Johns Hopkins University

Project 7

Quad Copter downloading GPS RPi to Host over WiFi

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EN.605.715.81.FA19 - Software Development for Real-Time Systems

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Contents

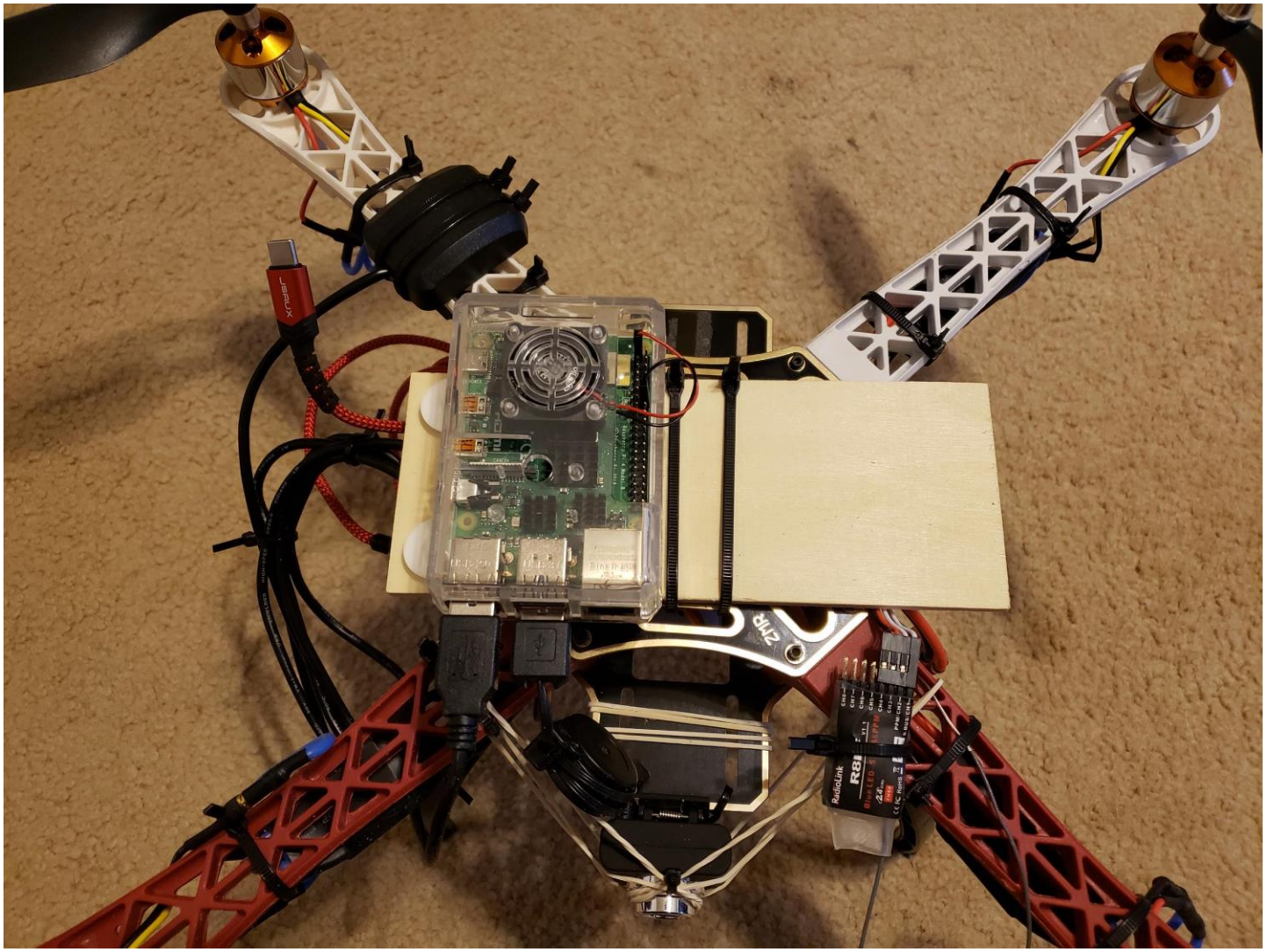
Derived Requirements

The following requirements were derived from the Project 7 Quad Copter Downloading GPS RPiToHostWiFi document:

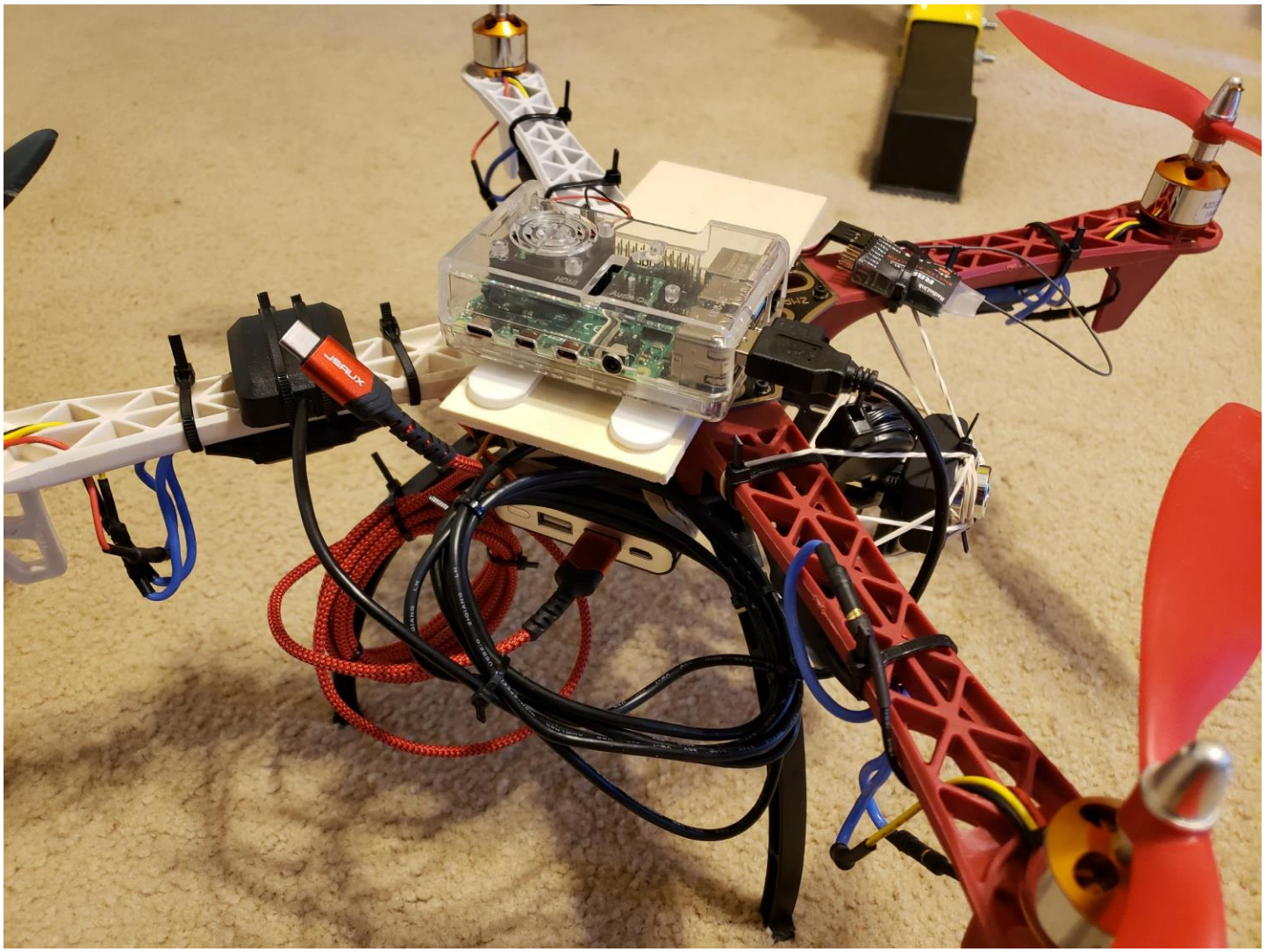
- The Raspberry Pi shall periodically read GPS data using the provided GPS receiver, and transmit the parsed GPS data over a socket to a host machine.
- The Raspberry Pi shall act as a wireless access point so that the host machine can connect to the Raspberry Pi over WiFi without a router.

