SCATTERING EFFECTS IN LONG DISTANCE RADIO PROPAGATION

A Thesis

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CHAPTER 1

INTRODUCTION

1.0 Background

It is well known that the ionosphere is not a uniform and homogeneous medium. For many years studies have been made of ionospheric irregularities down to sizes of less than 1 km; some of which are associated with periodic motion caused by gravity waves, others, with turbulence phenomena. The effect of these ionospheric disturbances on conventional high-frequency radio communication links is an important study, and extends back to almost the beginning of ionospheric investigations. It is now recognised, in fact, that the ionosphere behaves as an irregular reflector which imposes fluctuations on initially plane wavefronts as they emerge from the medium.

The irregularities of these wavefronts can be thought of as two distinct phenomena:

(a) Spatial fluctuations in the wavefront.

These are the time-stationary variations along a wavefront which are the result of an angular spread in the down-coming signal, and caused by the scattering nature of the embedded ionospheric irregularities.

(b) Temporal fluctuations.

The changes in detailed shape of the wavefront resulting from