UNIVERSITI TEKNOLOGI MARA

FORWARD-SCATTERING RADAR (FSR) GROUND TARGET SIGNAL PROCESSING FOR HUMAN MOTION

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ABSTRACT

The importance of human surveillance and detection for military activities such as border protection or commercial activities such as human trespassing need to be considered in detail. An efficient monitoring system in the area that is difficult to be accessed is required for safety of the people which can be done with the implementation of advanced technology such as radar sensor. This paper focused on the comprehensive analysis studies of human's motion by using forward-scattering radar (FSR) which may differ according to their miscellaneous types of activity such as walking and running. Three human targets with different types of movement and one vehicle were tested when they crossed the FSR baseline and two different operating frequencies of 2.5GHz and 3GHz were used during the experimental procedure. A simulation with several stages of signal processing were conducted by using MATLAB in order to extract the information of the target and to analyse the character of the information obtained.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The first chapter is divided into two parts. In the first part the readers will be provided with a brief introduction to radar technology followed by some overview to Forward-Scattering Radar (FSR) system. It will not cover all areas of the system but only emphasise several important parts that the reader needs to know and understand regarding the basic architecture of FSR before proceeding to the following chapters. This includes the concept and geometry of FSR, fundamental equations, FSR Radar Cross Section (RCS) and the Doppler Effect in FSR. The second part of this chapter covers the problem statement, objectives, scope and limitation of study and ends with the organisation of thesis.

1.2 BACKGROUND OF STUDY

Radar is one of the wireless communication's application which has been secretly developed by few countries way back before and during World War II such as United States of America, Germany, Russia and Great Britain. As for today, most countries in this world owned different types of radar which is used not only in military but also for commercial purposes. When it comes to radar, the idea of this technology is to detect and classify the target of interest. Originally, the term RADAR is an acronym which stands for 'RAdio Detection and Ranging' [2] . The primary common usage of radar system in today's modern era includes military,