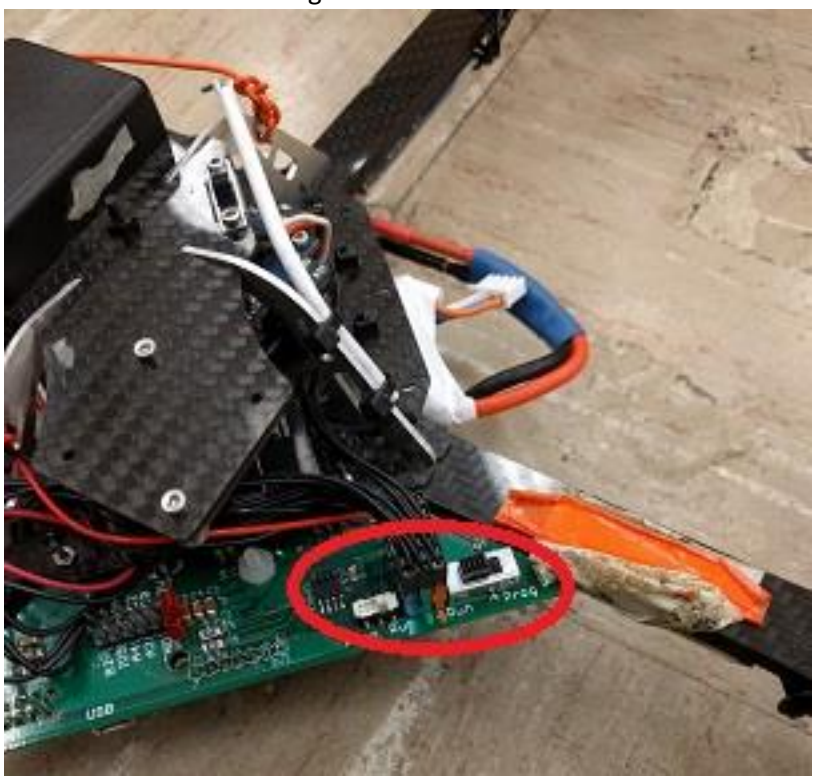
AE483 Lab Setup Guide

Powering up the quadrotor:

1. Get a battery from the **charged** section near the entrance of the lab:

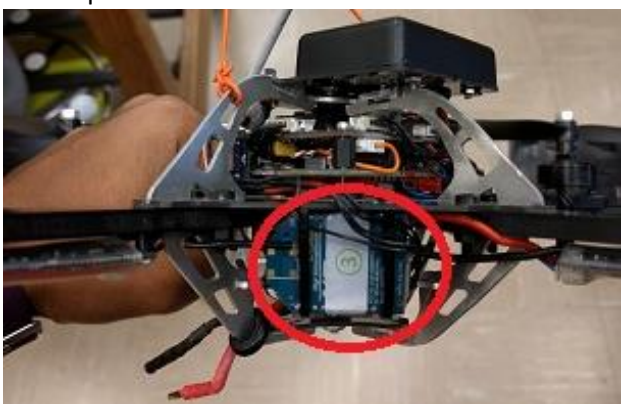
2. Slide battery into slot below quadrotor and connect the wires (red-red; black-black) :

3. Make sure that the switches on the green board are switched to '**run**':



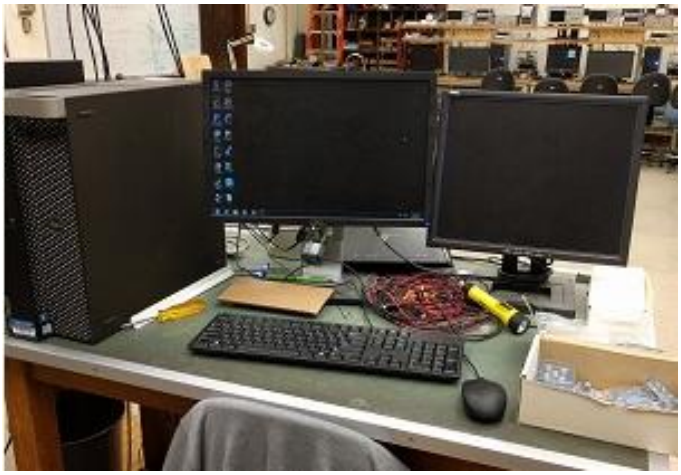
4. Power up the quadrotor while keeping it stable on the ground:

5. Note the Xbee ID on the quadrotor:

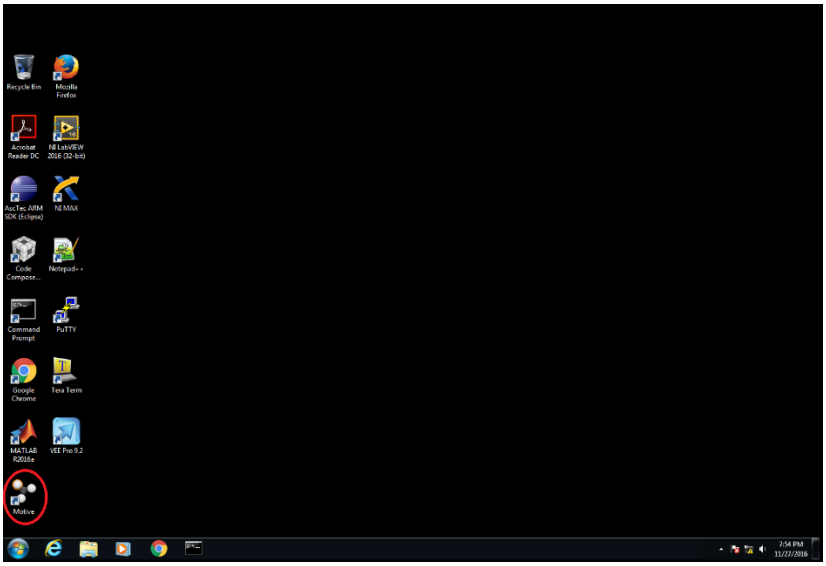


Motion Capture (MoCap):

