

Vicon Nexus Real-Time Integration

Overview

Visual3D streams data in real time as [Vicon Nexus](#) processes incoming frames. During streaming, Visual3D can either save the incoming frames to a C3D file or capture a static trial directly from the live stream. It's important to remember that Visual3D depends on Nexus for data streaming—Visual3D cannot replace Nexus in this workflow.

Capturing a static trial within Visual3D is especially useful when preparing for real-time digitizing or defining functional joints. Visual3D Professional also supports real-time biofeedback and event-triggered data capture. This allows the system to automatically record the last n seconds of data following an unexpected event, without requiring a manual capture to be initiated beforehand.

Before starting the stream, in Nexus 2, make sure that you have captured a static trial, and then have performed the labeling calibration to ensure that you are able to auto-label in live mode.

Purpose: This tutorial provides a step-by-step guide to streaming real-time data from Vicon Nexus to Visual3D, allowing users to take full advantage of Visual3D's real-time processing and biofeedback features.

Step 1 - Nexus

Before streaming in real time, Nexus must be running and the subject calibration trial must be labeled. This allows Nexus to label markers in "Live" mode.

Step 1a. Subject Calibration in Nexus

1. Calibrating the Capture Volume

- Calibrating the capture volume Nexus using the software's standard protocol.

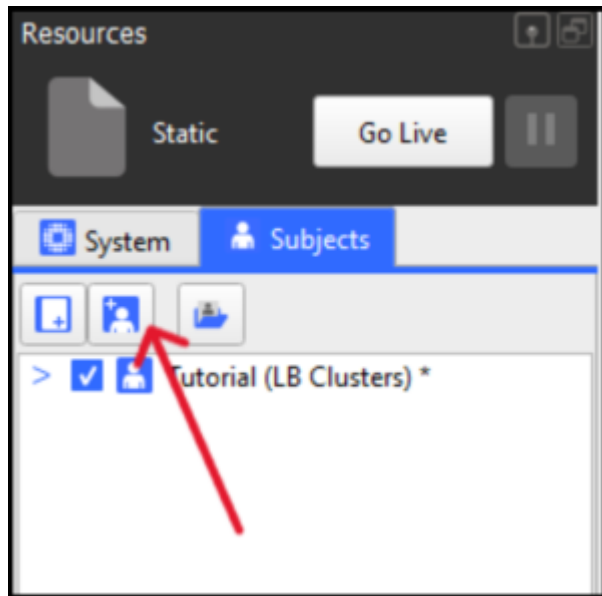
2. Verify Session Folder

- Ensure that the appropriate session folder has been selected before capturing motion capture data.
- Ensure Live mode is on before capturing data.

3. Creating a New Subject from a Labeling Skeleton Template

- Load the desired Vicon Labeling Skeleton Template ([VST](#)) (one provided by Vicon or a custom VST)

- Vicon Labeling Skeleton Template is a Vicon Nexus file type to describe the relationship between segments, joints, and marker sets.



4. Capture Static Calibration Trial

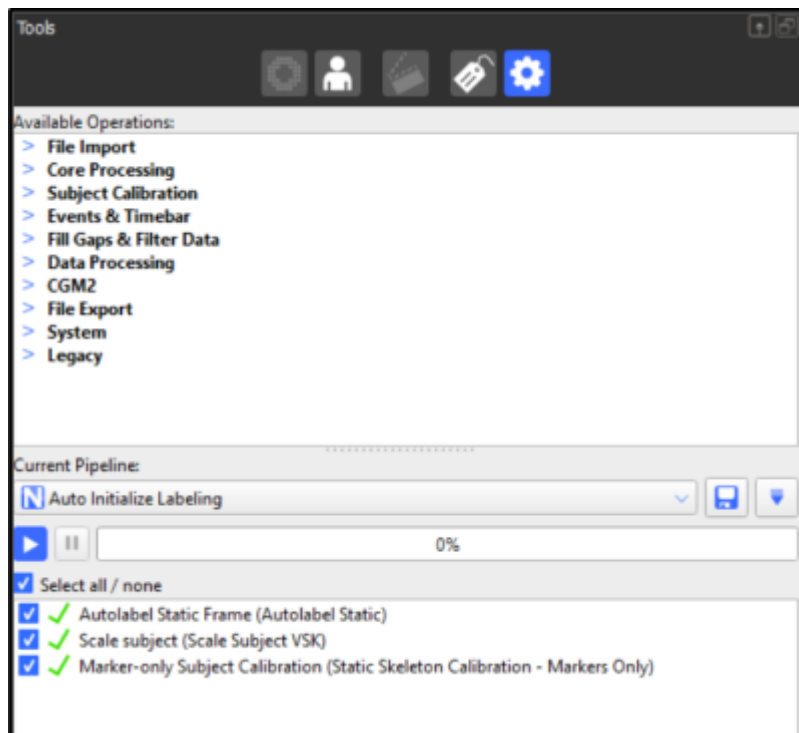
- Capture a static trial.

