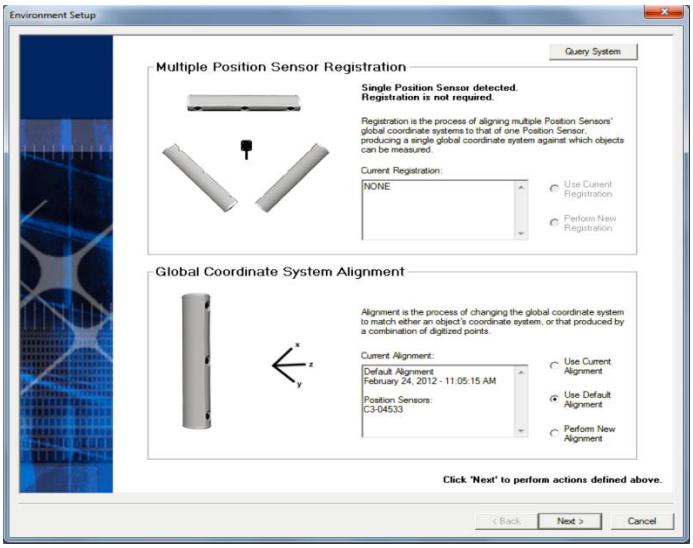
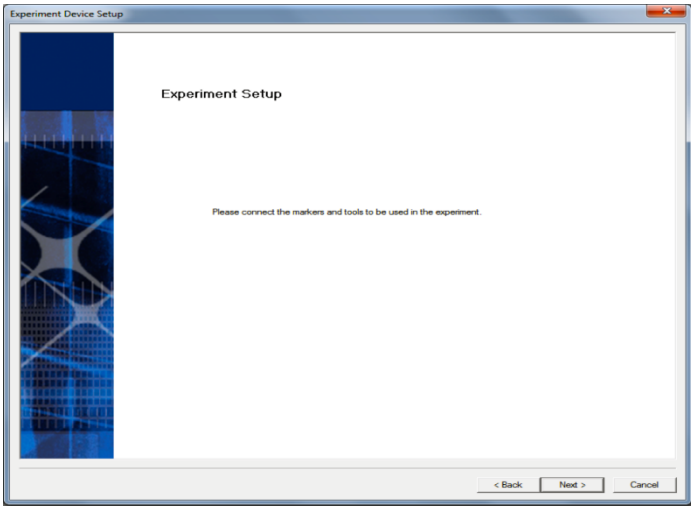
Creating a RIG File Procedure:

RIG files are preset geometery definitions that First Principles uses to express the translation of a body with respect to its six degrees of freedom. Whenever Northern Digital releases a new tool our technical staff follows a similar procedure to the one outlined in this document to create a .rig file. This document has been created to help customers generate their own RIG files after making a custom tool or modifying existing tools to better suit their application. To gain additional insight into this procedure please contact Technical Support at Northern Digital.

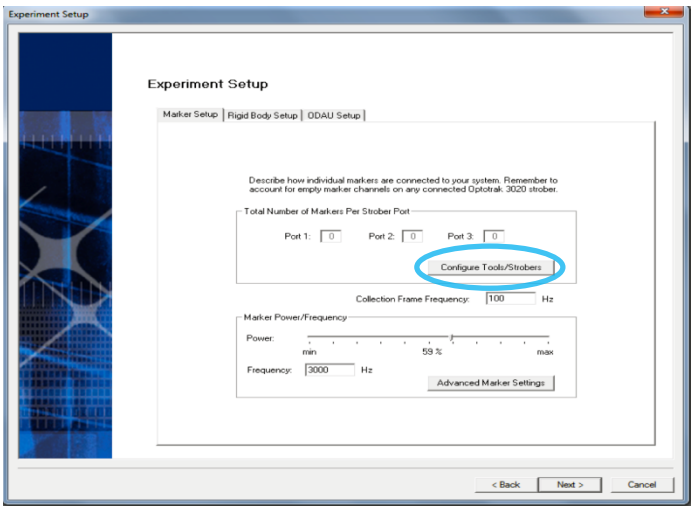
1) Create a new experiment in First Principles. After the first dialogue box appears specify whichever coordinate system you would like or is most convenient for your purposes. Please see the figure below.



