

EE CprE 491 – May 20 - 49

CySat Senior Design Team

Week 12 Report

November 9 – November 15

Faculty Advisors: Phillip Jones

Team Members:

Bryan Friestad — *Team Lead / EPS Lead / OBC Lead*

Ryan Hansen — *SDR Lead / Payload Secondary*

Chase Kirchner — *Ground Station Lead / CI Testing Lead / UHF Antenna Secondary*

Kyle Muehlenthaler — *UHF Lead / Ground Station Secondary*

Talon Stromgren — *GitLab Master / LNA Lead / SDR Secondary*

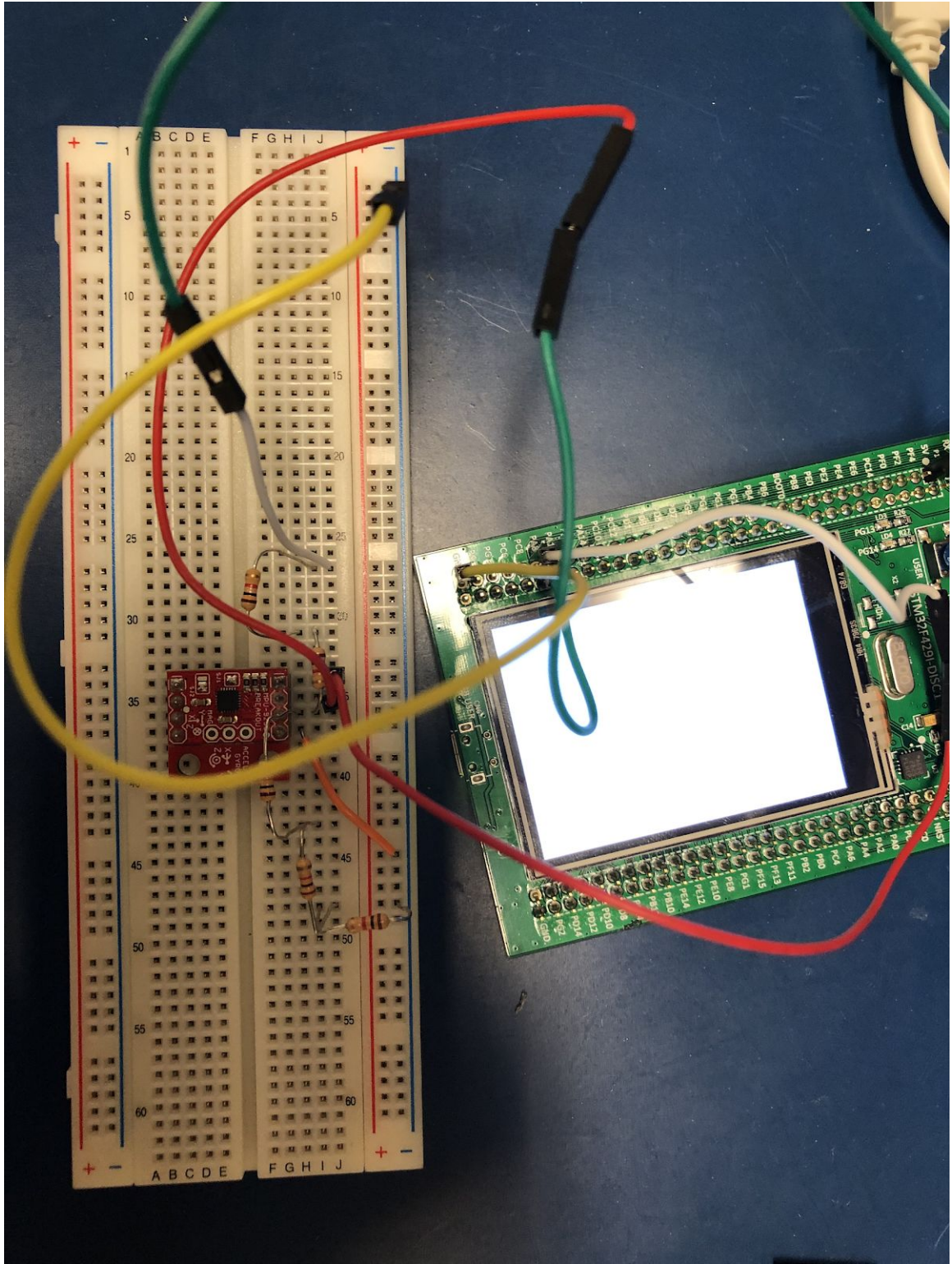
Xiangzhu Yan — *ADCS Lead*

Past Week Accomplishments

- OBC:
- ADCS: Worked on I2C communication with IMU chip. Fixed some bugs of STM program with the help of Brian.(Xiangzhu)
- SDR: Started detailed slide presentation on SDR sequences. Talked with Brian Bradford about SDR and decided on tasks to be done. Started setting up a “fake” OBC test sequence using C to talk with SDR over serial. (Pictures of working serial below)
- EPS:
- Ground Station: Met with Brian Kempa for better understanding of Ground Station application
- UHF: Cracked the issue with UHF communication over UART (Kyle, Bryan)
Made Short slide of how to configure putty and how to input the commands.(kyle)
- Boost Board: Met with James, figured out a different way to design the board. Currently working on board redesign. (Talon)
- LNA Board:

Pending Issues

- Ground Station: Need raspberry pi to begin serial port connection with ground station application
- ADCS: Can we borrow the PicoScope from CprE288 lab and bring it to M2I lab?



SDR Code (Arduino)

```
void loop() {
  recvWithEndMarker();
  showNewData();
}

void recvWithEndMarker() {
  static byte ndx = 0;
  char endMarker = '\n';
  char rc;

  while (Serial.available() > 0 && newData == false) {
    rc = Serial.read();
    if (rc != endMarker) {
      receivedChars[ndx] = rc;
      ndx++;
      if (ndx >= numChars) {
        ndx = numChars - 1;
      }
    }
    else {
      receivedChars[ndx] = '\0'; // terminate the string
      ndx = 0;
      newData = true;
    }
  }
}

void showNewData() {
  if (newData == true) {
    Serial.print("--Hello from SDR! Received: ");
    Serial.println(receivedChars);
    newData = false;
  }
}
```

OBC Code (C)

```
//loop forever for program
while(1){