5. Reconstruct the Static Calibration Trial

- To reconstruct the markers, on the **Tool Bar** click the Reconstruct button or run the **Reconstruct Pipeline**.

6. Auto Initialize Labeling Pipeline

- Run the first step of the pipeline individually (**Auto Label Static Frame**) to assess the labeling quality and correct any incorrect labels.
- Once satisfied, run the following two steps in the pipeline to scale the subject and create a Vicon Labeling Skeleton file(**VSK**) and to automatically label the markers.



7. Verify Labeling in Live Mode

- Go back to “Live” mode, with the subject in the capture volume to test that Nexus correctly autolabels markers in real-time.

Step 2 - Visual3D

Step 2a. Apply Model Template in Visual3D

To create the segments in Visual3D, you must first load a static trial into Visual3D and apply a model template (.mdh).

To load the static trial, you can either:

Option 1 - Load the static trial you collected in Nexus during Step 1

Option 2 - You can collect a static trial in Visual3D.

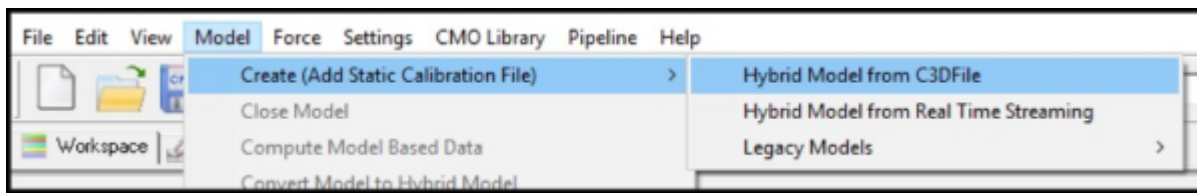
Its recommended to use the static trial collected in Nexus (Option 1).

Option 1

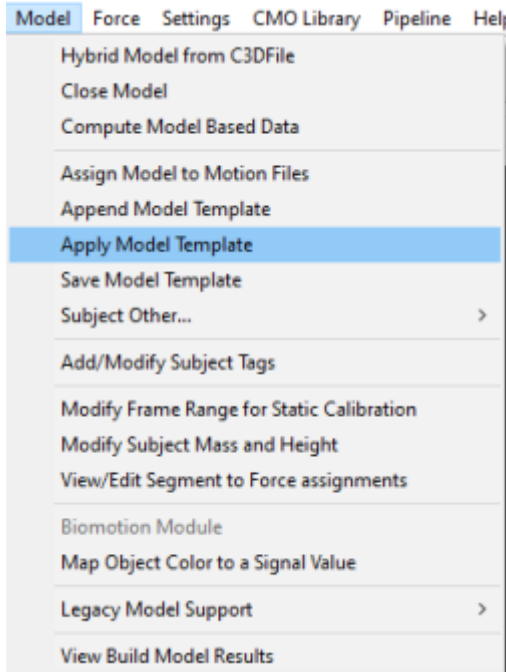
1. Import the Static File

- From the **Model** menu, select **Create → Hybrid Model from C3D file**.