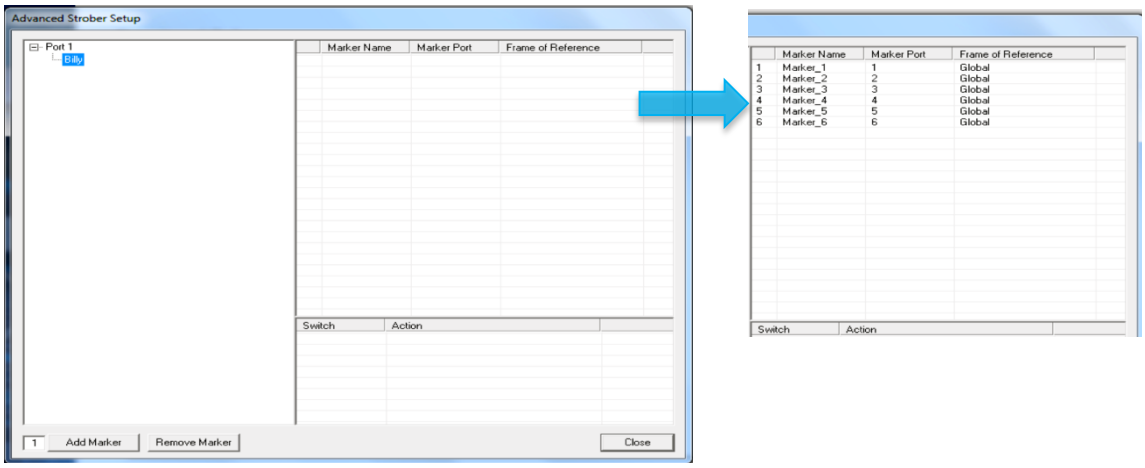
2) After specifying the coordinate system in the previous dialogue box connect the rigid body to the communication port on the front of system control unit (SCU). Please see figure below.



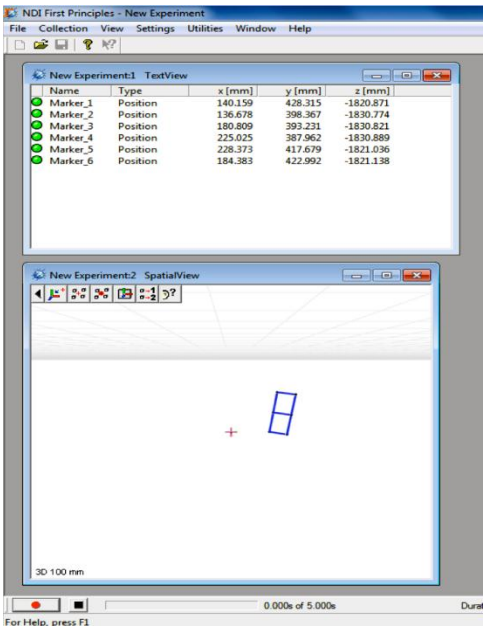
3) After connecting the new rigid body and proceeding to the next dialogue window you will need to click "*Configure Tool/Strobers*". In most cases customers do not use smart markers for tools and therefore this configuration step is required. If you are using smart markers a value should be present in one of the ports (*under heading "Total Number of Makers Per Strober Port"*) which should be representative of the number of markers connected to the system (*if using smart markers skip step 4*). Please see the figure below.



4) After clicking "*Configure Tool/Strobers*" in the previous dialogue box the "*Advanced Strober Setup*" dialogue box appears. Click on the "*+*" beside the port that the rigid body is connected to and in the bottom left corner specify the number markers and click the "*Add Marker*" button. Please see the figure below.

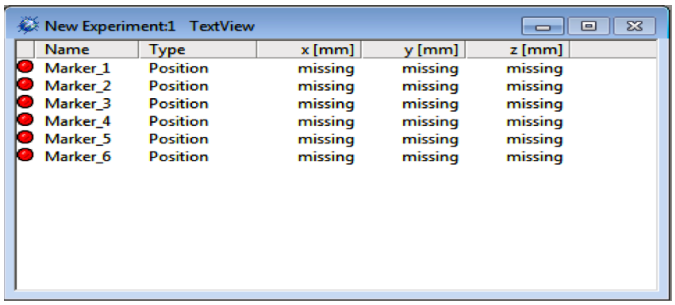


5) After adding the required number of markers and closing the "*Advanced Strober Setup*" dialogue box click the "*Next*" button found in the bottom right corner until you reach the last dialogue box which will have a "*Finish*" button located in the bottom right corner. Once the new experiment module closes the "*TextView*" should automatically open and display the position of all markers (*based on the assumption they are in view of the camera*). At this point additional views can be added to suit your preferences and this is also a good point to save your progress. Please see figure below.



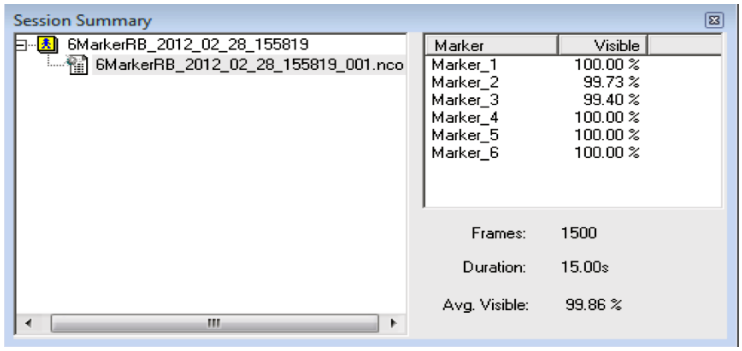
As an aside if you would like show lines between markers (which makes them easier to see) in the "SpartialView" simply hold the SHIFT key and click on a marker. It will begin to strobe and when you click on another point it will add a line between the two selected points. To exist this mode hold the SHIFT key and click on the last marker.

