

**UNIVERSITI TEKNOLOGI MARA**

**EVALUATION OF THE  
INSOLATION MODEL FROM  
LiDAR-DERIVED TOPOGRAPHICAL  
SURFACE MODELS**

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## **ABSTRACT**

The Sun illuminates the Earth and hence, provides the solar energy. Mankind and other forms of life use and benefits from this radiated energy in many ways towards sustainable planning and development of our nation. Earth's surface and objects differ in their types and materials. Thus, the incoming solar radiation or also known as insolation is expected to somehow change in regard to the initial solar energy due to the differing surface types and materials. Modelling the pattern of insolation of the Sun's rays as it interacts with the Earth's atmosphere, surface, and its objects is thus vital for many applications including in the context of green building technology concept. In this study, to reconstruct the surface models that represent the surface, high resolution airborne LiDAR datasets were used to produce the DTM and DSMs. The reliability of these models were verified accordingly. The derived products were further structured as TIN and topographic analysis as well as modelling was performed within ArcGIS environment. Models of irradiance were derived and distinguished based on the direct, diffuse and global irradiance. Then, the relationship of the response pattern with the topographical elements was determined and the results were discussed further in this study.

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# TABLE OF CONTENTS

	<b>Page</b>
<b>CONFIRMATION BY PANELS OF EXAMINERS</b>	ii
<b>AUTHOR'S DECLARATION</b>	iii
<b>ABSTRACT</b>	iv
<b>ACKNOWLEDGEMENT</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF TABLES</b>	ix
<b>LIST OF FIGURES</b>	x
<b>LIST OF SYMBOLS</b>	xiii
<b>LIST OF ABBREVIATIONS</b>	xiv
<b>CHAPTER ONE: INTRODUCTION</b>	1
1.1 Research Background	1
1.2 Problem Statements	6
1.3 Research Aim and Objectives	7
1.4 Significance of Study	8
1.5 Scope and Limitation of Research	8
1.5.1 Scope of Work	9
1.5.2 Limitations and Challenges	10
1.5.3 Study Area	11
1.6 Chapter Outline	13
<b>CHAPTER TWO: A REVIEW ON INSOLATION MODELLING</b>	15
2.1 Overview	15
2.2 LiDAR Derived SURFACE Model	17
2.2.1 Digital Surface Model and Digital Terrain Model	18
2.2.2 Slope and Aspect Calculation in Insolation Modelling	20
2.3 LiDAR Data in Modelling Insolation Pattern	21
2.3.1 Accuracy of LiDAR Data	21

2.3.2	LiDAR Data in Modelling	23
2.3.3	LiDAR in Modelling Solar Pattern	32
2.4	Incoming Solar radiation	35
2.4.1	Definition of Insolation	36
2.4.2	Concept of Insolation	40
2.4.3	Application of Solar Radiation in Diverse Sector	41
2.5	Types of Solar Radiation	43
2.5.1	Direct Irradiance	44
2.5.2	Diffuse Irradiance	44
2.5.3	Global Irradiance	45
2.6	Solar Radiation Models	46
2.6.1	Geographic Information System (GIS) Based Solar Radiation Models	47
2.6.2	Open Source Solar Radiation Models	50
 <b>CHAPTER THREE: METHODOLOGY</b>		 53
3.1	Introduction	53
3.2	Phase I: 3 Dimensional topographic surface model	54
3.2.1	Data Acquisition	55
3.2.2	Data Verification	56
3.2.3	Generation of DSM and DTM	60
3.3	Phase II: Insolation modelling and Investigation on Insolation Pattern	61
3.3.1	Exploring the Suitable Insolation Model Software	61
3.3.2	Insolation Modelling	62
3.3.3	Insolation Pattern Investigation	64
3.4	Phase III: Investigation on Insolation and Topographic model Reliance	66
3.4.1	The Surface Analysis	66
3.4.2	Overlay Analysis	67
 <b>CHAPTER FOUR: RESULTS AND ANALYSIS</b>		 69
4.1	Data Pre-Processing	69
4.1.1	Data Acquisition	69
4.1.2	Data Verification	71