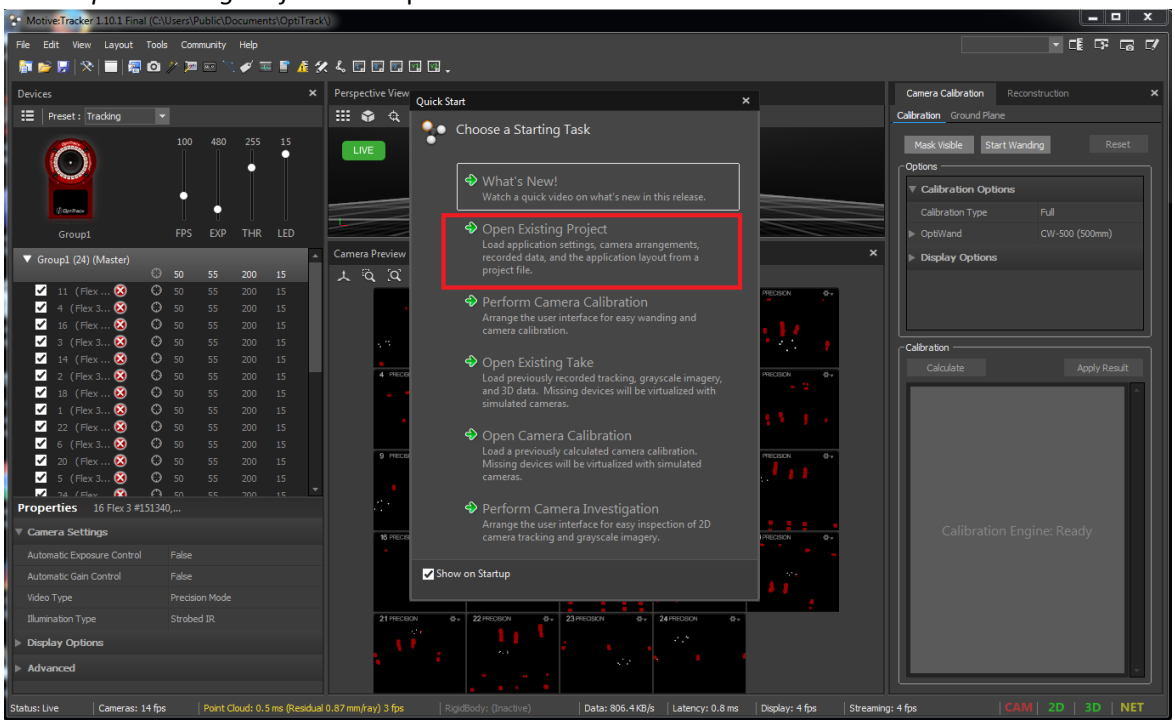
1. Proceed to the computer with the MoCap software. Logon to the account *dan5* and use the password: *f33dback5*

