Teleoperation setup Instructions

In order to operate the current segmented teleoperative control of the 7 D.O.F system, the following steps should be followed

1. Ensure I²RIS is attached properly to the SHER's end effector, with the appropriate adapter
    a. Ensure I²RIS is plugged into the laptop that will be running the *snake_omni.cpp* and the *StartMaxonWithUI.launch* will be running
    b. Ensure that the power supply to the I²RIS is plugged in and the power is on
        i. The LED on the Arduino will be on
2. Ensure the Phantom Omni is connected to the primary PC via its Firewire cable
3. Follow the following steps to start the Phantom Omni's control
    a. Open a terminal window
    b. On the primary computer**, cd** into "omni_ws" from the home directory
        i. Run: **source devel/setup.bash**
    c. Repeat step 2 on another terminal window
    d. Open another terminal window, and run **roscore**
    e. In the other two terminals, execute the following commands
        i. **rosrun geomagic_launch geomagic.launch**
        ii. **rostopic echo /Geomagic/pose**
            1. This is to ensure that the Phantom Omni is indeed publishing its pose
    f. On a third terminal, run the following commands
        i. **cd catkin_ws**
        ii. **source devel/setup.bash**
        iii. **rosrun beginners_tutorials GeomagicSubscriber**
            1. this is to ensure that the Phantom Omni publishes messages that can be read by both the SHER and I²RIS
            2. in order to verify this, in another terminal, run **rostopic echo /eye_robot/Set…** (any of the three topics that start with that)
4. Follow the following steps to start operating the I²RIS (on the secondary computer)
    a. Disconnect from the WIFI, and use an ethernet cable to connect to the local network router located on the desk that houses the SHER
    b. Edit your ".bashrc" to include the following commands at the bottom of the script (DO NOT FORGET TO CHANGE THIS BACK WHEN DONE USING THE SYSTEM)

```
export ROS_MASTER_URI=http://(primary computer's IP):11311
export ROS_HOSTNAME= (secondary computer's IP)
```

        i. IP addresses can be found by running **ifconfig** in the terminal for any given machine
    c. Open a terminal window
    d. **cd catkin_ws**
    e. **source devel/setup.bash**
    f. **rosrun snake_omni snake_omni_node**
    g. roslaunch snake StartMaxonPositionMode.launch
    h. Press the grey button, and the snake should move with the movement of the Phantom Omni in the X-direction (disengage the snake by ending the execution in step 4.)
5. Follow the following steps to use the SHER on the primary computer
    a. Open a terminal window
    b. **rosrun eye_robot_example eye_robot_example**

c. Release the e-Stop button
d. Click on the red button on the top right of the GUI labelled "Robot Off." Upon clicking, this button should turn green.
e. On the GUI that opens, click on "3DM control"
f. Pick up the Phantom Omni's pen, press the grey pedal, and move the SHER (the system should be in the RCM mode by default)
    i. In order to change this to a normal, free space teleoperation control, follow the following steps:
        1. Navigate to the code package (~/home/catkin_ws/src/eye_obot/EyeRobot2/code"
        2. Open robottask.cpp
        3. On line 1848, change teleoperation mode from "5" to "3"
        4. Once saved, run **catkin_build eye_robot_example** in a terminal.

Non-sequential workflow instructions:

- Pressing the grey button on the Phantom Omni pen will engage the I²RIS. In order to pause operation of the SHER, release the grey pedal
    - Relative movement has **not** been implemented, so the Phantom Omni pen should be returned to the same position as the position of the SHER's end effector
- If the SHER behaves erratically, immediately release the pedal and push the e-Stop
- If you wish to collect data, click on the logger button on the top right, enter the name of your file, and click reocrd.
    - To end data collection, press the white button on the Phantom Omni
        - Take care to do this before pressing "quit" on the GUI, to avoid file saving errors