DESIGN AND CONSTRUCTION OF HELICAL ANTENNA FOR WEATHER SATELLITE RECEIVER

Thesis presented in partial fulfilment for the award of the
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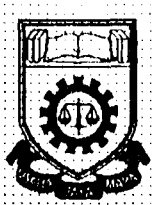

ZAKARIA BIN SALEH
Department of Electrical Engineering
INSTITUT TEKNOLOGI MARA
40450 Shah Alam, Malaysia
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Abstract

This report presents the theory, design, simulation and construction of a helical antenna for reception of orbiting weather Satellite signal from National Oceanic Atmospheric Administration (NOAA). This satellite transmits circular polarised AM-FM modulated signal at 137.5 MHz. The design and construction of this helical antenna was done with the aid of a computer program written in Turbo Pascal version 6. A program to simulate the radiation pattern of the helical antenna was also written in Turbo Pascal version 6. The constructed helical Antenna was tested and is perfectly matched.The gain of 13.01 dB, bandwidth of 23.5 MHz and half-power beamwidth of 36 degrees are achieved.

ACKNOWLEDGEMENT

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CHAPTER 1

1. INTRODUCTION

The first series of weather satellites was launched by the American in December 1963. Since then satellites equipped with Automatic Picture transmission (APT) have been launched by the USA , USSR and China. These Very High Frequency (V.H.F.) transmissions are of one of two types: APT, which gives a TV type picture of a snap short picture taken by the satellite, and scanning Radiometer (SR) pictures which are continuous scans received in real-time of a rotating camera mirror which sees the earth as the satellite progresses during a pass. APT pictures are usually only in the visible portion of the spectrum, whereas SR pictures may be infrared, visible, or both, sent in a side by side format.

The available weather satellites may be divided into polar orbiting vehicles which send either APT or SR pictures, and geostationary vehicles which send either APT or specially processed APT and SR. Currently, the polar orbiters sending V.H.F. APT are NOAA-9, NOAA-11, NOAA-12 and until now NOAA-14, they are operated and launched by the USA.

All American V.H.F. weather picture transmissions comprises amplitude modulated picture information on a 2.4 kHz subcarrier , which in turn frequency modulates the V.H.F. carrier. This signal were then transmitted to the earth in the