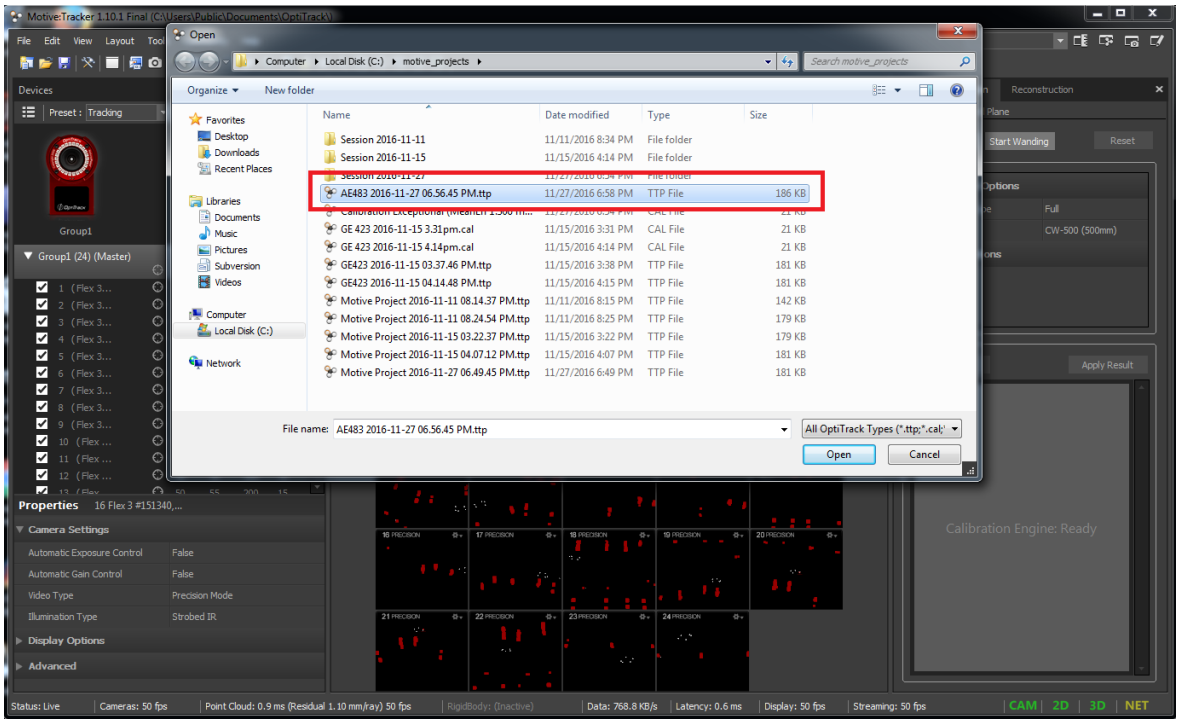


2. Launch the Motive application on the Desktop:

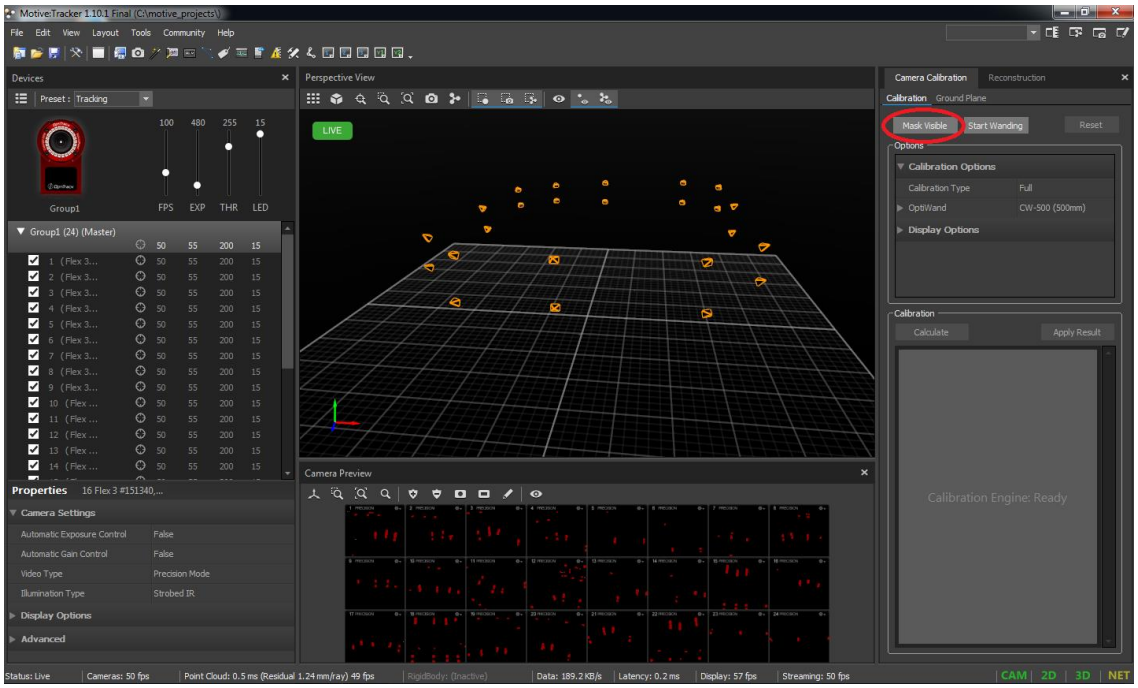


3. Click '*Open Existing Project*' and open the latest AE483 calibration file:



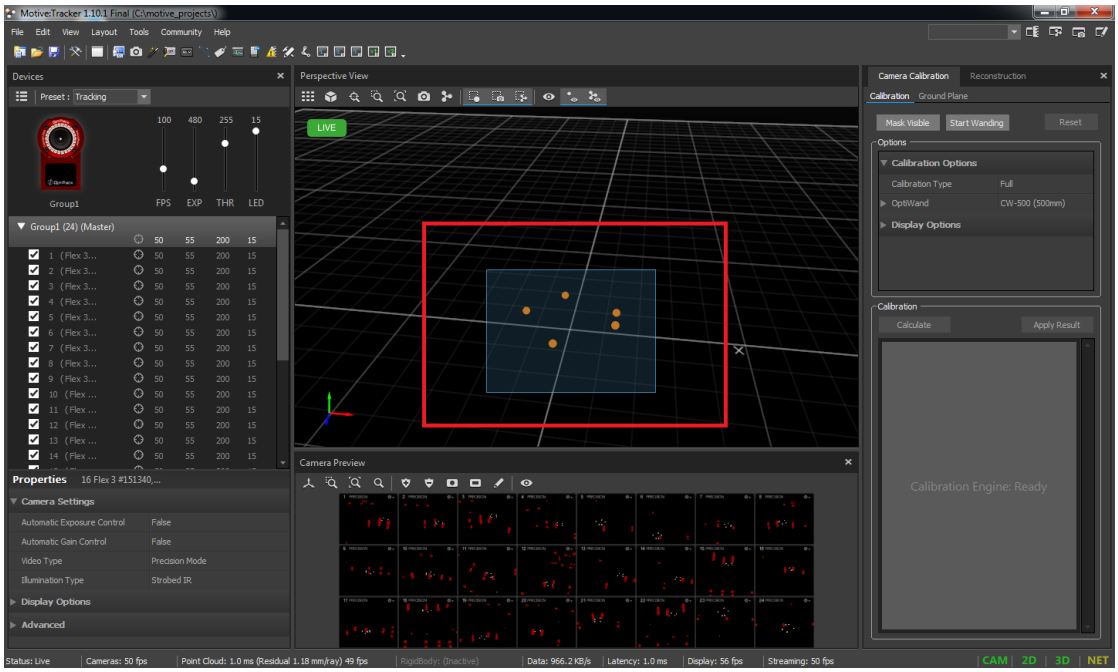


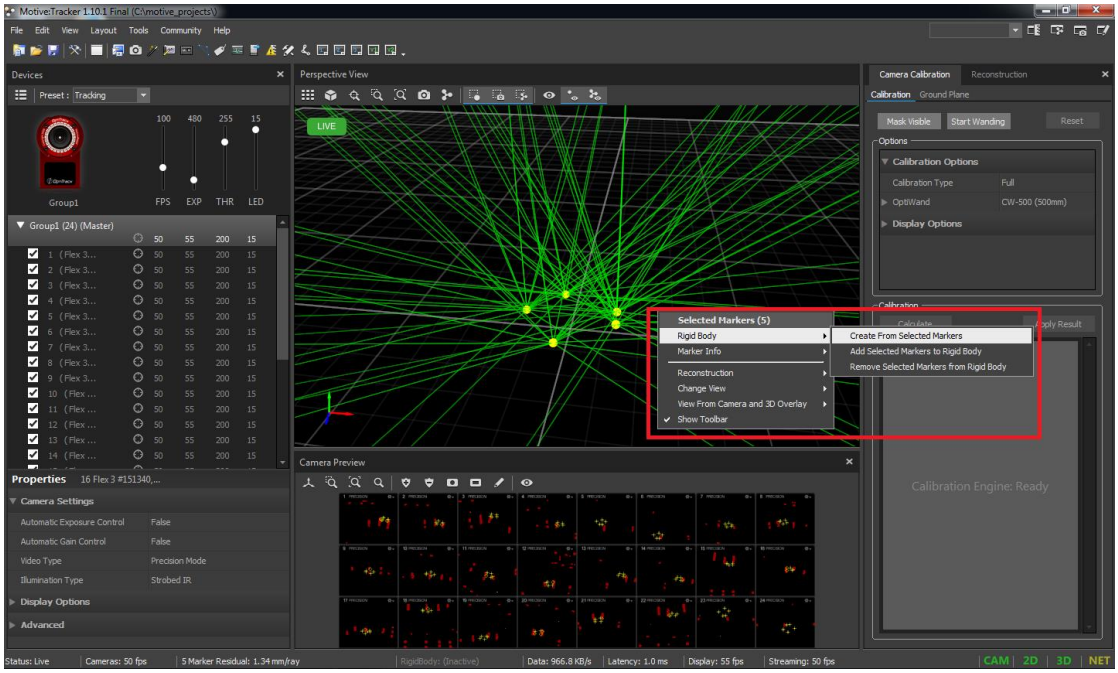
4. Remove all objects with markers outside the MoCap workspace and make sure no one is blocking the cameras' views. Then click Mask Visible, to get rid of any noise:



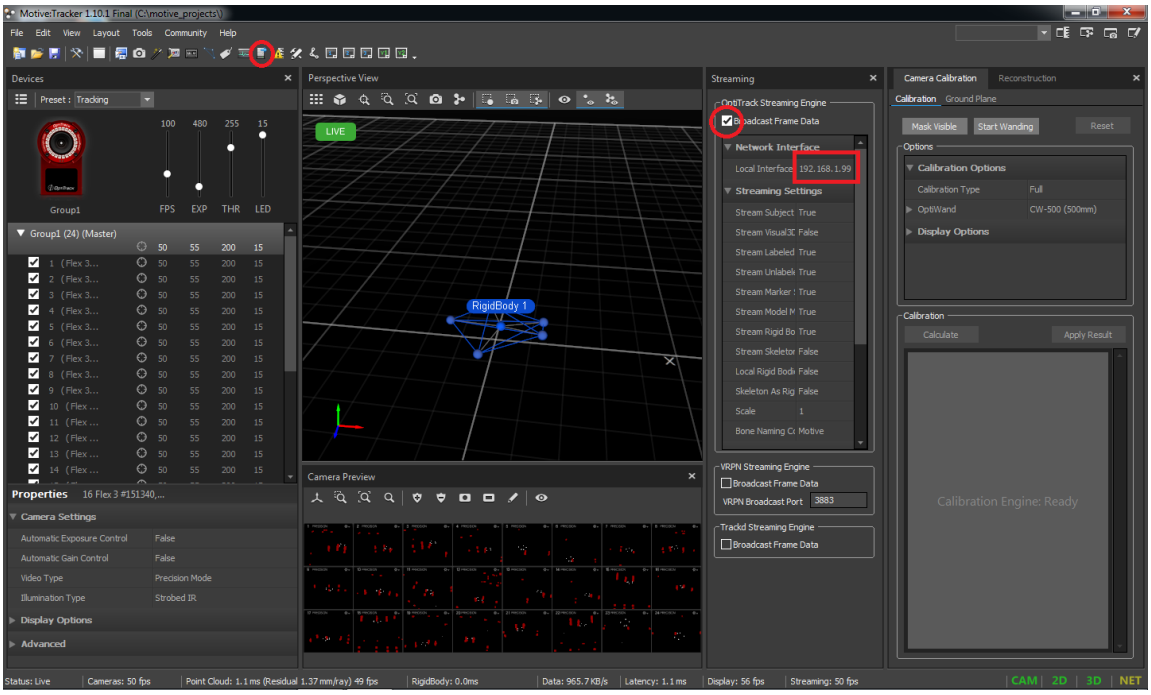
5. Place the objects back in the workspace. Align the orange tag on quadrotor with positive x axis of the MoCap system (towards the computer running the Motive software):

6. Click and drag to select markers. Right click and select *Rigid Body* → *Create From Selected Markers*. Follow similar procedure for more objects.



