# CORRELATION ANALYSIS OF TRAVELLING IONOSPHERIC DISTURBANCES (TID) DUE TO IONOSPHERIC AND TROPOSPHERIC EVENTS

NADIRA RAIHAN BINTI ABD RAHMAN

FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
MALAYSIA

# CORRELATION ANALYSIS OF TRAVELLING IONOSPHERIC DISTURBANCES (TID) DUE TO IONOSPHERIC AND TROPOSHERIC EVENTS

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

**NADIRA RAIHAN BINTI ABD RAHMAN**
**FACULTY OF ELECTRICAL ENGINEERING**
**UNIVERSITI TEKNOLOGI MARA**
**40450 SHAH ALAM,**
**SELANGOR, MALAYSIA**

**MAY 2010**

## ACKNOWLEDGEMENT

Alhamdulillah, the Most Grateful to Allah who has given me the strength and ability to complete this project successfully.

First of all, it would not be appropriate to go beyond this page without giving due credit to the person who made this thesis possible. Sincerely, I would like to thank my project supervisors, Miss Noor Hafizah Binti Abdul Aziz and Mr Mohamad Huzaimy Bin Jusoh for their contribution and encouragement upon accomplishment of this project.

My appreciation goes to all lecturers in the Faculty of Electrical Engineering, UiTM for their guidance and willingness to share their knowledge that contributes directly or indirectly towards the completion of this project. A high appreciation to my beloved parents, Mr Abd. Rahman Bin Mustafa and Mrs. Aishah Binti Ahmad who has supplied all the moral and physical support, and to all my friends for their unfaltering commitment, support and immense faith during this research.

Lastly, I'll make this most precious experience during this research as my guideline for the future.

## ABSTRACT

This project focuses on the effects of TID at various altitudes of the ionospheric layers. TID is part of disturbance that occurs at ionosphere and it is caused by sun activities. In this project, two main events; the Earthquake on the 26$^{th}$ December 2004 and Geomagnetic Storm on the 14$^{th}$ April 2006 were chosen. The main parameter in this project is Total Electron Content (TEC). TEC is extracted using GPS dual frequency data which in RINEX (Receiver Independent Exchange Format) format that supplied by JUPEM (Department Of Survey and Mapping Malaysia) and taken from receiver stations located at Universiti Teknologi Mara, Arau, for the event of earthquake and Kashima, Japan (KSMV), Station for the event of Geomagnetic Storm. The TEC is computed for different altitude that range from 50km up to 750km. The results show that both events for ionospheric and tropospheric influence the amount of TID can be detected at all chosen altitudes.

## TABLE OF CONTENTS