- Select ***Static.c3d*** and click **Open**.



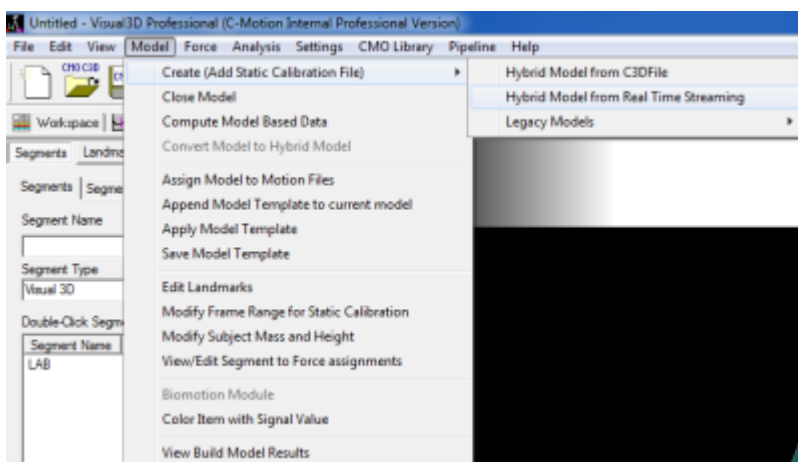
2. Apply the Model Template



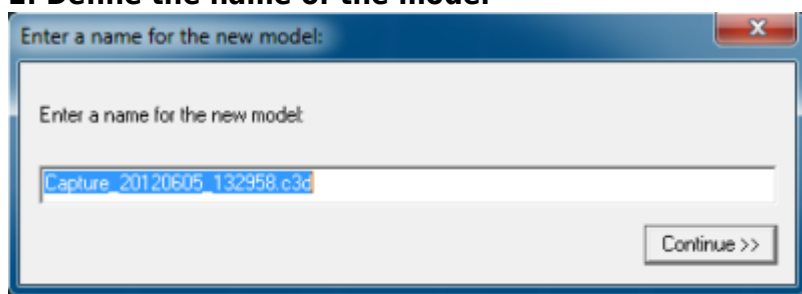
Option 2

1. Model Menu

- From the **Model** menu, select Create (Add Static Calibration File), then Hybrid Model from RealTime Streaming.