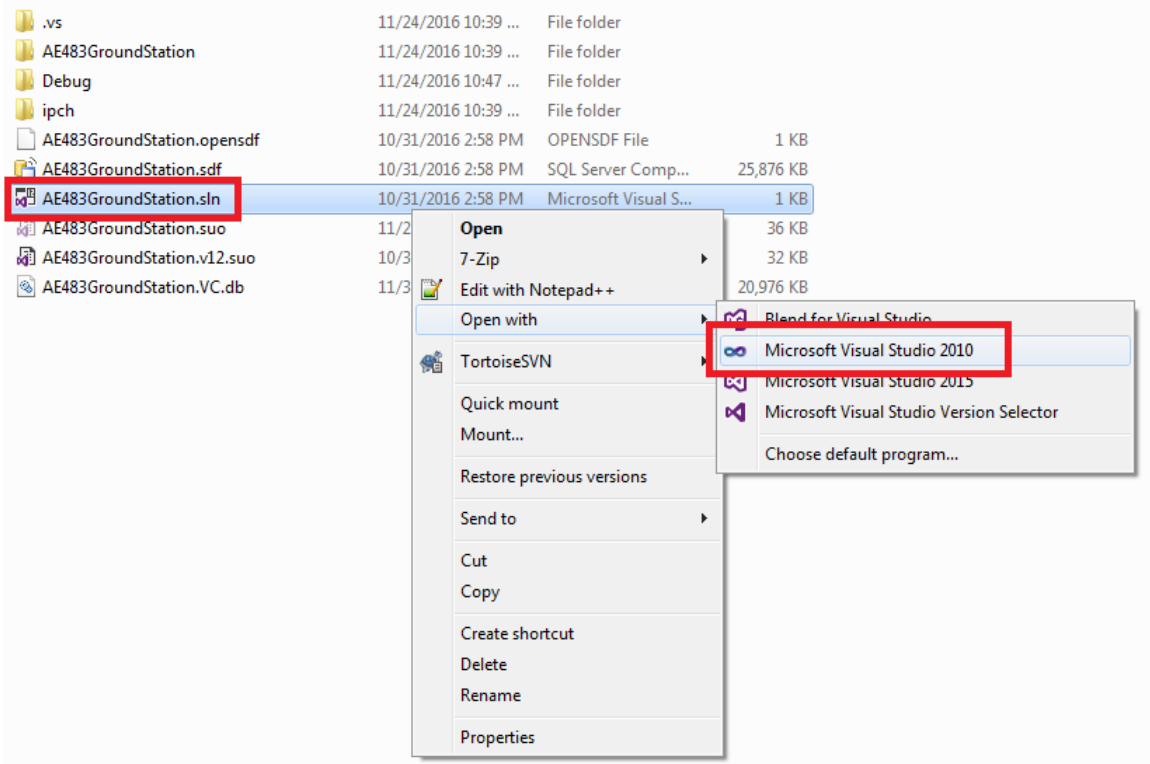


7. Check the *Data Streaming* pane and make sure broadcast frame data is checked, and IP is 192.168.1.99



GroundStation:

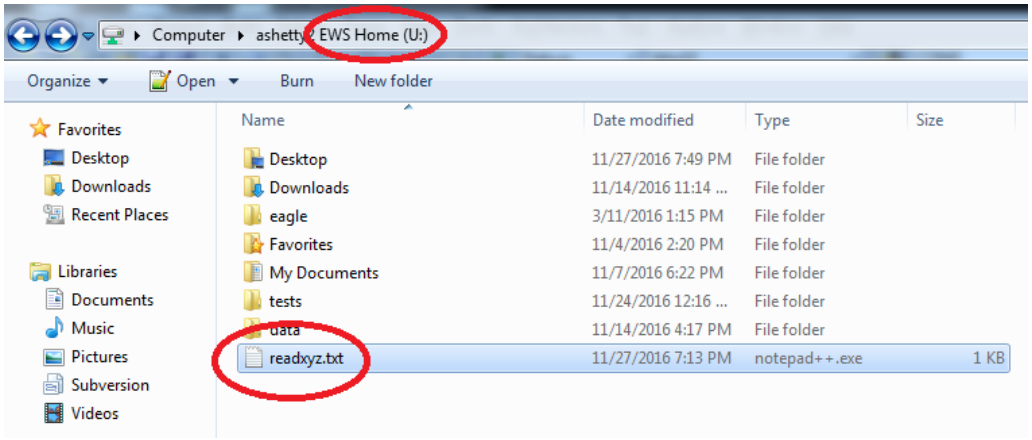
1. Connect corresponding Xbee to your GroundStation computer.
2. Open the AE483GroundStation.sln file with Visual Studio 2010:

