**APPENDIX**

#include<SoftwareSerial.h>

SoftwareSerial Serial12(2, 3); //make RX arduino line is pin 2, make TX arduino line is pin 3.

SoftwareSerial gps(10, 11);

#include<LiquidCrystal.h>

LiquidCrystal lcd(4, 5, 6, 7, 8, 9);

#define x A1

#define y A2

#define z A3

int xsample = 0;

int ysample = 0;

int zsample = 0;

#define samples 10

#define minVal -50

#define MaxVal 50

int i = 0, k = 0;

int gps\_status = 0;

float latitude = 0;

float logitude = 0;

String Speed = "";

String gpsString = "";

char \*test = "$GPRMC";

void initModule(String cmd, char \*res, int t)

{

while (1)

{

Serial.println(cmd);

Serial12.println(cmd);

delay(100);

while (Serial12.available() > 0)

{

if (Serial12.find(res))

{

Serial.println(res);

delay(t);

return;

}

else

{

Serial.println("Error");

}

}

delay(t);

}

}

void setup()

{

Serial12.begin(9600);

Serial.begin(9600);

lcd.begin(16, 2);

lcd.print("Accident Alert ");

lcd.setCursor(0, 1);

lcd.print(" System ");

delay(2000);

lcd.clear();

lcd.print("Initializing");

lcd.setCursor(0, 1);

lcd.print("Please Wait...");

delay(1000);

Serial.println("Initializing....");

initModule("AT", "OK", 1000);

initModule("ATE1", "OK", 1000);

initModule("AT+CPIN?", "READY", 1000);

initModule("AT+CMGF=1", "OK", 1000);

initModule("AT+CNMI=2,2,0,0,0", "OK", 1000);

Serial.println("Initialized Successfully");

lcd.clear();

lcd.print("Initialized");

lcd.setCursor(0, 1);

lcd.print("Successfully");

delay(2000);

lcd.clear();

lcd.print("Callibrating ");

lcd.setCursor(0, 1);

lcd.print("Acceleromiter");

for (int i = 0; i < samples; i++)

{

xsample += analogRead(x);

ysample += analogRead(y);

zsample += analogRead(z);

}

xsample /= samples;

ysample /= samples;

zsample /= samples;

Serial.println(xsample);

Serial.println(ysample);

Serial.println(zsample);

delay(1000);

lcd.clear();

lcd.print("Waiting For GPS");

lcd.setCursor(0, 1);

lcd.print(" Signal ");

delay(2000);

gps.begin(9600);

get\_gps();

show\_coordinate();

delay(2000);

lcd.clear();

lcd.print("GPS is Ready");

delay(1000);

lcd.clear();

lcd.print("System Ready");

Serial.println("System Ready..");

}

void loop()

{

int value1 = analogRead(x);

int value2 = analogRead(y);

int value3 = analogRead(z);

int xValue = xsample - value1;

int yValue = ysample - value2;

int zValue = zsample - value3;

Serial.print("x=");

Serial.println(xValue);

Serial.print("y=");

Serial.println(yValue);

Serial.print("z=");

Serial.println(zValue);

if (xValue < minVal || xValue > MaxVal || yValue < minVal || yValue > MaxVal || zValue < minVal || zValue > MaxVal)

{

get\_gps();

show\_coordinate();

lcd.clear();

lcd.print("Sending SMS ");

Serial.println("Sending SMS");

Send();

Serial.println("SMS Sent");

delay(2000);

lcd.clear();

lcd.print("System Ready");

}

}

void gpsEvent()

{

gpsString = "";

while (1)

{

while (gps.available() > 0) //Serial incoming data from GPS

{

char inChar = (char)gps.read();

gpsString += inChar; //store incoming data from GPS to temparary string str[]

i++;

// Serial.print(inChar);

if (i < 7)

{

if (gpsString[i - 1] != test[i - 1]) //check for right string

{

i = 0;

gpsString = "";

}

}

if (inChar == '\r')

{

if (i > 60)

{

gps\_status = 1;

break;

}

else

{

i = 0;

}

}

}

if (gps\_status)

break;

}

}

void get\_gps()

{

lcd.clear();

lcd.print("Getting GPS Data");

lcd.setCursor(0, 1);

lcd.print("Please Wait.....");

gps\_status = 0;

int x = 0;

while (gps\_status == 0)

{

gpsEvent();

int str\_lenth = i;

coordinate2dec();

i = 0; x = 0;

str\_lenth = 0;

}

}

void show\_coordinate()

{

lcd.clear();

lcd.print("Lat:");

lcd.print(latitude);

lcd.setCursor(0, 1);

lcd.print("Log:");

lcd.print(logitude);

Serial.print("Latitude:");

Serial.println(latitude);

Serial.print("Longitude:");

Serial.println(logitude);

Serial.print("Speed(in knots)=");

Serial.println(Speed);

delay(2000);

lcd.clear();

lcd.print("Speed(Knots):");

lcd.setCursor(0, 1);

lcd.print(Speed);

}

void coordinate2dec()

{

String lat\_degree = "";

for (i = 20; i <= 21; i++)

lat\_degree += gpsString[i];

String lat\_minut = "";

for (i = 22; i <= 28; i++)

lat\_minut += gpsString[i];

String log\_degree = "";

for (i = 32; i <= 34; i++)

log\_degree += gpsString[i];

String log\_minut = "";

for (i = 35; i <= 41; i++)

log\_minut += gpsString[i];

Speed = "";

for (i = 45; i < 48; i++) //extract longitude from string

Speed += gpsString[i];

float minut = lat\_minut.toFloat();

minut = minut / 60;

float degree = lat\_degree.toFloat();

latitude = degree + minut;

minut = log\_minut.toFloat();

minut = minut / 60;

degree = log\_degree.toFloat();

logitude = degree + minut;

}

void Send()

{

Serial12.println("AT");

delay(500);

serialPrint();

Serial12.println("AT+CMGF=1");

delay(500);

serialPrint();

Serial12.print("AT+CMGS=");

Serial12.print('"');

Serial12.print("9821757249"); //mobile no. for SMS alert

Serial12.println('"');

delay(500);

serialPrint();

Serial12.print("Latitude:");

Serial12.println(latitude);

delay(500);

serialPrint();

Serial12.print(" longitude:");

Serial12.println(logitude);

delay(500);

serialPrint();

Serial12.print(" Speed:");

Serial12.print(Speed);

Serial12.println("Knots");

delay(500);

serialPrint();

Serial12.print("http://maps.google.com/maps?&z=15&mrt=yp&t=k&q=");

Serial12.print(latitude, 6);

Serial12.print("+"); //28.612953, 77.231545 //28.612953,77.2293563

Serial12.print(logitude, 6);

Serial12.write(26);

delay(2000);

serialPrint();

}

void serialPrint()

{

while (Serial12.available() > 0)

{

Serial.print(Serial12.read());

}

}