

UNIVERSITI TEKNOLOGI MARA

**FEASIBILITY STUDY ON UTILIZATION OF STUB
LOADED MINIATURE MONOPOLE ANTENNA
FOR FORWARDS SCATTERING MICRO-RADAR
(FSR) NETWORK PROJECT**

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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

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ABSTRACT

A feasibility study on concept of stub loaded miniature dual band VHF/UHF antenna design is proposed in this research. The main application of the antenna is purposely for the Forward Scattering Micro-Radar (FSR) network project which had been carried out by some other researchers from University of Birmingham during the last few years. The simulation result of the miniature antenna design by using the Computer Simulation Technology (CST) Studio Suite software will be analyzed and performance analysis will be conducted by comparing with the Commercial Off-The-Shelve (COTS) antenna which had been used before for the prototype of the sensor network. The performance parameter which would be evaluate consists of the operating frequency, the wavelength, return loss (S_{11}), antenna gain, beamwidth, line impedance and Voltage Standing Wave Ratio (VSWR). The result obtained from both execution of Genetic Algorithm (GA) optimization and Parameter Sweep analysis presented and conclude by future work recommendations for the continuity of this research.

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CHAPTER I

INTRODUCTION

1.0 Overview

The utilization of the wireless sensor network has been growth extremely for the last few decades comprising a number of unattended sensors for wide area surveillance and monitoring. Such networks have found applications in monitoring environmental, meteorological and seismic parameters, tsunami and volcanic activities, facilities and road traffic control, alarm systems and remote asset monitoring, as well as other commercial applications. For these applications, different physical principles (acoustic, seismic, thermal, magnetometer, electromagnetic, optical, biological, chemical, etc.) are typically used in the network sensors. The Forward Scattering Radar (FSR) sensor prototype configuration is shown in Figure 1.

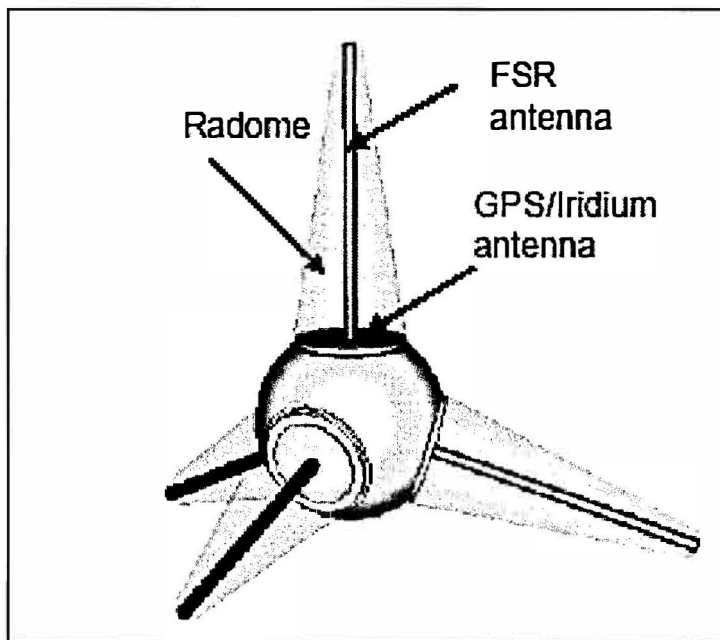


Figure 1: FSR Sensor Prototype Configuration [2]