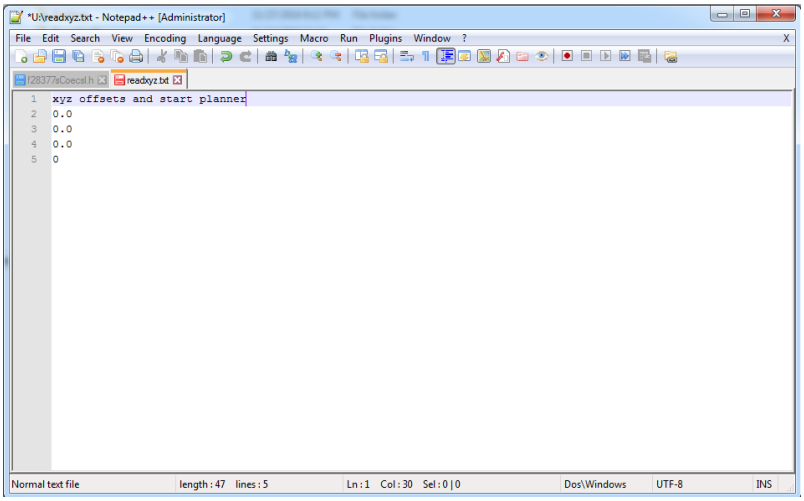


3. Check IP address in main.c:

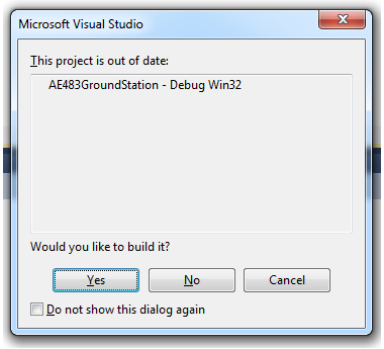
```
//get local server ip
if (!GetLocalIPAddresses((unsigned long *)&ServerAddress, 1)) { PrintMessage("Failed to get local server ip. Exiting..."); PrintExitPrompt(); WSACleanup(); return 0; }

ServerAddress.S_un.S_un_b.s_b1 = 192;
ServerAddress.S_un.S_un_b.s_b2 = 168;
ServerAddress.S_un.S_un_b.s_b3 = 1;
ServerAddress.S_un.S_un_b.s_b4 = 92;

sprintf_s(szServerIPAddress, MAX_ADDLENGTH, "%d.%d.%d.%d", ServerAddress.S_un.S_un_b.s_b1, ServerAddress.S_un.S_un_b.s_b2, ServerAddress.S_un.S_un_b.s_b3, ServerAddress.S_un.S_un_b.s_b4);

//get local client ip
if (!GetLocalIPAddresses((unsigned long *)&MyAddress, 1)) { PrintMessage("Failed to get local client ip. Exiting..."); PrintExitPrompt(); WSACleanup(); return 0; }

MyAddress.S_un.S_un_b.s_b1 = 192;
MyAddress.S_un.S_un_b.s_b2 = 168;
MyAddress.S_un.S_un_b.s_b3 = 1;
MyAddress.S_un.S_un_b.s_b4 = 92;
```

4. Place the readxyz.txt file in U drive. Make sure all numbers are 0.

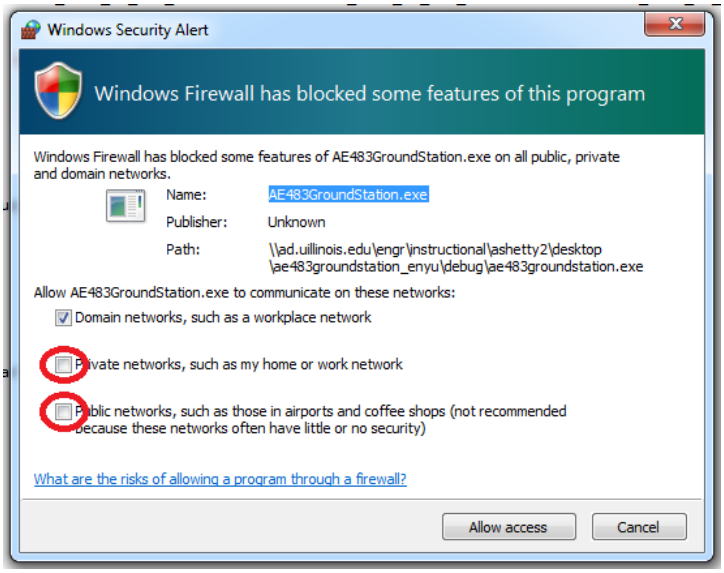




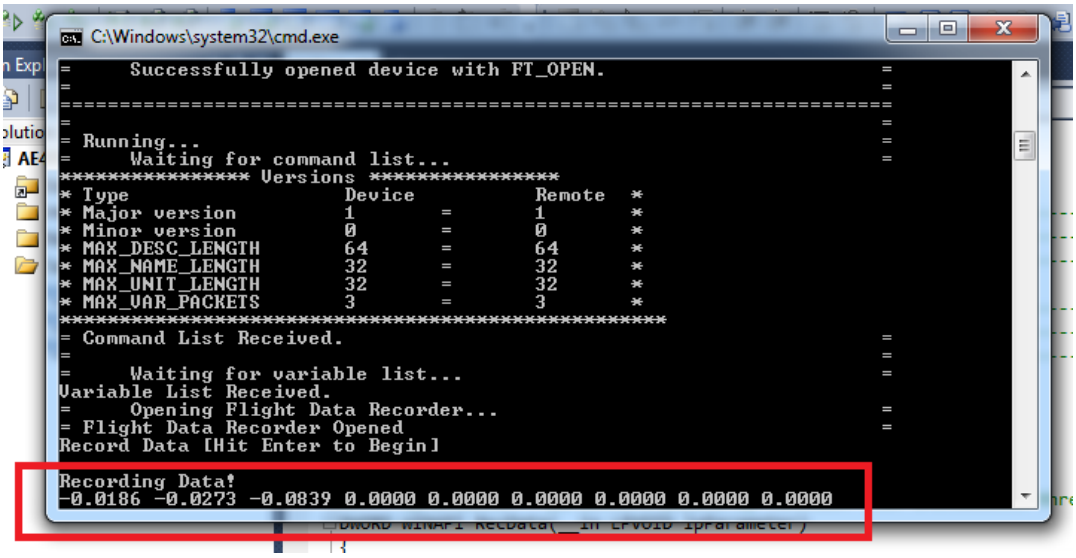
5. Run GroundStation code by pressing *Ctrl+F5* in Visual Studio. Click *Yes* if prompted to *Build*:



6. If Firewall pops up, check **all** boxes and click *Allow Access*:



7. You should see the command window with real-time numbers being printed:

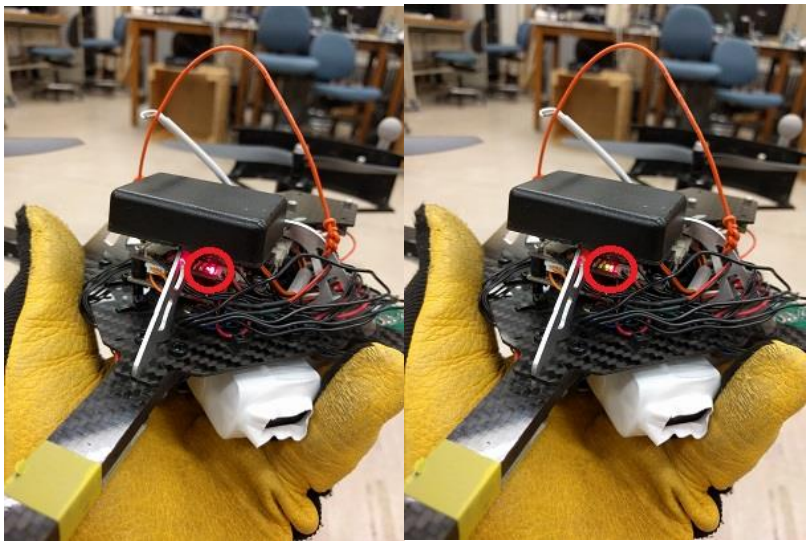


Flying:

1. Pick the radio controller with the same color tag as your quadrotor:

2. Hook the quadrotor with the fishing pole, and have one member hold the quadrotor with gloves. This is similar to how we flew during lab sessions.

3. Check the blinking rate of the green LED next to the red LED at the rear of the quadrotor. The green and red LEDs should be blinking consistently at a similar rate:

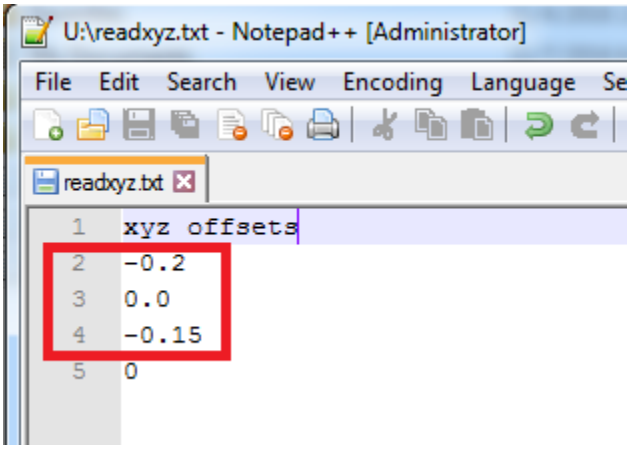


4. Power on the radio controller:

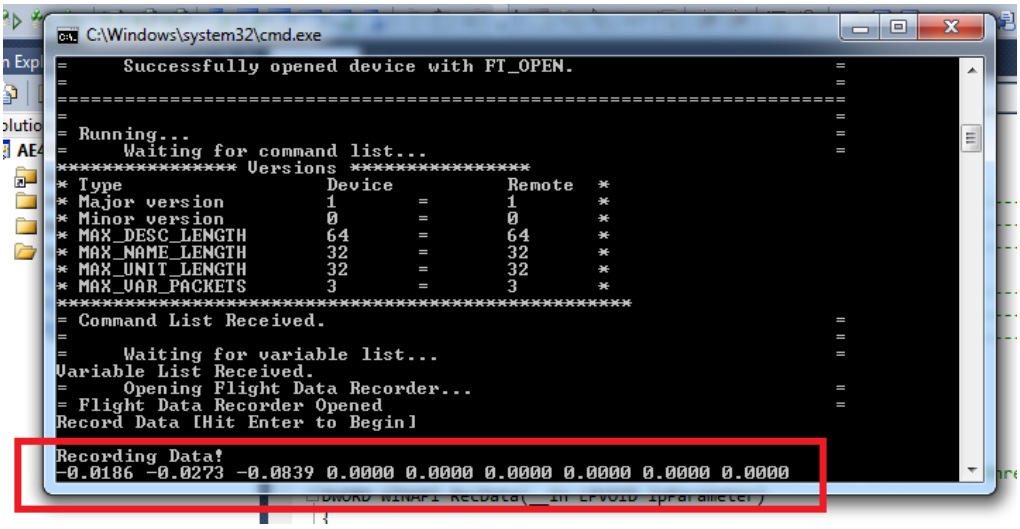
5. Hold quadrotor firmly a meter above the origin and arm the quadrotor:

6. Make sure the quadrotor is firmly held. Flip the black switch on the top-right to implement the code. During flight, if the quadrotor flies unexpectedly, make sure to quickly flip this switch down again.

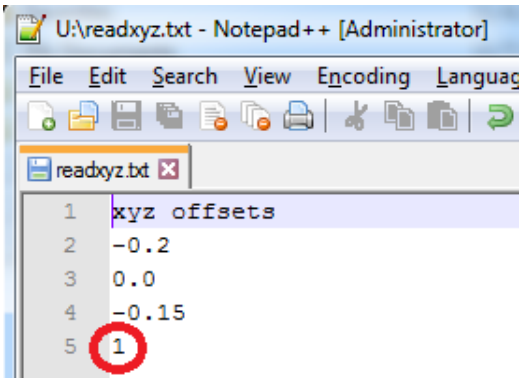
7. In the readxyz.txt file, change the first 3 values to alter the x, y and z offsets. Change these values such that the current quadrotor position is close to [0, 0, -1].
    a. Example readxyz.txt values:



    b. The command window from the GroundStation code displays the current position. The first 3 values correspond to the current x, y and z positions:



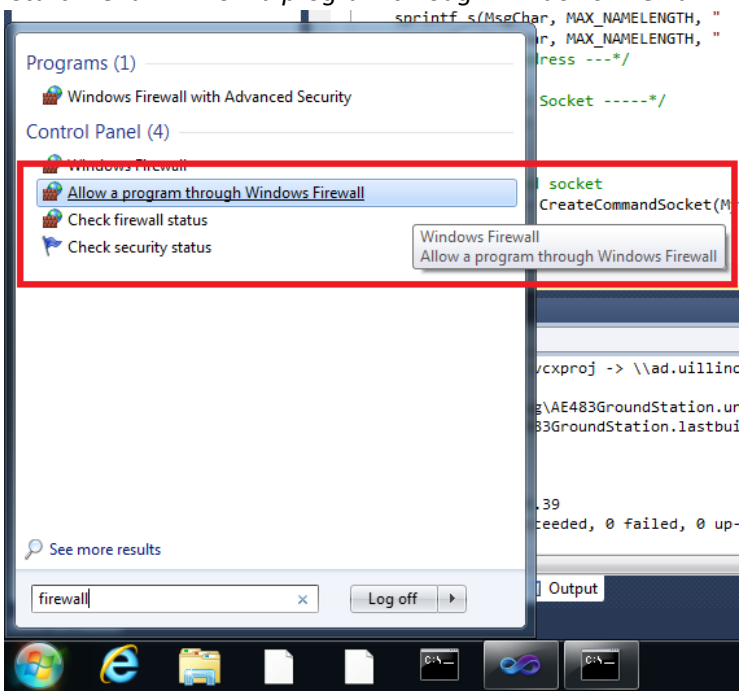
8. Once the offset values are set, change the last value in readxyz.txt to 1, to being implementing your project code:



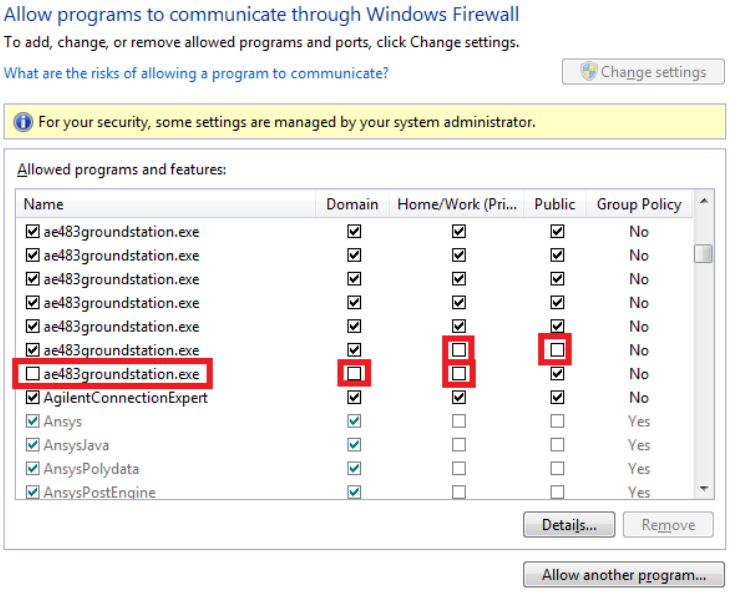
9. After you have tested out your project code, flip the black switch down, and disarm the quadrotor (similar to arming the quadrotor).

Debug Steps:

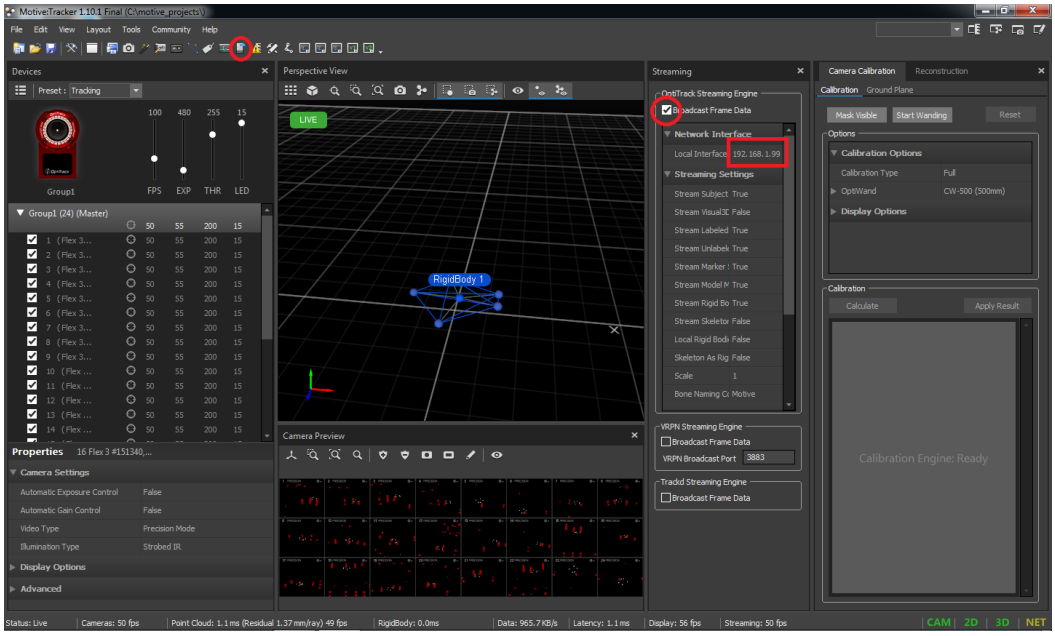
1. No numbers on command window (GroundStation 7.):
   - Confirm that IP address in *main.c* is correct (GrounStation 3.)
   - Confirm that you checked all boxes when Firewall prompted (GroundStation 6.). To confirm go to *Start Menu* → *Allow a program through Windows Firewall*



   Make sure all ae483 boxes are checked



- On MoCap software, make sure Streaming settings are set correctly (Motion Capture 7.):



  Uncheck and re-check the Broadcast frame data checkbox.

2. Green LED blinks inconsistently (Flying 3.):
   - Restart GroundStation code. Press *Ctrl+C* to stop the code and then *Ctrl+F5* to run code again (GroundStation 5.)
   - Disconnect and reconnect Xbee on GroundStation computer (GroundStation 1.)
   - Restart quadrotor (Powering up quadrotor 4.)