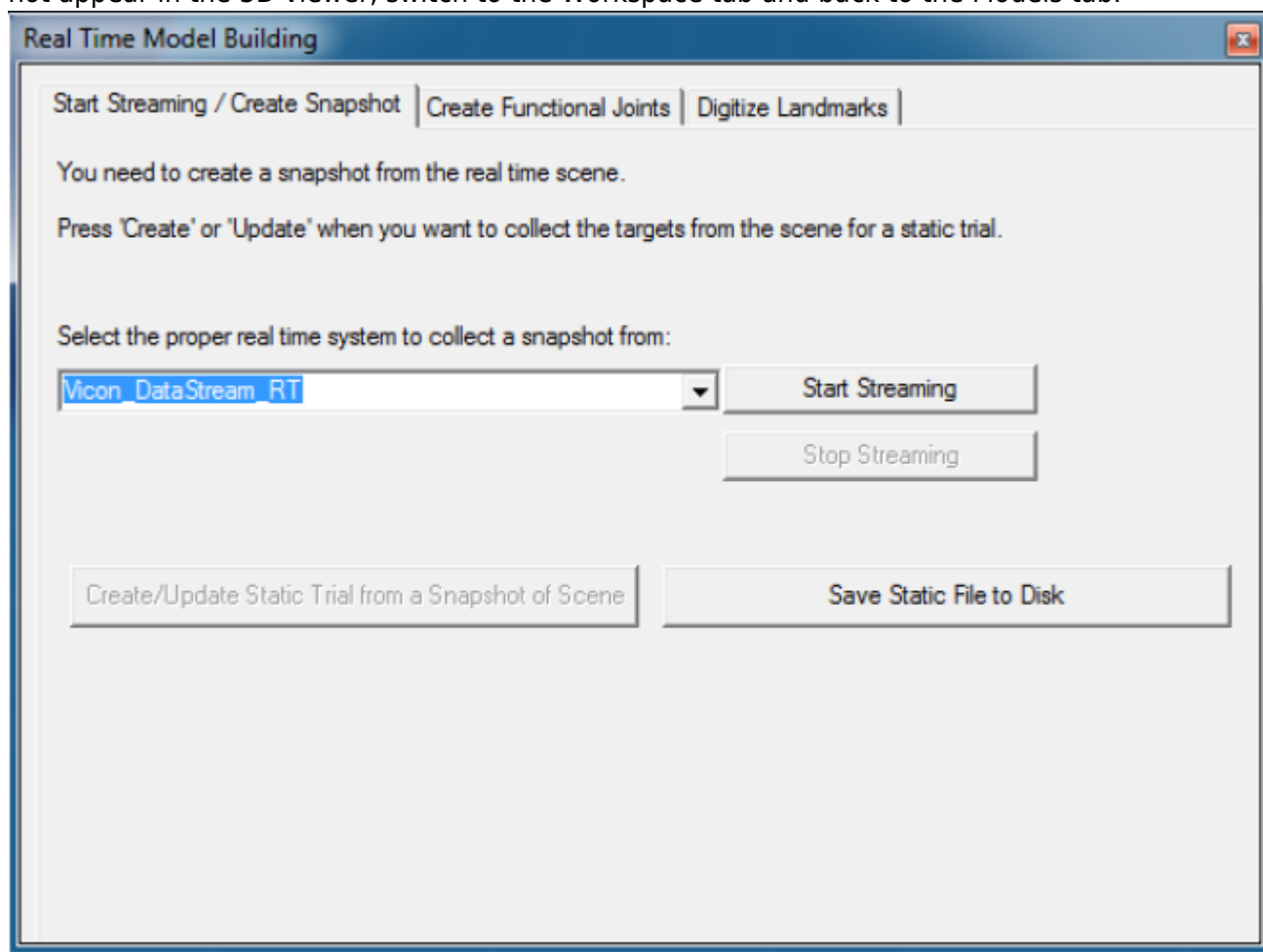


2. Define the name of the model



3. Select the correct real-time system from the drop down menu and click start streaming. When prompted, specify your sampling frequency. When prompted, specify the IP address as the local host, 127.0.0.1 and port as 801.

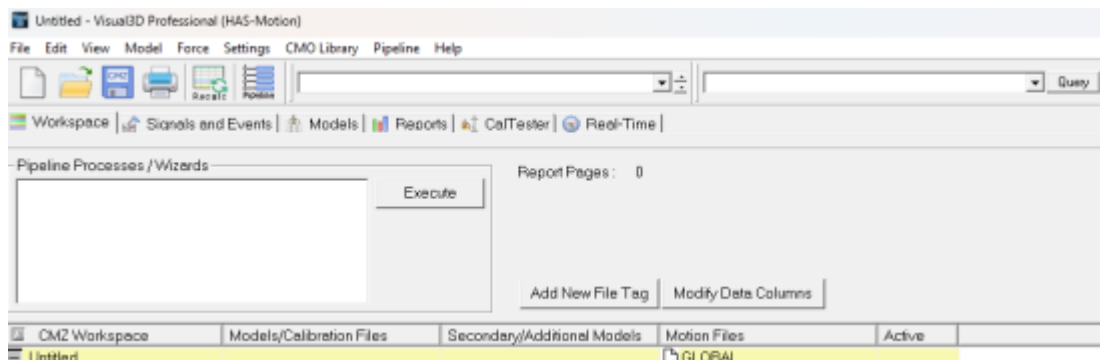
4. While the subject is standing still, collect a static trial by either clicking **Create Snapshot (Static Trial)** to save the static trial in the workspace or **Save Static File to Disk** to save the static trial as a C3D file. Please note that closing the Real Time Model Building dialog box will stop the real time streaming and remove the markers from the 3D viewer. After closing this dialog, if the static trial does not appear in the 3D viewer, switch to the Workspace tab and back to the Models tab.



