Basics Tutorial

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Before you use the lab:

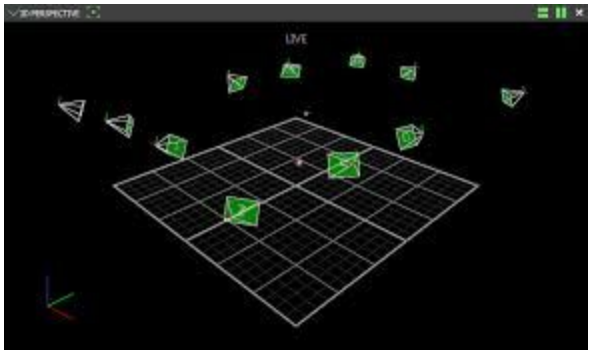
- Fill in the FRL access form
- Once the access is authorised, the new user should contact Len McLean to receive induction
- After the induction the new user should contact Anne Murphy to have their ID card coded

Getting Started:

- Switch the PC and network switch on
- The password for the PC is 'vicon' the same as the username
- Open the 'Vicon Tracker 3.7'
- Vicon Tracker User Guide

Interface Basics:

1. The left panel has several tabs “System, Calibrate, Object, Recording”
2. The large view pane has different options, we are interested in “3D Perspective” and “Camera”. Set the view pane to 3D Perspective
3. You can see each camera’s orthogonal reference and the reference for the world.



3D Perspective View

4. If you select a camera in the System Tab, you will see it highlighted in the view pane and you will see the camera’s LED light will have changed colour.
5. Keep one or more camera’s highlighted and change the view pane to Camera.
6. This will show you the current feed from the selected camera(s).

Camera View

7. Any grey/blue blobs that appear in the camera view are called masks. These are pixels that the camera is ignoring as there is interference from the real world. The likelihood that the same position in space is masked by all cameras is negligible.

8. If you haven't already done so, you can select multiple cameras and the view panel will split to show multiple camera feeds.

Calibration

1. It is recommended that you calibrate the system before running an experiment.
2. In the System Tab (left side) select all the cameras and make sure the view pane is set to Camera view rather than 3D Perspective.
3. Remove all reflective objects from the real world that are not necessary for your experiment. This includes robots, we want just want the background environment.
4. Switch to the Calibrate tab, under "Create Camera Mask" click start. The cameras' LEDs will turn blue.
5. Wait a few seconds and the click stop. This will create the grey masks on the camera feeds.
6. Grab the wand from it's stand on the wall and switch it on.

Vicon Active Wand

7. Under "Calibrate Cameras" Advanced Setting, make sure the Active Wand V2 is selected and press start.
8. The cameras' LEDs should now be flashing purple.
9. Now you wave the wand at all the cameras until their LEDs turn green. As the individual camera's calibration progresses the purple flash will increase in frequency. This process can take a few minutes, but concentrate on a single camera at a time.
10. As the last camera is calibrated, all the camera LEDs will switch to solid purple.
11. Switch the view pane to 3D Perspective. You can see the camera's are localised relative to one another, but they are in a weird pose relative to the world. We need to calibrate the origin of the real world.

12. Place the wand (lights side up) where you want the origin to be. The small arm is the x axis, the long arm is the y axis and the z axis comes up.
13. Once the wand is in the correct position, return to the PC and under the “Set volume origin” section click the “start” button. The wand should now appear in the view panel. Now click “set origin” and you will see the cameras reorientate themselves relative to the world.

Objects

1. You need a minimum of 3 markers in order to get 6DOF. (rotation and position in x,y,z).
2. The markers need to be in an **asymmetrical** pattern (for pose) and all groups of markers need to have a **unique** configuration (for multi object tracking).
    - I also recommend placing a marker over the spot where you wish for your robots axis origin to be placed.
3. If the system gets confused as two objects’ configurations are too similar, one will be highlighted in red.
4. If one or more objects are selected markers which do not belong to these object do not appear in the view pane. So make sure to unselect objects before you start.
5. To create an object - a collection of markers to track as one - highlight them on the view pane by alt + left click & drag across the markers.
6. At the bottom of the Object tab you can give your collection a name and then click the “create” button.

Objects Tab with two objects

7. Double check that tracking is enabled - the Tracking button will be green if it is.
8. If an object flashes whilst moving around the environment, you will need to repeat the calibration process above.

Set Origin on Objects

1. Click the arrow  next to your object to show markers associated with object
2. Rename the marker you want to be the origin
    - Here you can also change the colour of the markers as they appear in the Vicon view panel which is useful for multi-robot tracking
3. Pause the system by pressing the space bar or clicking the  icon.
4. You can move the object axis by clicking on each one individually and dragging it to the correct position.
    - This is where using a marker for the origin comes in handy, as if you select the marker before you try to move the axis, the system will snap it to the centre of the marker as you get close to it.