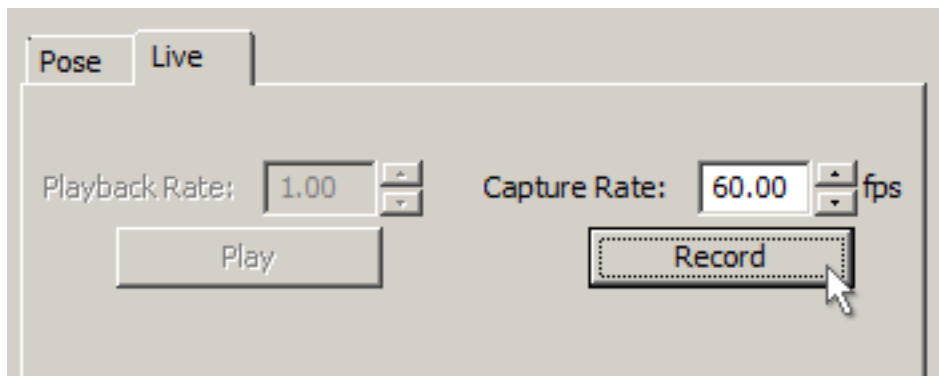
Okay if you cannot click the check-box be sure that the node in the Node Graph window has a TSS Node attached and that the TSS Node has a 3-Space Sensor by right clicking and going to “Properties”. Now orient the sensor mesh as it looks like on the arm. Do this for the other bones as well.



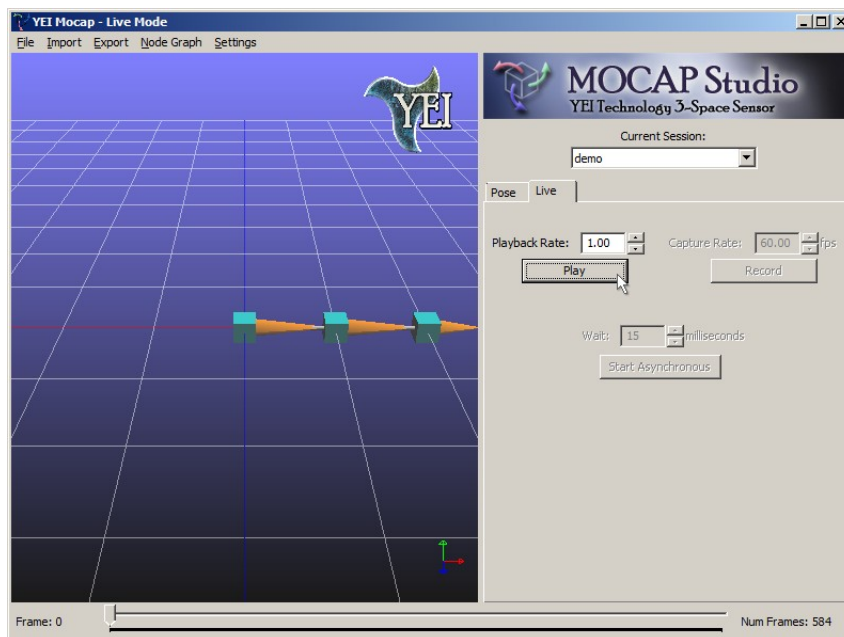
Once you have finished orientating the sensor meshes, we are ready to calibrate the 3-Space Sensors. So hold the arm with the 3-Space Sensor units still and click the “Calibrate Sensors” button. A message dialog will pop up giving instructions to follow.



After clicking the “OK” button, the application will immediately go to the “Live” panel and start asynchronous if everything went well with calibrating the 3-Space Sensor units. From here you may set how many frames per second you want to capture and start recording.



After recording you may change the name of the session and export the data in either the BVH or TSH format for later use. You will also be able to play back the data you just recorded by clicking the “Play” button in the “Live” panel. Just make sure the “Current Session” drop-box is not “None”.





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