5. Go to **Model → Apply Model Template** and browse to your model template (.mdh)

Step 2b. Visual3D Real-Time Set Up

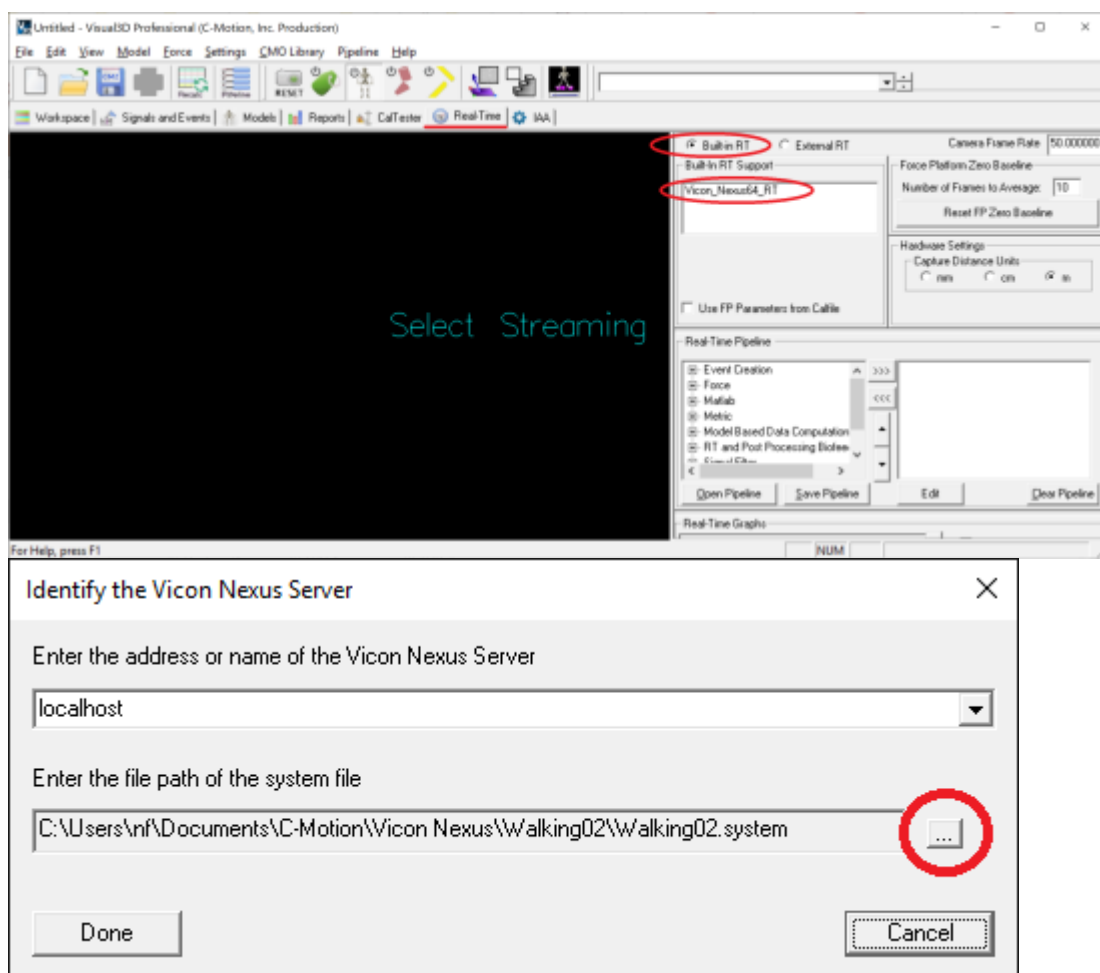
1. Launch Visual3D



**2. Select the Real-time capture TAB **

3. Data Streaming in Nexus

- In the dialog box you should see your plug in _____.dlls Click Vicon_Nexus_RT.
- A dialog box will appear to select your current Nexus System file. When using standard Nexus file structure, the system file should be located under:
C:\ProgramData\Vicon\Nexus\Configurations\System\



Streaming data from Nexus is continuous, the streaming status is in the bottom left of the page. If streaming for a long duration, the labeling in Nexus may start to fail. In Nexus, clicking **CTRL+R** may

improve the labeling.

