Ain Shams University
Faculty of Engineering

MODELING AND SIMULATION OF A LAND MOBILE SATELLITE LINK

By

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A Thesis

Submitted in partial fulfillment of the Master Degree in

Electrical Engineering

Electronics and Communications Department

Under the supervision

of

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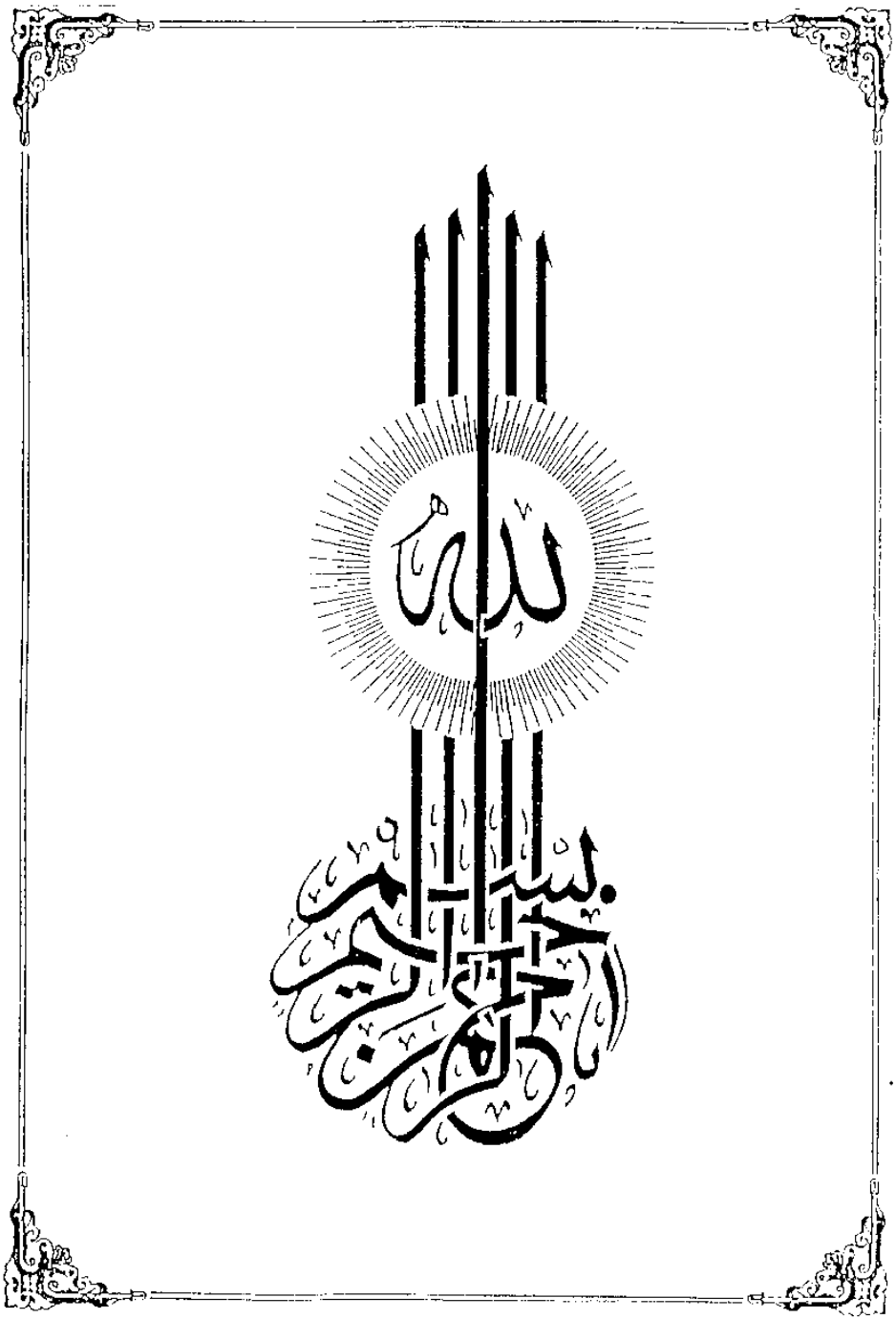
Cairo-1993

بسم الله الرحمن الرحيم



To my family,

and all my friends...

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Electrical Engineering.

The work included in this thesis was carried out by the author in the National Telecommunication Institute, Transmission department, from December 1990 to December 1993

No part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

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Abstract

The objective of this thesis is evaluating the performance of a digital land mobile satellite link under some of the main impairments to which the signal is subjected. The considered system impairments include the land mobile propagation channel, in addition to the transponder travelling-wave tube amplifier. For this purpose, a simulation package is developed to analyze the link performance under the effect of multipath and shadowing phenomena of the mobile propagation channel. The nonlinearities encountered in the satellite transponder amplifier are also added in the simulation and the performance of the link is evaluated in a Gaussian noise environment.

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Chapter 1

General Introduction

In the ever-growing field of telecommunications, new services are continuously offered, supported by the rapidly growing technological development. Presently, satellite systems constitute one of the major telecommunications fields experiencing tremendous evolution. Satellite services are no longer confined to organizations, or large groups of users, rather it is extending to satisfy individual demands all over the world. Nowadays, it has become possible for a user, wherever located, whether stationary or travelling, to communicate in a relatively efficient, cost-effective manner, with any desired, remotely located destination. The global coverage and high communications capacity of satellite systems facilitated the realization of such advanced services on a personal need basis.

Land mobile satellite communications is a recently introduced service, offering wide range of speech and data communications. Researchers and system designers are directing their efforts towards improving the present system performance and developing new services to satisfy future demands.