Software Requirements:

Must:

- Have communication between the payload computer and the sonar board through ethernet.
- Keep writing data at every ping to the .872 file and return the file.
- Allow the sonar board to accept up to 27 bytes of switch data from the payload computer.
- Be able to start/stop recording data from MOOS.
- Be able to communicate data from the payload computer to the main computer through USB to Ethernet through a dongle.

Should:

- Implement GPS/NAV MOOS variables in the .872 file.
- Have an on/off status to MOOS whether or not the sonar system is on or off.
- Control the inputs of range, mode/frequency, gain, and balance gain.

May:

- Implement the altimeter MOOS variable in the .872 file.
- Create a script to run the program at a certain depth and stop running the program at a certain depth.

Technology Needed:

Language:

- C++

Framework:

- MOOS IVP

Network:

- TCP/IP

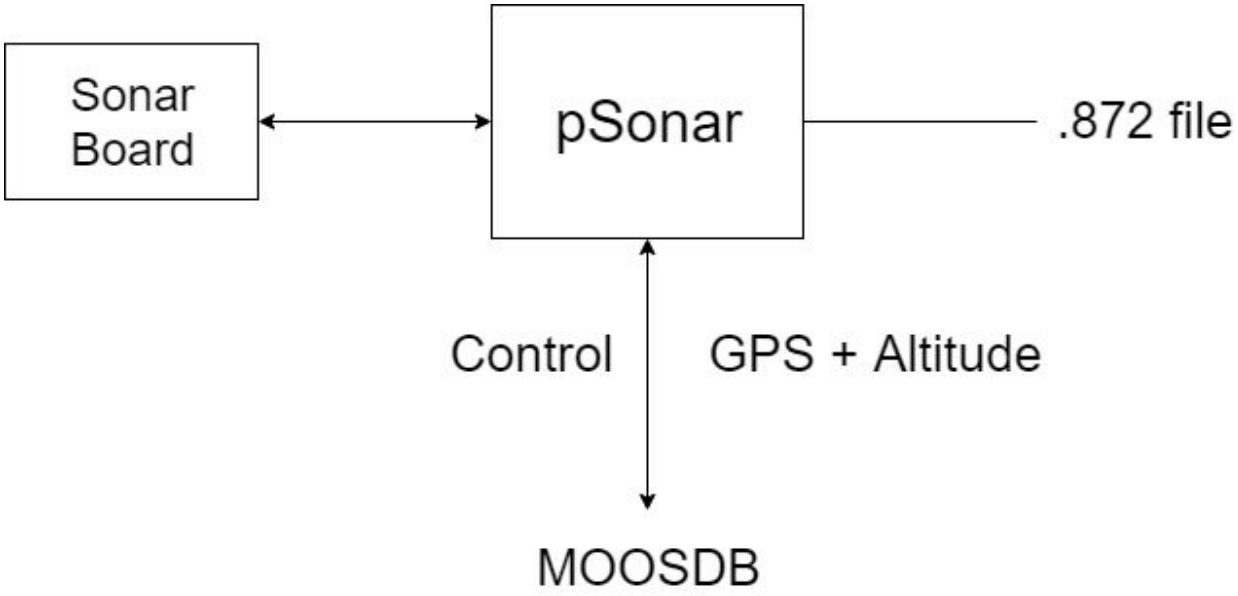
Source Control:

- Github

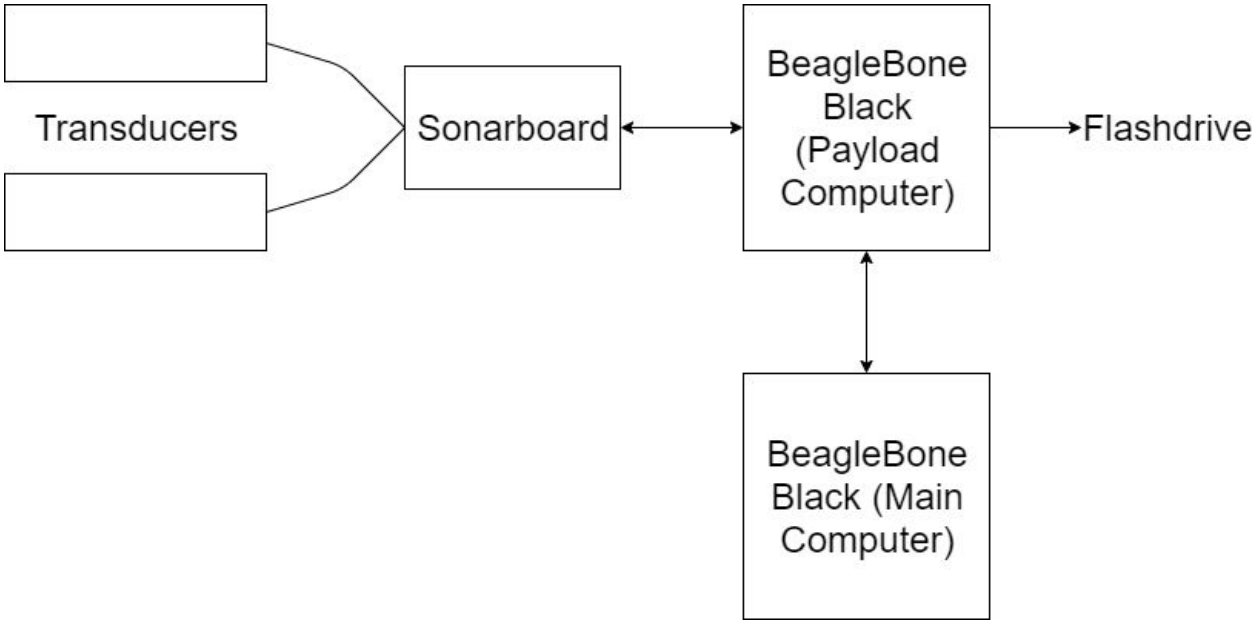
Program Algorithm:

1. Program socket clients and check ethernet connection between the sonar board and the payload computer.
2. Create an empty .872 file that will generate data to be stored for each ping.
3. Create an array of strings that will store 27 bytes of switch data and will be passed from the PC to the sonar system.
4. Set up USB to Ethernet communication protocol between both computers.
5. Set fixed values for array:
    - Byte 0 (Switch Data Header) = 0xFE
    - Byte 1 (Switch Data Header) = 0x44
    - Byte 2 (Reserved) = 0x00
    - Bytes 4-6 (Reserved) = 0x00
    - Bytes 9-17 (Reserved) = 0x00
    - Byte 18 (TCP Packet Number) = 0x00 or 0x02 (will be switching on every ping)
    - Bytes 19-25 (Reserved) = 0x00
    - Byte 26 (Termination Byte) = 0xFD
6. Set values input from user for array:
    - Byte 3 (Range) = 0x0A - 0x32 (10-50)
    - Byte 7 (Frequency) = 0 - 2
    - Byte 8 (Start Gain) = 0 - 40dB
7. Create a ping function that will write data to the .872 and then append that data for every new ping.
8. Receive GPS data from the pNAV application and write to the .872 file while each ping data is being processed.

Data Flow Diagram:



Hardware Diagram:



.872 File Reference:

Imagenex Technology Corp. "DATA STORAGE FILE FORMAT (.872)." *MODEL 872 SIDESCAN (YellowFin)*, 1.01, Imagenex Technology, pp. 54-57. *Google Drive*, drive.google.com/open?id=0B4CkagcY3pD7Zmx1dFVTdnBydmdYejBQb2ZEUW5pRE tudVBR.