2020 Year Project Log

12 Oct

Project Ideas: bicycle ...

motorcycle ...

airplane ...

car ...

Software --

Hardware ++

19 Oct

Idea 1: Airplane Flight Data Recorder.

Using many sensors to acquire data, process, display it. Used to help

investigators in crash scenario

Idea 2:

Digital Flight Data Recorder

The objective in the selection of parameters is that the following information,

required for accident investigation purposes shall be obtainable either directly

or by deduction from the system.

a) the flight path of the airplane,

b) the attitude of the airplane in achieving that flight path,

c) the basic forces acting upon the airplane and resulting in the

achieved flight path (e.g. lift; drag; thrust; control forces),

System parameters

1. Time (GMT or elapsed time)

2. Pressure altitude

3. Airspeed

4. Normal acceleration (i.e. normal to the longitude and lateral axis of the

airplane)

5. Compass heading

6. Engine power

7. Flap angle

8. Temperature

9. Primary flying controls

26 Oct

Proposal due Friday 29th

Main board to use: Arduino - need a separate Wi-Fi module, limited inputs/outputs

Esp8266 - limited GPIO

Intel Edison - too powerful, big footprint

Raspberry Pi - big footprint

Esp32 - use of Arduino libraries, modules

Esp32 languages - Arduino IDE - C++ API

ESP - IDF - C API, FreeRTOS - complicated

Micropython - Python - need to learn from start

MicroEJ SDK - not supported board

VS Code

mongoose OS?

mDash?

2 Nov

Components to use to measure proposed parameters:

Time - Arduino time libraries - RTC? get time on program start

Pressure Altitude - barometric pressure & altitude - BMP280

BME280 =+ humidity

BMP388 = updated

Airspeed - GPS measurement (actual airspeed = pitot tube, expensive)

Normal Acceleration - acceleration ADXL3xx Accelerometer

Compass Heading - magnetometer HMC5883l

Engine power - digital / analogue input from receiver, motor

Flap, controls angle - digital / analogue input from receiver, servo

Temperature - tmp36

Primary flight controls - digital / analogue input from receiver, servo

9 Nov

Sent component request to supervisor,

Transfer, organise project ideas, files into GitHub

Researching Arduino Accelerometer and interfacing with it

11 Nov

Researching Accelerometer and I2C specification

18 Nov

Creating folder structure to store documents and notes on different components to be used in project,

Accelerometer folder created and info added.

25 Nov

Created project plan,

Components submitted,

Researching Accelerometers and I2C

2 Dec

blocker: components

moving to Chart.js

9 Dec

Research Chart.js

small file with few charts done for testing

line charts, random data

23 Dec

Project Webpage, few charts in collapsables

Uploading files from pc filesystem

12 Jan

Project Video

Project Christmas presentation

27 Jan

19 Jan, order components

26 Jan, own components order received

SD card module, bmp388, accel/mag/gyro & gps

Esp32 examples test, breadboarding, test components

03 Feb

plugging in all components on breadboard,

going through example codes and libraries to test if components survived.

GPS had its serial data sent to u-center on pc – gps location acquired

10 Feb

Started with BMP388 temp and pressure

Studying Bosch sensor datasheet, helpful but some mistakes and hard to understand.

Unsure about pressure and temp oversampling increasing resolution bits.

Take a break learning pointers and pass by reference

14 Feb – bmp388 output pressure, need a pressure -> altitude formula.

17 Feb

Getting pressure output,

Worked on getting data from the 9dof sensor: accelerometer, gyroscope, magnetometer,

Had a problem with configuration due to copy paste same address for two registers

Small example for connecting to node js using esp wifi.

24 Feb

Tidy up and make code cleaner, work on getting all data into json to transmit.