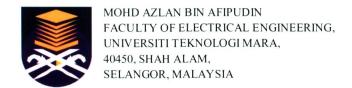
# ANALYSIS OF TARGET RADAR CROSS SECTION (RCS) USING COMPUTER SIMULATION TECHNOLOGY (CST) SOFTWARE

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



## Acknowledgement

Firstly, I would like to thanks to Allah the Al-Mighty who guide me to this project and gave me the strength to proceed this learning process. I would also want to thanks to all of people who support and help me in completing my degree.

My grateful thanks are also extended to my Final Year supervisor's, Dr Nur Emileen Binti Abd Rashid for her patient guidance, enthusiastic encouragement and useful critiques for this project. Without her guide, this project may be unsuccessful.

I also want to thank my friends who have been supporting me in designing with my design especially in giving me the information about the car specification and where to get the information.

Thanks also to CST program that had been held in Faculty Of Electrical Engineering for giving the training to using the software more effectively that had been organize by Dr Ahmad Asari Sulaiman, Mdm Hasimah Bt Baba, Madam Suhaila Bt Subahir and also their team. This program is helpful and giving me additional information.

I would also like to thank Mr. Arnold Chua as Application Engineer CST Malaysia who gives me an advice and information in completing my project in process using CST Software. Their team has helped me and share knowledge about the RSC simulation process.

Finally, I wish to thank my parents for their support and encouragement throughout my study in this field.

## **Abstract**

This paper describes about the design and analysis target radar cross-sectional (RCS) for radar system topology using Computer Simulation Technology (CST MWS) Software. Simulation of the target radar is done in order to demonstrate the radar cross sectional and farfield simulation. The result consists of comparison between target radar cross-sectional for different selected targets angle position and specific frequency of a same car, and RCS for different cars model. The simulation process was done using transient solver from the software application. This simulation process will be the input of the prediction of the performance of forward scatter radar (FSR).

# Table of Contents

Chapter	Title	Page
	Title	i
	Approval	ii
	Declaration	iii
	Acknowledgement	iv
	Abstract	
		<b>V</b>
	Table Of Contents	vi 
	List Of Figures	viii
	List Of Tables	xi 
	List Of Symbols And Abbreviations	xii
I	Introduction	.1.
	1.1 Background of Study	1.
	1.2 Problem Statement	2
	1.3 Objective	3:
	1.4 Scope of Works	<b>3</b> :
	1.5 Thesis Organization	4
2	Literature Review	5
	2.1 Overview of Radar Technology	5
	2.2 Forward Scattering Radar (FSR)	7
	2.3 Radar Cross Section (RCS)	8

### Chapter 1

## Introduction

#### 1.1 Background of Study

Forward scatter radar network (FSR), is a special type of bistatic radar, where the target is close to the transmitter-receiver baseline that corresponds to the case when the bistatic angle,  $\beta$  is close to 180° [1]. When the bistatic angle is equal or close to 180°, the radar system is referred to FSR system. In FSR network, the presence of a target will partly block the signal wave front from the transmitter. This blocking yields a hole in the wave front, known as the target shadow where the shadow is actually an EM field being scattered by the target.

One of the factors which affecting the target signature or signal is the radar cross-sectional (RCS) where the RCS is highly depending on target's silhouette and frequency. Hence the changes in target's trajectories will affect the received signal.

The aim of these studies is to analyze the target RCS using CST software base on the selected design car using simulation method. This CST MWS software is simulation software where it simulates selected design based on user application. By using CST MWS software, a target model RCS has been developed using the three dimension (3D) application tool to analysis and obtain the farfield simulation on different target angles of RCS, frequencies and types of car. This result will be an input to predict the performance of FSR.