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## EXECUTIVE SUMMARY

According to Trans-African Hydro-Meteorological Observatory, current available sensors used in weather stations are not suitable for the TAHMO (Trans-African Hydro-Meteorological Observatory) project. They are either too expensive, not robust or they do not measure the variables that are desired. Hence there is a need to design a sensor that measures a weather or hydrological variable which is both inexpensive and robust.

The design of solar radiation sensor was done by using a transistor 2N3055 which cost $2.99 per piece. The top of the transistor was cut off and which is now cover by a glass plate. GPS device measure the precise location and the time of the area.

## 1.0 INTRODUCTION

Solar radiation is a term used to describe visible and near-visible (ultraviolet and near-infrared) radiation emitted from the sun. Solar radiation is the energy emitted by the sun. It is radiated energy in the form of waves or particles. In other words, it is energy that travels through space, usually as heat but also is in the form of X-rays, radio waves, visible light, and ultraviolet light. The spectrum of solar radiation is close to that of a black body with a temperature of about 5800 K.

## OBJECTIVE

The main objective of this paper is to design a solar radiation sensor using transistor 2N3055. Basically the objectives are:

1. To use transistor 2N3055 as sensor in building the solar radiation.

2. To design a solar radiation sensor.

3. To measurement the precise location and time.

## 2.0 IMPLEMENTATION OF THE DESIGN

### 2.1 Solar Cell

Transistor 2N3055 is used to build the solar radiation sensor. The voltage across the solar cell in the room under room light is 84mV and in sunlight is 413.65mV.

Figure 1. Transistor 2N3055

As the sun strikes it, the surface gets hot. The temperature of the surface is measured with a voltmeter, giving an output voltage related to the amount of solar radiation striking the surface. When sunlight strikes it, it produces electricity, and the more sunlight strikes it, the more electricity it produces.

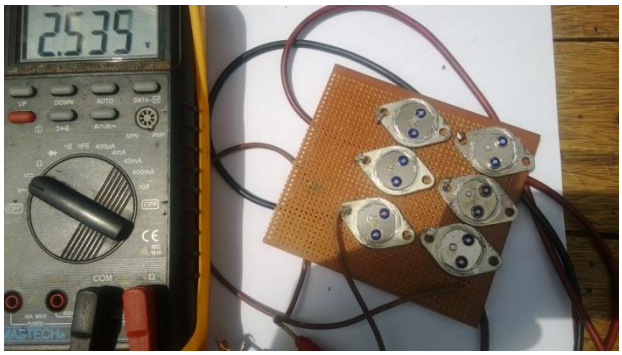


Figure 2. Voltage across four 2N3055 transistors

### 2.2 Photocurrent

The short circuit current of the solar cell is directly proportional to the energy incident on the solar cell or the solar radiation. The solar cell is used as input and the photocurrent circuit will converts the current to voltage.

### 2.3 Signal Conditioning

This signal conditioning circuit can amplify the voltage from the photocurrent circuit so that it produces a voltage in a more easily usable range. The solar cell itself can produce voltage in the range of 0.084V to 0.413V as mentioned earlier. Each day the intensity of the sun is different so it is assumed that the solar cell can produce voltage in different ranges.

## 3.0 Conclusion

Solar radiation sensor was build using transistor and was place at different angle to measure the radiation of the sun and GPS device is used to know the precise location and time of the measurement area.

## 4.0 REFERENCE

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