DIP004U3M

PRODUCT DEVELOPMENT

Velocity Meter

GROUP 8

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INTRODUCTION

Our wind sensor is based on the new approach where we detect the speed of the wind by using the force exerted by the wind on the obstructing surface, causing it to deflect, and by measuring the deflection through sensors and calibrating it according to measured wind speed.

The wind sensors available in today's market are not very affordable, unlike this device as it does not require any sophisticated design for wind flow measurement and this device is easy to carry.

Working

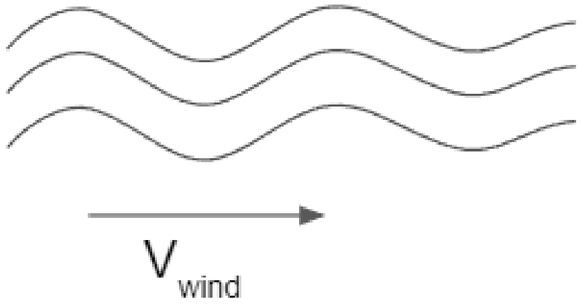
The design consists of a light shaft mounted on a joystick sensor with a lightweight, high surface area object (such as a thermocol ball).

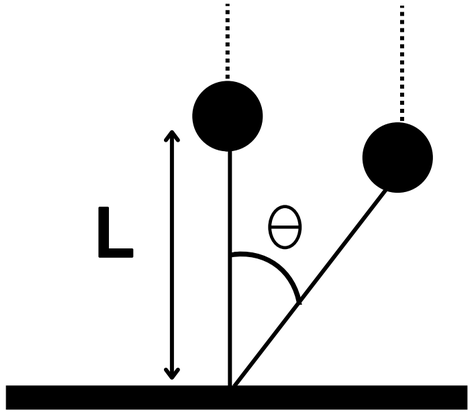
When the wind blows on the ball, the device indicates the direction of the flow of wind the joystick sensor attached to the shaft, the orientation of the digital joystick sensor changes depending on the wind direction.

The digital output of elevation and Azimuth is then transduced to read wind direction. The speed of wind is calculated by measuring the angle of deflection.

The output provided by joystick/gyro sensor is input to the Arduino uno micro controller board and the calibrated output is then displayed on the display module.

BASIC FORMULATION





$$w = f(Re)$$

$$Re = \frac{\rho u L}{\mu}$$

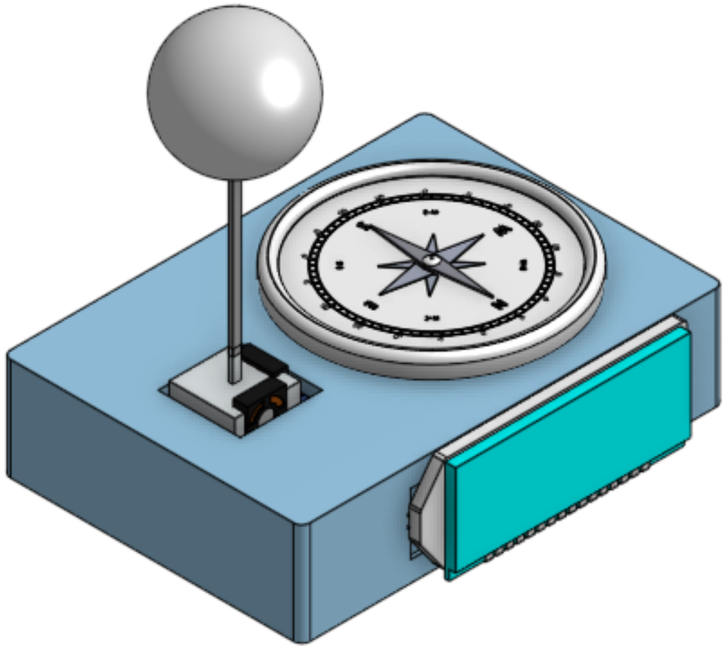
$$w = f(V_{wind})$$

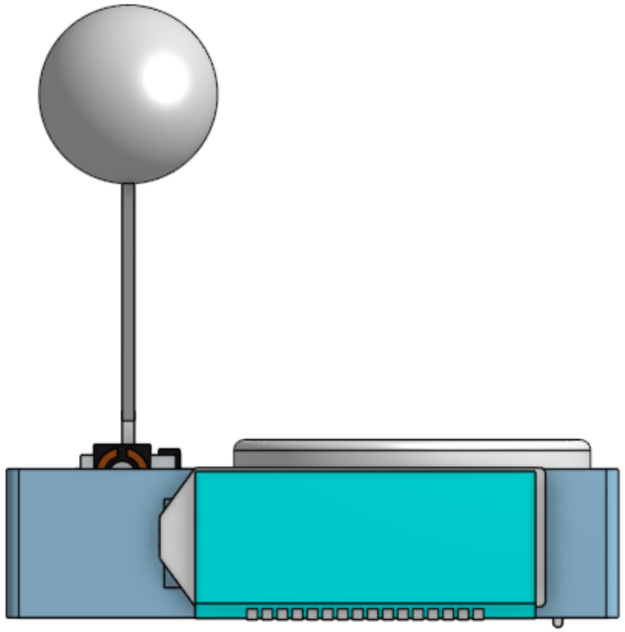
w = Deflection due to wind
Re = Reynolds no.
ρ = Density of Air
Vwind = Flow Velocity
L = Linear dimention