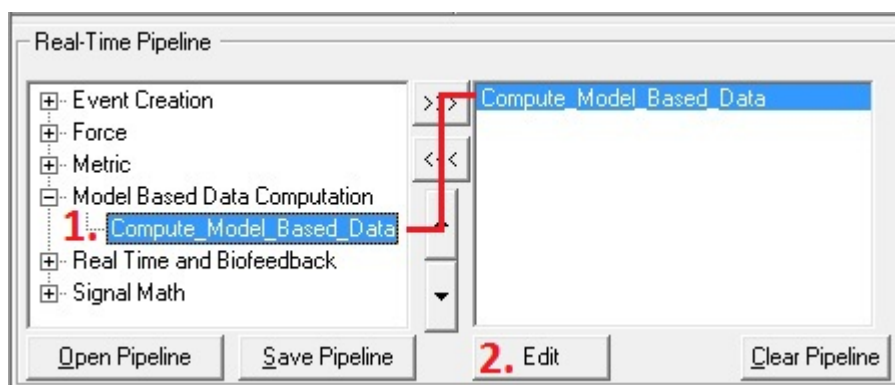
It is very important that Nexus automatic labelling works properly in “Live” mode and identifies markers correctly. If the markers aren't correctly identified in Nexus, Visual3D can not process any real-time data.

Step 2c. Compute Model Based Item: RT Pipeline

After having created or loaded a model, and established connection with the system back in the Real-Time tab, it is then possible to compute any model based item through the real-time pipeline.

1. Compute Model Based Items via Pipeline Commands

- Open up: Model Based Data Computation under the **Real-Time Pipeline**
- Double click, Compute_Model_Based_Data
- Click **Edit**



Change the corresponding:

```
**Data Name:** Ankle
**Folder:** ORIGINAL
**Model Based Item Properties:** JOINT_ANGLE
**Segment:** Right Foot
**Reference Segment:** Right Shank
```

Compute Model Based Data

Data Name: **Ankle**

Folder: **ORIGINAL**

Result Folder will always be Original

Joint Angle (degrees):

Segment and Reference Segment define the angle desired. Normalization is relative to standing posture. The Cardan Sequence defines the order of rotations. Warning!!! If you are using the anatomical axes (ML, AP, or AXIAL) the sign of the angle follows the Right Hand Rule about the actual corresponding segment coordinate system axes.

Model Based Item Properties

JOINT_ANGLE

Negate: ☐ X ☐ Y ☐ Z

Normalization: **Normalization Off**

Segment: **Right Foot**

Reference Segment: **Right Shank**

Cardan Sequence: **X-Y-Z**

Done **Reset Dialog** **Cancel**

Step 2d. Create Graph

1. Graph Creation

- Click **Add** in the **Real-Time Graphs** section, and enter the following:

Data: LINK_MODEL_BASED::ORIGINAL::Ankle

Add/Modify Real-Time Feedback

Graph Type: ☐ No Graph ☒ 2D Graph ☐ Bar Chart

Data to: 1. LINK_MODEL_BASED-ORIGINAL-Ankle

Component: X Line Color: White

☐ Graph P2D StdDev Component

Graph Position: Column: 1 Span: 1
Row: 1 Span: 1

☒ Automatically Scale to Signal Min/Max ☐ Scale Graph to User Defined Min/Max

☐ Highlight Target Range 0 + 0

☐ Highlight Metric Mean ☐ Highlight Metric StdDev

Event Handling

☐ Anchor Graph Start Frame on Event

☐ Anchor Graph Stop Frame on Event

☐ Update Graph Every Nth Cycle 1

Number of Cycles to Display 4

Select Events to Annotate

Warning Data Color. NOTE: If 'Less Than' equals 'Greater Than' then there is no warning given.

