

Team F: FALCON EYE

Individual Lab Report 5

Progress Review 4

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Team

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1.2 Central Network setup and Testing

One of our major requirements for both FVE and SVE is to be able to control both the husky and Bebop 2 done within a radius of 50m. Now that we were able to connect the bebop as a client, we setup our network via router and connected the central computer, Husky and Bebop on it. We had to make sure that the network bandwidth was good enough to support transmission of video data back to central computer, simultaneously being to be able to control both Bebop and Husky. We tested these requirements and the current bandwidth was able to adhere to the requirements.

For the range test, we connected both bebop and husky to the hosted network. We teleoperated the husky through our central computer with bebop on it transmitting its video data. After trying different antennas, we were able to operate husky over a range of 58 meters. From that distance we manually carried the drone further away and were able to get the video feed over more than 90 meters. Thus, we finalized our router, antenna and network settings for our final system.

1.3 Husky PC and network debugging

We faced this bizarre issue with the Husky PC when connected to CMU secure. We were able to use the internet but were unable to install any packages using sudo apt-get initially. This turned out even unpredictable when we were able to install packages every now and then later. Lack of support online led us to re-install the ubuntu again, but it was of no use. On further probing we realized that the problem was with the Avahi connection settings with CMU-secure which wasn't supported. We switched to mobile hotspot and now is working just fine. We are planning to get a domain from SCS as suggested to us.

Also, we were having trouble acquiring the data from all the serial connections namely Husky serial communication, IMU and GPS since the computer was confused on allocating ports (multiple ports had the same configuration) and acquiring data. We solved this by changing the dev rules for serial ports. We configured each serial port by its functionality rather than its port and named it ttygps, ttyimu etc as seen in Fig.3. We also started with the EKF localization of the husky to fuse IMU and GPS data and are proceeding with that now.

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SUBSYSTEM=="tty", ATTRS{idVendor}=="10c4", ATTRS{idProduct}=="ea08", ATTRS{serial}=="08E59175", SYMLINK+="ttyimu"
SUBSYSTEM=="tty", ATTRS{idVendor}=="1387", ATTRS{idProduct}=="0002", ATTRS{serial}=="0000000000000000", SYMLINK+="ttygps"
SUBSYSTEM=="tty", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="6001", ATTRS{serial}=="A1044E5E", SYMLINK+="ttygps"
SUBSYSTEM=="tty", ATTRS{idVendor}=="067b", ATTRS{idProduct}=="2303", SYMLINK+="ttyhusky"

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Fig. 3 Renaming serial ports by changing dev rules

2 Challenges

Apart from the constant workload from other courses which is common for everyone, we faced quite a lot of issues in comparison to past weeks. As mentioned above, unavailability of online resource for bebop caused us quite a lot of time. We made sure that this problem is not faced by others by posting this solution in bebop's main forum with the codes. Similarly re-installing ubuntu again and again caused us quite a lot of time providing no solution.

Dealing with serial ports issues were both challenging and interesting as we now learnt how to configure any given device permanently with a name of our own. We have got several hints from both the TA's and classmates which will help us along.

Initially we were not planning to work on Husky for the FVE but upon constant push from the Professor we got started on that and have solved these issues right now rather than solving them next semester which would have been too late. We are working on the GPS navigation of Husky and its going smooth so far. Thanks to the Professor's push without which we wouldn't have realized our potential to do more.

3 Teamwork

This week's by far has been the best team effort put together since we have had some rapid improvements towards our goals. Yuchi and Danny worked on the way-point navigation of Bebop which they have achieved successfully but with some drift. Pratibha worked on the acquisition of IMU and GPS data onto the Husky node and developing launch files for the same.

Pulkit and I worked on the network setup, bebop network re-configuration, debugging of issues with Husky and are currently further working on the EKF localization of Husky for GPS navigation.

4 Future plans

Its FVE next!! I will work alongside Pulkit on the GPS navigation of the Husky. Yuchi will work on perfecting the GPS navigation. Pratibha and Danny will work on populating the PCB port. Then as a team we will work on the integration of our systems for the FVE.