STUDIES IN EQUATORIAL AERONOMY

A THESIS

SUBMITTED FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

OF THE

GUJARAT UNIVERSITY

BY

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AUGUST, 1985

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D E D I C A T E D

TO

MY PARENTS

CERTIFICATE

I hereby declare that the work presented in this thesis is original and has not formed the basis for award of any degree or diploma by any University or Institution.

Surendra Pal

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(Author)

Certified by

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SATYA PRAKASH
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STATEMENT

This thesis is based on the studies of the equatorial ionosphere carried out by the author at Physical Research Laboratory, Ahmedabad, India under the guidance of Prof. Satya Prakash. The experimental measurements were made using rocket-borne probes flown from Thumba and SHAR, India.

The present investigations were aimed at studying the electric field and electron density irregularities in the equatorial electrojet and night-time equatorial spread-F.

The author has actively participated in designing, fabricating and testing of the payloads and microcomputer based data acquisition/processing systems for these studies. A new double-probe system was developed by the author for the vertical and horizontal electric field measurements, which is particularly suitable for these studies in the equatorial region.

This thesis has been divided into five chapters. The first chapter gives a brief introduction to the equatorial ionosphere and the plasma density irregularities observed in this region. The phenomenon of equatorial spread-F is also introduced.

The second chapter deals with the experimental techniques used for the above studies. Abrief review of the techniques used earlier for electric field measurements, along with the details of a new double probe system developed for the present studies are given here. The last section describes the data processing system.

Results of the electric field and electron density measurements carried out in the equatorial E-region are described in the third chapter.

The fourth chapter describes results of the night-time studies conducted in the equatorial spread-F.

Chapter five summarises significant results and conclusions obtained from the studies presented in this thesis.

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ACKNOWLEDGEMENTS

I take this opportunity to express my deep sense of gratitude to Prof. Satya Prakash, who guided me throughout the course of this work. His constant and everlasting enthusiasm is gratefully acknowledged.

My senior colleague Dr. Rajesh Pandey has helped me in almost every aspect of this work, to whom I remain indebted.

My sincere thanks are due to Prof. B.H. Subbaraya, Prof. R. Raghavarao, Dr. H. Chandra and Dr. S.P. Gupta for their encouragement and interest in my work.

I thank Prof. S.P. Pandya, Director, PRL and Prof. D. Lal for their keen interest in this work.

Messrs R.N. Misra, Y.B. Acharya, R.I. Patel, V.K. Parmar, H.D. Parikh, M.B. Dadhania, R.S. Singh, R.C. Shah and Mrs. S. Desai have been very helpful and cooperative in designing and developing the payloads and data processing systems. I gratefully acknowledge their untiring efforts and sincerely thank them all.

Mr. K.C. Patel, Mr. K.S. Patel and Mrs. S.G. Bakre are gratefully acknowledged for their assistance in numerical analysis of the data.

I am indebted to messrs V. Sudhakar, A.C. Bahl, R. Jayamani, J. Peter and their colleagues at TERLS and

SHAR for their efforts in developing the sensor deployment system and succesfully launching the rocket payloads.

My colleagues and friends have always been very kind and helping to me. Ranjan, Kanchan, Jayaraman and Drs. R. Ramesh and Manab Chakraborty deserve my special thanks for assisting me at various phases of this work.

I express my indebtness to Prof. N.C. Varshneya of Roorkee University, who encouraged me to take up research as my career.

Family members of Prof. Satya Prakash and Dr. Rajesh Pandey have been very affectionate to me. I express my heartiest thanks to them all.

I am grateful to my family members and relatives, who have been my greatest source of moral support and inspiration throughout this work.

I thank my wife Kalpana and my son for their patient endurance.

Mr. Philip Samuel and Mr. Bupendra Patel need special mention for typing and cyclostyling the thesis very efficiently. I thank them for the excellent job. Mr. N.P.M. Nair has also helped me during the course of this work by typing various reports and my research publications. I gratefully acknowledge his cooperation.

Thanks are also due to PRL Library personnel for their helping nature. Mrs. Kokila Bhatt needs special mention for her help in xeroxing the diagrams at a very short notice.

Surendra Pal

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