

Surveillance of Environmental Pollution and Resources by Electromagnetic Waves

*Proceedings of the NATO Advanced Study Institute
held in Spåtind, Norway, 9-19 April, 1978*

edited by

TERJE LUND

*Remote Sensing Technology Programme
Kjeller, Norway*



UNIVERSITÄTSBIBLIOTHEK
HANNOVER
TECHNISCHE
INFORMATIONSBIBLIOTHEK

D. Reidel Publishing Company

Dordrecht : Holland / Boston : U.S.A. / London : England

Published in cooperation with NATO Scientific Affairs Division

CONTENTS

Preface	ix
Participants	xi
Program Committee	xv
HOST NATION ADDRESS	
A. Tonning	xvii

PART I: FUNDAMENTALS

FUNDAMENTAL BEHAVIOUR OF BIOSYSTEMS IN CONNECTION TO SURVEILLANCE OF ENVIRON- MENTAL POLLUTION AND RESOURCES	
A. Jensen	3
FUNDAMENTALS OF REMOTE SENSING METHODOLOGY	
D.T. Gjessing	13

PART II: THE ATMOSPHERE

FUNDAMENTALS OF ATMOSPHERIC SPECTROSCOPY	
S. Svanberg	37
SIGNAL-TO-NOISE RATIO OF HETERODYNE LIDAR SYSTEMS IN THE PRESENCE OF ATMOSPHERIC TURBULENCE	
H.T. Yura	67
REMOTE MEASUREMENTS OF ATMOSPHERIC PROPERTIES FROM SATELLITES	
G.E. Peckham	95

INFRARED LASER AUTOMATED FIELD INSTRUMENTATION FOR MONITORING OF THE ATMOSPHERE S.T. Eng	111
REMOTE SENSING IN THE ATMOSPHERE BY MEANS OF FIXED FREQUENCY IR LASER K.W. Rothe	145
MILLIMETRE REMOTE SENSING OF THE STRATOSPHERE AND MESOSPHERE D.L. Croom	155
ACTIVE HETERODYNE SPECTROMETRY WITH AN AIRBORNE CO ₂ LASER SYSTEM W. Wiesemann, W. Englisch, J. Boscher, G. Schäfer	171
HOLOGRAPHIC REAL TIME SEEING THROUGH MOVING SCATTERING MEDIA H. Schmalfluss	183
WORKING GROUP: PROBING OF THE ATMOSPHERE Chairman: K. Rothe	191
PART III: THE EARTH'S SURFACE; LAND - SEA	
SCATTERING OF ELECTROMAGNETIC WAVES FROM THE OCEAN G.R. Valenzuela	199
THE RADAR SIGNATURE OF NATURAL SURFACES AND ITS APPLICATION IN ACTIVE MICROWAVE REMOTE SENSING E.P.W. Attema	227
MICROWAVE RADIOMETRY APPLICATIONS TO REMOTE SENSING E. Schanda	253
CORRECTION OF AIRBORNE IR-SCANNER DATA G.A. Becker	275
LASER - INDUCED FLUORESCENCE TECHNIQUES FOR SOUNDING OF THE HYDROSPHERE F. Günneberg	283
MICROWAVE MEASUREMENTS OVER SEA IN THE NETHERLANDS E.P.W. Attema, P. Hoogeboom	291

CONTENTS	vii
APPLICATIONS OF REMOTE SENSING BY CONVENTIONAL RADARS P.D.L. Williams	299
ERICSSON SLAR B. Ekengren	309
WORKING GROUP: OCEAN WAVES Chairman: O.H. Shemdin	319
PART IV: METHODS OF INFORMATION RETRIEVAL	
THE FOURIER TRANSFORM: PROPERTIES AND APPLICATIONS A.G. Kjelaas	329
PATTERN RECOGNITION - WITH SPECIAL EMPHASIS ON IMAGE PROCESSING T. Orhaug	353
DIGITAL ANALYSIS OF MULTI-CHANNEL RADAR DATA AT CCRS P.M. Teillet	381
EXPERIENCES FROM APPLYING AIRCRAFT AND SATELLITE MSS-DATA TO EARTH RESOURCES INVENTORY PROBLEMS IN SWEDEN T. Orhaug, L.-E. Gustafsson, L. Wastenson, S.I. Åkersten	387
WORKING GROUP: SIGNAL PROCESSING, PATTERN RECOGNITION AND IMAGE PROCESSING Chairman: T. Orhaug	399