

# **The Development of Uninterruptible Power Supply Using Solar Energy for Earth's Electromagnetic Monitoring Application**

Thesis is presented in partial fulfillment for the award of  
Bachelor of Engineering (Hons.) in Electronics Engineering (Communication)  
UNIVERSITI TEKNOLOGI MARA (UiTM)



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JULY 2014

## **ACKNOWLEDGEMENT**

Above all, I am very grateful to the Almighty ALLAH SWT for the chance and health given to me throughout the completion of this study. It would seem impossible for me to finish this thesis without His blessings and help.

I would like to express my sincerest thank you to my supervisor, Dr Mohamad Huzaimy bin Jusoh for his full support, encouragement, advice and knowledge in the development of this study. His never-ending support and patience are truly priceless.

I would also like to thank Mr Shamry Mubdi Subra Mullisi, Ir. Yasser Asrul Ahmad, Mr. Norazam Aziz and Mr. Muhammad Fikri bin Abdullah Jalil from Lui Mewah (M) Sdn Bhd for giving the chance for me to present my project at their company and for their willingness to endorse my project presentation.

Special thanks to my beloved parents who have been nothing but understanding and supportive in the period of completion of this project from scratch to this thesis write-up.

My deepest thank you also goes out to my friends and SEE UiTM research team for the help and ideas given for my project.

Last but not least, I profoundly appreciate all the supports and guidance to the lecturers of Universiti Teknologi Mara, Shah Alam throughout my degree years.

## **ABSTRACT**

Most earth electromagnetic monitoring activity involves the installation of the equipment (magnetometer) in remote areas with limited power supply from grid system. Most devices and application for remote monitoring purposes are suffering with the problem of power supply disruption. Therefore the development of interruptible power system is crucial to solve this issue. This paper discusses the uninterruptible power system using solar as a main source of power supply for electromagnetic monitoring. This system will supply power to the magnetometer. From the designed system, the magnetometer will fully depends on the solar input as the main source during daytime. During night time or when the voltage of solar panel is lower than the assigned threshold voltage, it will switch to the lead acid 12V (4.5 AH) battery which acts as a secondary power supply. In order to control the switching transition process, of power supply from solar to battery, a switching controller circuit has been deployed. The charging process is controlled by solar charge controller to avoid overcharge which can cause damages to the battery. The system is working properly to continuously operate the magnetometer by using both solar panel and battery. The development processes, troubleshooting and measurements are explained thoroughly in this technical paper.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 BACKGROUND OF STUDY**

Interruptible power supply is very critical for many sectors when there is a need of continuous power supply. To achieve this, the system should have secondary power as a backup. Additionally, automatic switching controller should be embedded to the system. A conventional power system is fully depends on grid system. However, for any continuous monitoring application at remote area, the most common problem faced is limited power supply due to the location that is very far from the grid-based power supply. Therefore, we have developed a system which can supply power continuously by using solar panel with battery as a backup power. A power supply that incorporates a renewable source of energy that involve in this project provides a feasible option to deal with the interruption of work in progress due to power failure.

A magnetometer is an electromagnetic monitoring device used mostly in space based research and navigation. The typically used fluxgate magnetometer is said to be robust, reliable and have considerable space heritage [1]. An anisotropic magnetoresistive magnetometer has a significantly lower mass, volume and to a lesser extent power compared to fluxgate in its measuring capability.