6) Now ensure that all markers are visible by the system. This can be done based on visual inspection of the "*TextView*" dialogue window. When you move the tool the values that are streaming for the "X, Y, Z" for each marker will change and when the markers are visible you will see a green dot beside each name (*if cannot be seen red dot will be present*). Please see figure below.



7) Now with the rigid body in the viewing area of the camera go to the bottom of the First Principles screen and set the recording duration to 15 seconds and set a delay of approximately 5 seconds (*to give yourself enough time to get up and move in a suitable recording area in the cameras capture volume*). When ready click the "*Record*" button located in the bottom left corner of the First Principles window. Please see figure below.

8) Once the set delay time has lapsed start moving the rigid body within the viewing area of the camera and begin to collect data. During this procedure attempt to keep all markers visible at all times and also attempt to illustrate a good range of motion. Please see the figure below.

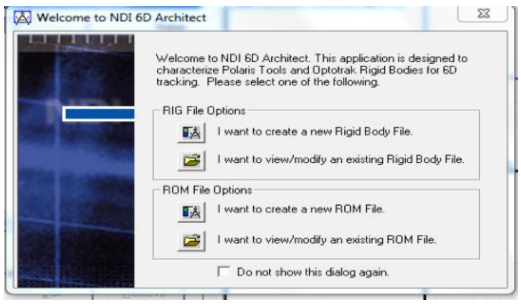


As an aside the higher the percentages are in the "Visible" column the better.

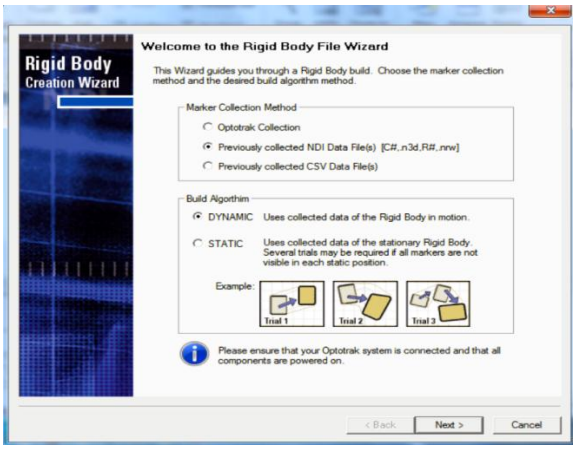
9) Now with the data recorded save your experiment once again.

10) After the completing the 9 steps described above successfully launch NDI 6D Architect.

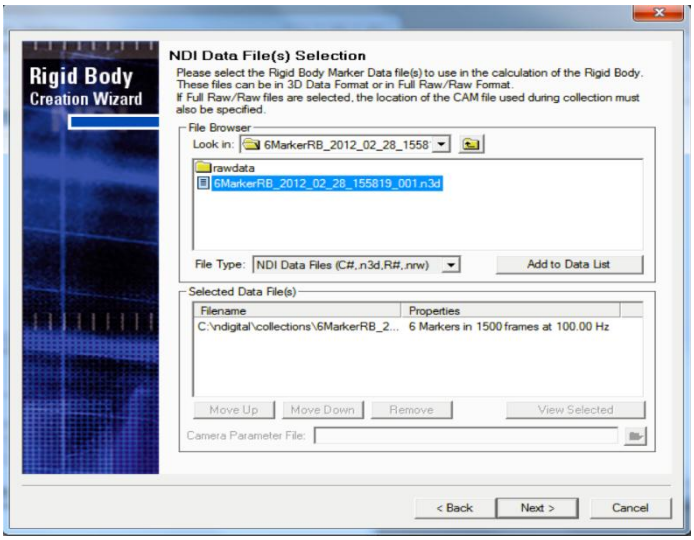
11) After launching NDI 6D Architect within the first dialogue box select the "*I want to create a new Rigid Body File*" option under the heading "*RIG File Options*". Please see the figure below.



12) Within the next dialogue box under the heading "*Marker Collection Method*" select the option "*Previously collected NDI Data File(s) [C#.n3d.R#.nw]*" and under the heading "*Build Algorithm*" select the "*DYNAMIC*" option. Please see the figure below.

