MASSACHUSETTS INSTITUTE OF TECHNOLOGY

RADIATION LABORATORY SERIES

LOUIS N. RIDENOUR, *Editor-in-Chief*

RADAR SCANNERS AND RADOMES

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RADAR SCANNERS AND RADOMES

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RADAR SCANNERS AND RADOMES

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Foreword

THE tremendous research and development effort that went into the development of radar and related techniques during World War II resulted not only in hundreds of radar sets for military (and some for possible peacetime) use but also in a great body of information and new techniques in the electronics and high-frequency fields. Because this basic material may be of great value to science and engineering, it seemed most important to publish it as soon as security permitted.

The Radiation Laboratory of MIT, which operated under the supervision of the National Defense Research Committee, undertook the great task of preparing these volumes. The work described herein, however, is the collective result of work done at many laboratories, Army, Navy, university, and industrial, both in this country and in England, Canada, and other Dominions.

The Radiation Laboratory, once its proposals were approved and finances provided by the Office of Scientific Research and Development, chose Louis N. Ridenour as Editor-in-Chief to lead and direct the entire project. An editorial staff was then selected of those best qualified for this type of task. Finally the authors for the various volumes or chapters or sections were chosen from among those experts who were intimately familiar with the various fields, and who were able and willing to write the summaries of them. This entire staff agreed to remain at work at MIT for six months or more after the work of the Radiation Laboratory was complete. These volumes stand as a monument to this group.

These volumes serve as a memorial to the unnamed hundreds and thousands of other scientists, engineers, and others who actually carried on the research, development, and engineering work the results of which are herein described. There were so many involved in this work and they worked so closely together even though often in widely separated laboratories that it is impossible to name or even to know those who contributed to a particular idea or development. Only certain ones who wrote reports or articles have even been mentioned. But to all those who contributed in any way to this great cooperative development enterprise, both in this country and in England, these volumes are dedicated.

L. A. DUBRIDGE.

Preface

A RADAR scanner, or antenna mount, is the assembly consisting of the antenna and the mechanism that causes the radiated beam to scan. In this volume we are concerned mainly with the engineering of the scanner and its housing. The electrical design of the antenna and the transmission line are discussed in Vol. 12 of the Radiation Laboratory Series. Since the reader is presumed to have an engineering background, the discussion of radar antenna mounts in Part I deals only with those features of the design which are peculiar to radar antenna mounts. The treatment is incomplete in two respects. There is almost no reference to equipment operating at wavelengths longer than 10 cm, and there is little discussion of scanners that were not developed at the Radiation Laboratory. These omissions, particularly the latter, should not be regarded as indication of editorial complacency; they result from lack of information by the authors. Many valuable radar systems and radar antenna mounts have been devised for use at 20 cm and longer wavelengths; many have been developed by industry and the armed services. These systems get only passing mention or none at all because of our reluctance to write about unfamiliar topics.

It has been necessary to omit much pertinent material for reasons of military security. The editors have sought to include as much technical information as permissible and the advisory group on security has been cooperative. Deletions and revisions had to be made in the proof, however, in accord with recommendations of the final review board and it was not possible at the late date to smooth out the resulting gaps by thorough revision. The editors regret the deletions but believe that the material which remains will prove to be of value.

Part I is written largely for the mechanical engineer; in Part II electrical considerations predominate. This second part is the first comprehensive discussion of radomes, the plastic enclosures for antennas. Radome development has opened a new field of electromechanical engineering. Because the electrical aspects are less familiar, they are more fully treated here.

All the authors wrote as staff members of the Radiation Laboratory. Their contributions are indicated in each chapter. The book was

planned and guided through several stages of revision by W. M. Cady and M. B. Karelitz; after their departure in February 1946, L. A. Turner took over. M. B. Karelitz assumed the principal responsibility for editing the chapters on ground-based and shipborne antenna mounts; W. M. Cady for the airborne scanners; and L. A. Turner for Part II on radomes.

The techniques of preparing the volume were in the hands of Louise P. Butler, Betty S. Karasik, Martha T. Romanak and Joyce H. Randall. The multiple authorship and the changes of editorial staff that occurred while the volume was being prepared are doubtless reflected in some lack of homogeneity. We hope that this will not interfere with the usefulness of the book.

The nature of the development work at Radiation Laboratory has been so highly cooperative that very often the originators of an idea are unknown and credit cannot be given. It is the labor of these anonymous workers that we most wish to acknowledge, for they are the ultimate authors. Throughout the writing and editing of the volume we have benefited from the friendly criticisms of many of our colleagues in this Laboratory.

THE AUTHORS.

April, 1948.

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