

Frame Module

The wheel modules run off of a Raspberry Pi 3B+ to collect and process data.

9-Axis IMU

Calibrate in static state to remove offsets

Pickle to import from other processes



100 Hz

Read data from MPU-9250 (9-axis IMU)

IMUSensorLib.py

6-Axis IMU

Calibrate in static state to remove offsets

Pickle to import from other processes



300 Hz

Read data from MPU-6050 (6-axis IMU)

IMUSensorLib.py

Ultrasonic Proximity Sensor #1



25 Hz

Read data from AJ-SR04M

USSSensorLib.py

Ultrasonic Proximity Sensor #2

Untested



25 Hz

Read data from AJ-SR04M

USSSensorLib.py

Pi Camera

Not fully implemented



1 Hz

Read data from Sony IMX219

PiCamSensorLib.py

CarisPAWMsg

carisPAWMsg.time_stamp = timeSincePiStart (s)
carisPAWMsg.sensorType =IMU_9
carisPAWMsg.acc_x = x acceleration value in g
carisPAWMsg.acc_y = y acceleration value in g
carisPAWMsg.acc_z = z acceleration value in g
carisPAWMsg.angular_x = x ang. velocity value in deg/s
carisPAWMsg.angular_y = y ang. velocity value in deg/s
carisPAWMsg.angular_z = z ang. velocity value in deg/s
carisPAWMsg.mag_x = x ang. velocity value in deg/s
carisPAWMsg.mag_y = y ang. velocity value in deg/s
carisPAWMsg.mag_z = z ang. velocity value in deg/s

CarisPAWMsg

carisPAWMsg.time_stamp = timeSincePiStart (s)
carisPAWMsg.sensorType =IMU_6
carisPAWMsg.acc_x = x acceleration value in g
carisPAWMsg.acc_y = y acceleration value in g
carisPAWMsg.acc_z = z acceleration value in g
carisPAWMsg.angular_x = x ang. velocity value in deg/s
carisPAWMsg.angular_y = y ang. velocity value in deg/s
carisPAWMsg.angular_z = z ang. velocity value in deg/s

CarisPAWMsg

carisPAWMsg.time_stamp = timeSincePiStart (s)
carisPAWMsg.sensorType =USS_DOWN
carisPAWMsg.USensorDownward = distance to floor (cm)

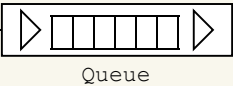
CarisPAWMsg

carisPAWMsg.time_stamp = timeSincePiStart (s)
carisPAWMsg.sensorType =USS_FRWD
carisPAWMsg.USensorForward = distance to front (cm)

CarisPAWMsg

carisPAWMsg.time_stamp = timeSincePiStart (s)
carisPAWMsg.sensorType =PI_CAM
carisPAWMsg.piCamImage = PIL image object

Proto Buffer Structures



Encode Message Using Proto Buffers

Encode proto buffers using COBS

Transmit packet to server via Wifi

Via 192.168.0.100 Port 65432