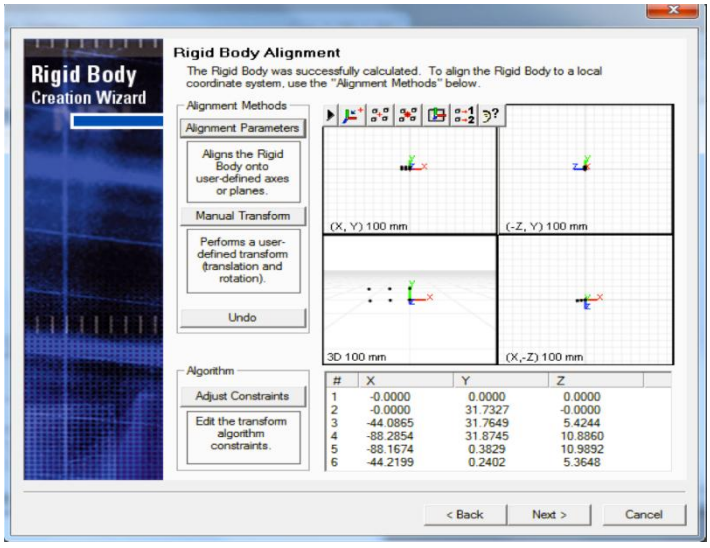


13) Within the next dialogue box navigate to the directory where the previously recorded (*steps 7 and 8*) data is located in. Once file is found click on the file name in the explorer window and then click the "*Add to Data List*" button. After this is done you should see the files that were previously selected under the heading "*Selected Data File(s)*". Please see the figure below.

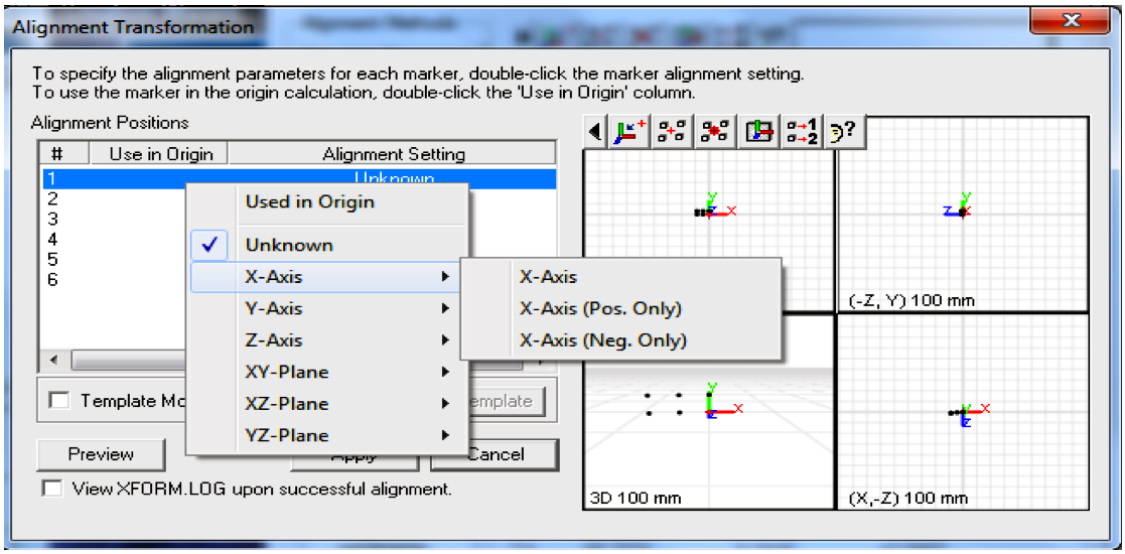


14) Within the next dialogue box "*Build Parameters*" all parameters can be left in there default state unless the user would like to modify them in some way (*i.e. change marker numbering order, etc…*).

15) Within the next dialogue box "*Rigid Body Alignment*" you can specify how to align your coordinate system and a variety of other different parameters. If you would like to keep all settings in there default state click "*Next*" and skip to step 17, otherwise click "*Alignment Parameters*" button and continue to step 16. Please see the figure below.



16) After clicking the "*Alignment Parameters*" button the "*Alignment Transformation*" dialogue box will open. At this point a variety of different things can be set or specified by right clicking on a marker under the "*Alignment Positions*" headings. After you have finished configuring your alignment settings click the "*Preview*" button to ensure everything is set in the desirable manner (*if not repeat this set again*). Please see figure below.



17) After completing the previous step click the "*Next*" button until you have reached the end of the module and click the "*Finish*" button at the end.

18) The last step is to save your new rigid body file. The default location that First Principles looks for rigid body files in is the following: *C:\ndigital\rigid,* it is recommended that you save in this directory.

After successfully completing the steps above you will have created a rigid body file that is ready for use. To use this file simply start a new experiment within First Principles connect the tool or rigid body at the prompt, after being given the prompt to connect all tools and markers click on "*Rigid Body Setup*" tab and load the newly created .rig file.