	Less Than	Greater Than	Also Change Background Color to
Warn Yellow When:	0	0	Default
Warn Red When:	0	0	Default
Warn Sound When:	0	0	Default

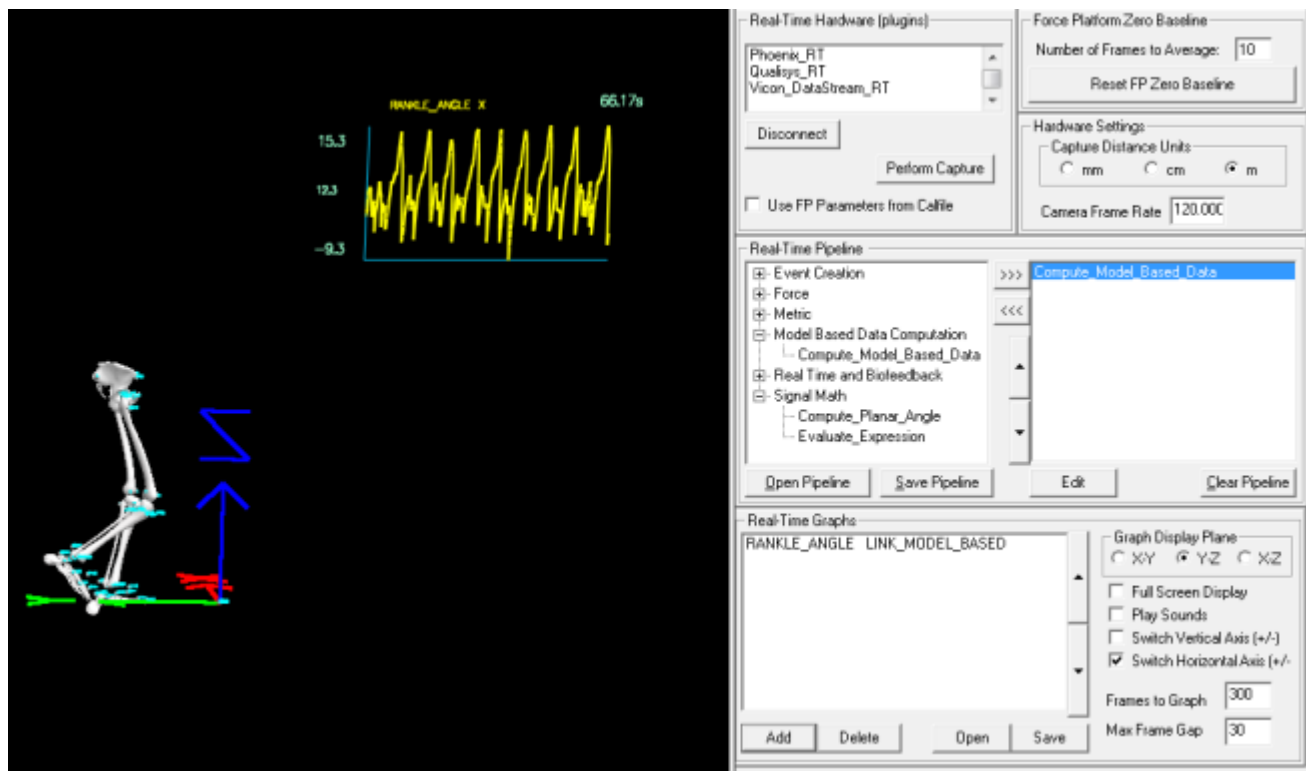
☒ Only Graph ☐ Graph Border

Sound File (Less than)

Sound File (Greater Than)

2. OK Cancel

Your result should show a Real-Time stream that looks like the picture below



Remember to save the Graph and RT Pipeline

It is very important that Nexus automatic labeling works properly in “Live” mode and identifies markers correctly. If the markers aren't correctly identified in Nexus, Visual3D can not process any realtime data.

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<https://has-motion.com/wiki/> - Wiki Documentation Site

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