DESIGN AND IMPLEMENTATION OF A MINI TRACKING SYSTEM FOR SOLAR CELLS

By
DIDIT RITANTO 1 - 1501 - 135

BACHELOR'S DEGREE

in

MECHANICAL ENGINEERING – MECHATRONICS CONCENTRATION FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY



SWISS GERMAN UNIVERSITY
EduTown BSD City
Tangerang 15339
Indonesia

FEBRUARY 2017

Revision after the Thesis Defense on [14 February 2017]

STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

	Didit Ritanto	
	Student	Date
	Approved by:	
	Ir. Suryo Abadi, M.Sc	
		Date
	Thesis Advisor	
W	ISS GERMAN UNIVE	RSIT
	Dena Hendriana, B.Sc., S.M., Sc.D	
		Date
	Thesis Co-Advisor	
	Dr. Ir. Gembong Baskoro, M.Sc	
	Dean	Date

ABSTRACT

DESIGN AND IMPLEMENTATION OF A MINI TRACKING SYSTEM FOR SOLAR CELLS

By

Didit Ritanto

Ir. Suryo Abadi, M.Sc, Advisor Dena Hendriana, B.Sc., S.M., Sc.D, Co-Advisor

SWISS GERMAN UNIVERISTY

Solar cells now many are applying to be installed everywhere. While the source of energy from sunlight is converted into electricity. Where in the process of converting it into electricity solar cells require sunlight as much as possible so it depends on the intensity of the rays of the sun of course is affected by the weather everyday but there are other things that the sun itself is not positioned on a fixed or sun moves in virtually any time of east to the west depends on the position where we are also due to be different in every place on earth so that there is a position where we do not get the maximum beam at all times if we do not follow the movement is also apparent from the sun. To get the maximum sunlight of course we have to position the solar cells themselves perpendicular to the sun's position and therefore we need a tool and a system that can follow and try to always be perpendicular to the sun. In this thesis I focus in designing and making tools and systems where solar cells can follow the movement of the apparent sun course I also will analyze whether the tools and systems that I design and make this already as expected which will receive much more sunlight so the greater the the voltage generated by the solar cells, compared with the voltage coming out of the other solar cells are mounted permanently.

Keywords: Sun Tracking, Solar Tracking, Tracking System, (use scientific terms).



DEDICATION

I dedicate this works for the future of my daughter "Mentari" , my wife, my family and ATMI St.Michael Group



ACKNOWLEDGEMENTS

Gott sei Dank, I am grateful to the God for the good health and wellbeing that were necessary to complete this book.

I wish to express my sicere thanks to my Advisors Mr. Ir. Suryo Abadi, M.Sc, and Mr. Dena Hendriana, B.Sc., S.M., Sc.D for the continuous support of my Bachelor Thesis. I place on record, my sincere thank you to Mr. Dr. Ir. Gembong Baskoro, M.Sc Dean of the Faculty, for the continuous encouragement.

I am also grateful to Mr. Dedy Loebis, lecturer. I am extremly thankful and indebted to him for sharing expertise, and sincere and valuable guidance and encouragement extended to me.

I take this opportunity to express gratitude to all of my friends member of the fast track program in ATMI-SGU for their help, support and togetherness. I also thank my family and my parents for the unceasin encouragement, support and attention. I am also grateful to my partner who supported me throught this venture.

SWISS GERMAN UNIVERSITY

TABLE OF CONTENTS

			Page
	STATE	MENT BY THE AUTHOR	2
	ABSTR	RACT	3
		ATION	
		OWLEDGEMENTS	
		OF CONTENTS	
		F FIGURES	
		F TABLES	
		TER 1 - INTRODUCTION	
	1.1.	Background	
	1.3.	Research Problem	
	1.4.	Objectives	
	1.5.	Research Questions	
	1.6.	Hypothesis	
		TER 2 - LITERATURE REVIEW	
	2.1.	Theoretical Perspectives	
W	2.2.	2.1.1. Sun Path	13 15 18
	2.3.	Comparison of Previous Study	
	_	TER 3 – RESEARCH METHODS	
	3.1.	Research Framework	
	3.2.	Design Justification.	
	3.3.	3.2.1. Kinematic of Micro Servo Motor 3.2.2. Kinematic of Moving Platform. 3.2.3. Mechanical Design. 3.2.4. Hardware Design. 3.2.5. Sensor Design. 3.2.6. Electric Design. 3.2.7. Programming. Materials and Equipment.	29 31 33 34
		3.3.1. Solar cells	

	3.3.3. Micro Servo Motor	41	
	3.3.4. Microcontroller Arduino Mega 2560	42	
	Analytical Method		
СНАРТ	TER 4 – RESULTS AND DISCUSSIONS	49	
4.1.	Initial Evaluation	49	
4.2.	Data Analysis		
CHAPTER 5 – CONCLUSIONS AND RECCOMENDATIONS			
5.1.	Conclusions		
	Recommendations		
REFERENCES			
APPENDIX			
CURRICULUM VITAE			



SWISS GERMAN UNIVERSITY