QuadCopter Layout

Top view of how the Raspberry Pi, camera, and GPS receiver are connected and attached to the Quadcopter:



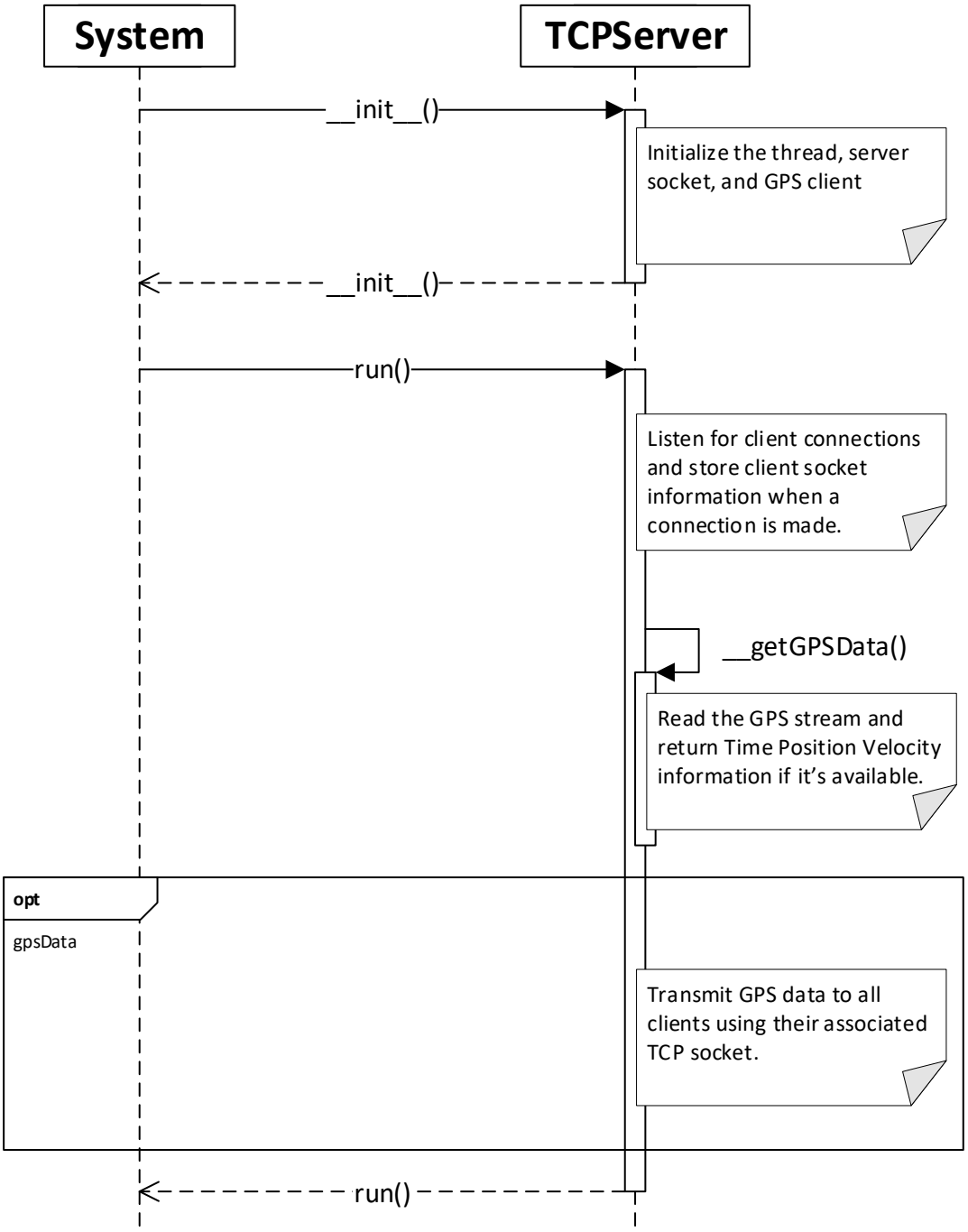
Side view of how the Raspberry Pi, camera, and GPS receiver are connected and attached to the Quadcopter:



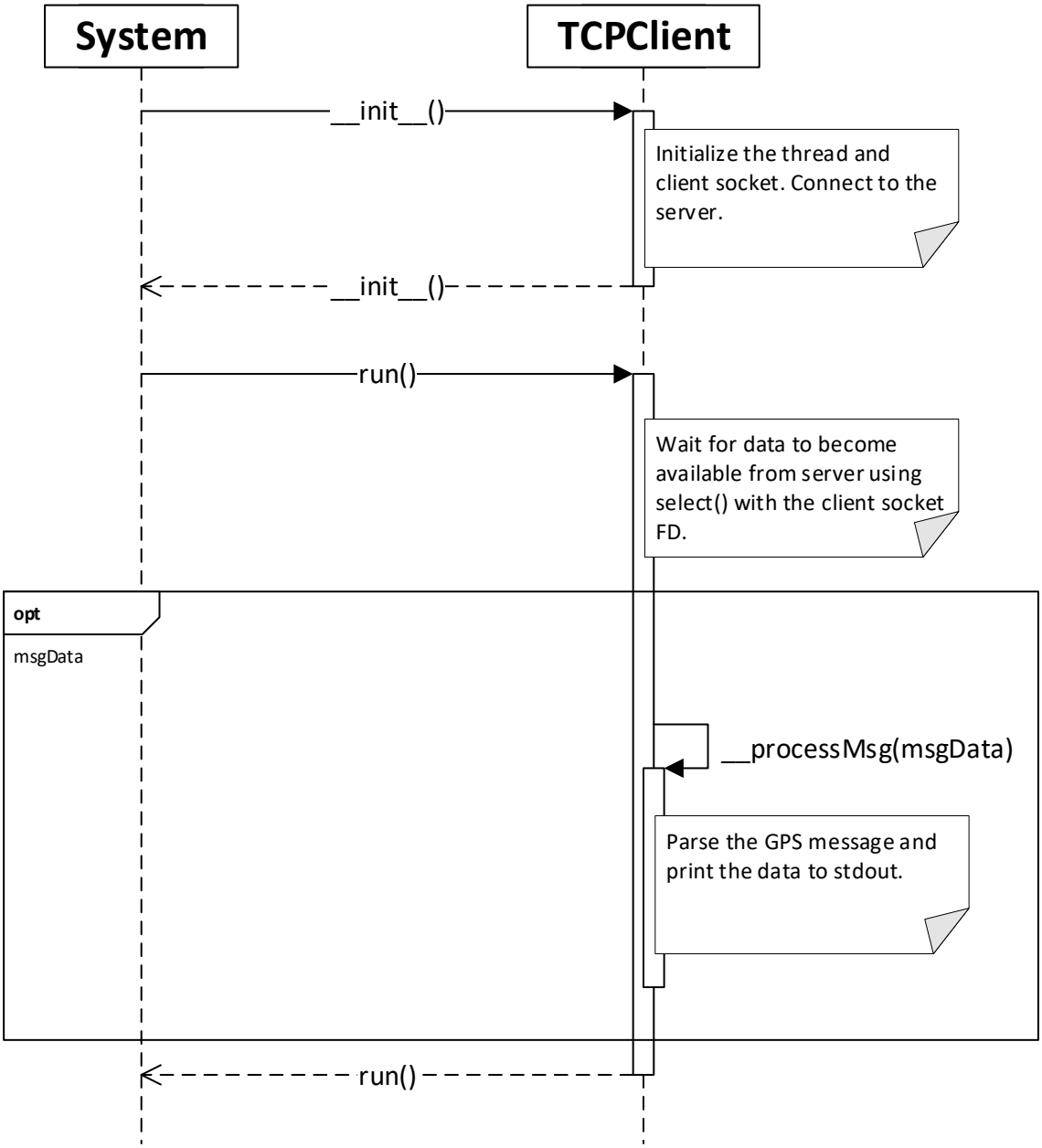
Software Design and Implementation

Sequence Diagrams

The following diagram is a sequence diagram of the server that reads and transmits GPS data to a client:



The following diagram is a sequence diagram of the client that receives the GPS data from the server and prints the information to stdout:


System
TCPClient
__init__()
Initialize the thread and client socket. Connect to the server.
__init__()
run()
Wait for data to become available from server using select() with the client socket FD.
opt
msgData
__processMsg(msgData)
Parse the GPS message and print the data to stdout.
run()

Video Demonstration

The following videos demonstrate the Raspberry Pi streaming GPS data from the quadcopter to a host machine. The first flight had an issue where I clicked in the powershell window, causing it to scroll down and not show the GPS data. However, the first flight went better as the webcam stayed active and I was able to land the quadcopter, thus I wanted to include that here. The second flight showcases the GPS data being streamed to the host, but the webcam cuts out shortly after takeoff and I was not able to land the vehicle. Both videos have a second view of the flight at the end to show what happened to the quadcopter.

Flight 1

https://www.youtube.com/watch?v=s0niszHzFCs

https://www.dropbox.com/s/ch25858gqyya9pp/Miles_Gapcynski_EN_605_715_81_Project_7_Flight1.mp4?dl=0

Flight2

https://www.youtube.com/watch?v=iu_GOpGEQFE

https://www.dropbox.com/s/gd0p6ua3qxrd9xy/Miles_Gapcynski_EN_605_715_81_Project_7_Flight2.mp4?dl=0