    //write to port
    writePort(fd, "hello world\n");

    //read from port
    readPort(fd);

    sleep(2);
}
return 0;
}

void readPort(int fd){
    char read_buffer[255];
    int bytes_read = 0;
    //read data from serial
    bytes_read = read(fd, &read_buffer, sizeof(read_buffer));
    read_buffer[bytes_read] = 0;

    //print data
    printf("Bytes RX: %d\n", bytes_read);
    printf("RX: %s\n", read_buffer);
    tcflush(fd, TCIFLUSH);
}

void writePort(int fd, char write_buffer[]){
    int bytes_write = 0;
    //write data to serial
    bytes_write = write(fd, write_buffer, strlen(write_buffer));

    //print data
    printf("Bytes TX: %d\n", bytes_write);
    printf("TX: %s\n", write_buffer);
    tcdrain(fd);
}
```

Program Outputs

OBC writes "hello world" to serial port

SDR reads port and replies with Hello and what it received.

TX and RX byte count used for debugging.

```
ryhansen@DESKTOP-IU0QOPG:~/CySat$ ./obc
/dev/ttyS4 Opened Successfully
/dev/ttyS4 Attributes Set Successfully
BaudRate = 115200      StopBits = 1      Parity = none
-----PORT READY-----

Bytes TX: 12
TX: hello world

Bytes RX: 40
RX: --Hello from SDR! Received: hello world

Bytes TX: 12
TX: hello world

Bytes RX: 40
RX: --Hello from SDR! Received: hello world

Bytes TX: 12
TX: hello world

Bytes RX: 40
RX: --Hello from SDR! Received: hello world
```

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours	Attend Gen. Meeting?
Bryan Friestad	Worked on I2C communication with IMU chip. Helped Kyle with UHF issues.	8	41	yes
Ryan Hansen	Set up linux C based OBC and communication with SDR (Arduino)	8	28	yes
Chase Kirchner		5	29	No
Kyle Muehlenthaler	Uhf commands working. Made slides for others to see if they want to try it.	9	28	Yes
Talon Stromgren	Boost Board stuff, see above	7	38	Nah
Xiangzhu Yan	Worked on I2C communication with IMU chip.	10	32	No

Plans for Coming Week

- Bryan Friestad: Finish I2C communication to IMU
- Ryan Hansen: Get a working Linux C based OBC sequence to SDR/Arduino.
- Chase Kirchner: Begin implementation of serial port connection
- Kyle Muehlenthaler:
- Talon Stromgren: Wrap up boost board redesign
- Xiangzhu Yan: Fix bugs of STM program and hardware connection. Finish I2C communication with IMU chip.