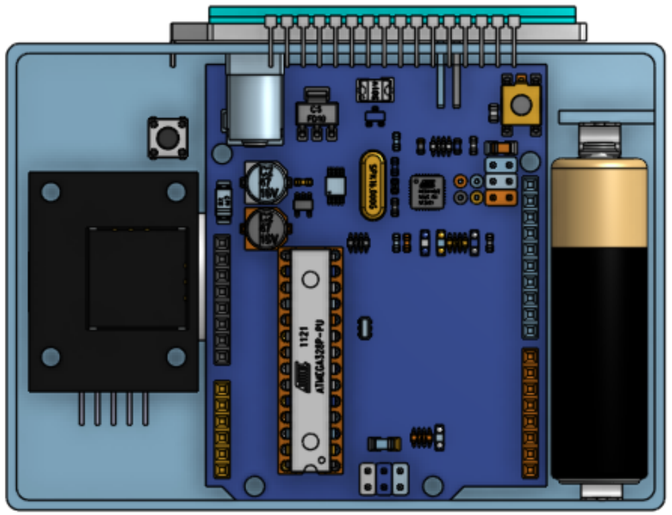
BASIC COMPONENTS INVOLVED:

Gyro sensor	Joystick Sensor
Arduino UNO	Mini-display module
Vertical column	Battery (5-9V)

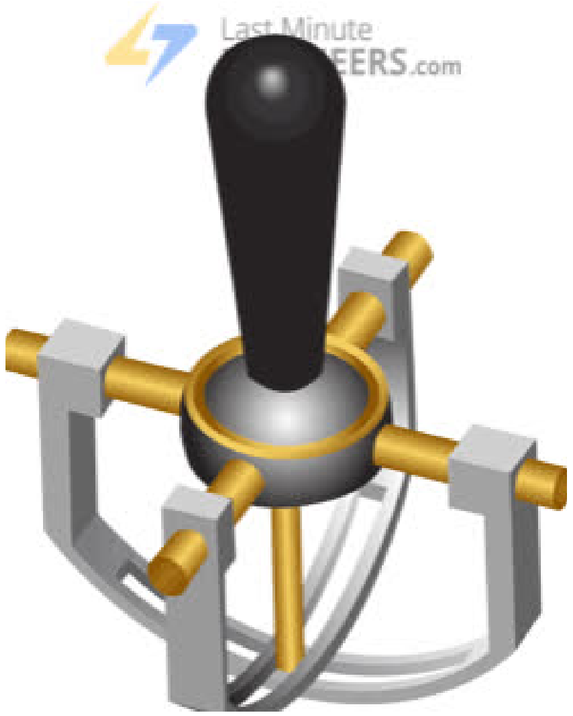
initial CAD Design

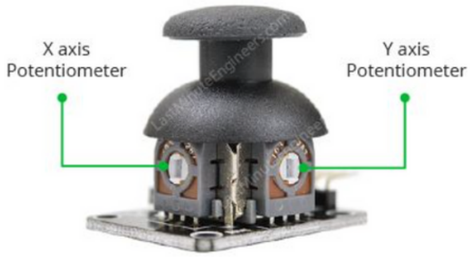


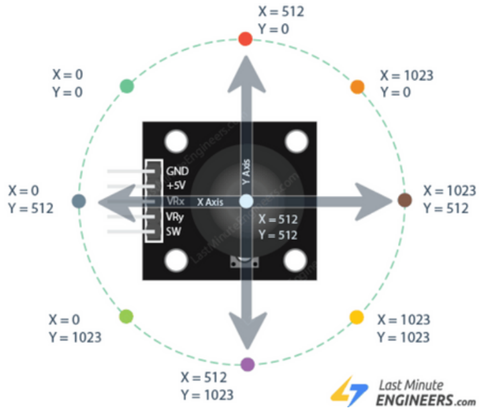




Joystick Input








```arduino
const int SW_pin = 8; // digital pin connected to switch output
const int X_pin = 0; // analog pin connected to X output
const int Y_pin = 1; // analog pin connected to Y output

void setup() {
  pinMode(SW_pin, INPUT);
  digitalWrite(SW_pin, HIGH);
  Serial.begin(9600);
}

void loop() {
  Serial.print("Switch:  ");
  Serial.print(digitalRead(SW_pin));
  Serial.print(" | ");
  Serial.print("X-axis: ");
  Serial.print(analogRead(X_pin));
  Serial.print(" | ");
  Serial.print("Y-axis: ");
  Serial.print(analogRead(Y_pin));
  Serial.println(" | ");
  delay(200);
}
```

Gantt Chart

Velocity sensor