

EARSeL

EARSeL ADVANCES IN REMOTE SENSING

Vol.2, No.1, January 1993

Editor-in-Chief: EARSeL Chairman

Sergio Vetrella

Istituto di Gasdinamica
University of Naples
P.le Tecchio, 80
I-80125 Naples, Italy

Editorial Bureau:

Martti Hallikainen

Laboratory of Space Technology
Otakaari, 5A
Helsinki University of Technology
SF-02150 Espoo, Finland

Manfred Buchroitner

Joanneum Research Centre
Inst. for Image Processing
Wastiangasse, 6
A-8010 Graz, Austria

Editorial Assistant:

Anna Calandro

Istituto di Gasdinamica
University of Naples
P.le Tecchio, 80
I-80125 Naples, Italy

EARSeL Secretariat:

Madeleine Godefroy

EARSeL Secretariat
Bureau B-318
2, Avenue Rapp
75340 Paris Cedex 07, France

EARSeL ADVANCES IN REMOTE SENSING

Aims

EARSeL Advances in Remote Sensing is an international journal serving the worldwide scientific and user community working in the field of remote sensing. Each issue of the journal is focussed on a particular theme, which has been analysed and discussed among international experts within a workshop or other special events organised by EARSeL.

The aims of the journal are:

- to fill the gap between technology and applications
- to enhance international exchange of information on new developments and applications
- to promote new areas of research and applications
- to foster the use of remote sensing and the interest of new scientists.

Language

All articles published in the journal are in English.

Refereeing

All contributions will be submitted to referees. Names of referees will be kept confidential, but the names of referees will be published in every third issue.

Proofs and Offprints

The principal or corresponding author will be sent proofs for checking and will receive 30 offprints free of charge. Additional offprints may be ordered on a form which accompanies the proofs.

Format

The large format (27.9 cm x 21 cm) of this journal is in line with all EARSeL publications and enables the inclusion of color and black and white illustrations of good quality.

© Copyright

All rights reserved. Authors are themselves responsible for obtaining permission to reproduce copyright material from other sources and are required to sign a form for agreement of the transfer of copyright. All requests from third parties to reprint material held in copyright by EARSeL must be referred to the author for consent or on condition of the granting by EARSeL of permission for reproduction.

INSTRUCTIONS FOR PAPERS TO BE INCLUDED IN THE EARSEL INTERNATIONAL JOURNAL “ADVANCES IN REMOTE SENSING”

Papers presented at EARSeL Workshops are printed, after reviewing, in the EARSeL International Journal “Advances in Remote Sensing”.

Conditions and instructions to be followed by authors are the following:

- papers must be submitted in their final form at the Workshop registration desk;
- the reviewers comments will be sent to the authors within two months after the meeting;
- after receiving the reviewers recommendations, authors are requested to send their final papers on diskette using MS-DOS operating system (Word processor: Wordstar; Word; Chiwrite, etc.); (Desk Top Publisher: Ventura);

Papers have to be sent to

Dr. Anna Calandro
Istituto di Gasdinamica - Facoltà di Ingegneria
Piazzale Tecchio, 80 - 80125 Naples - Italy
Tel: 39-81-7682176 Fax: 39-81-7682160

- Each paper must be accompanied by a 100 to 200 word abstract, written as a single paragraph. It should be a summary and complete in itself. The abstract should indicate the subjects dealt with in the paper and should state the objectives of the investigations.

- The text should contain:

(a) Introduction, (b) Main text with sections and subsections numbered, (c) Conclusions, (d) Acknowledgements, (e) Appendices, (f) References, (g) Tables, (h) Illustrations.

- The title should be brief and concise. The author's name should be typed on the line below the title, and it is preferable to use the full name. The company affiliation should follow on the next line, with the author's official title and complete mailing address given in a foot note.

- Equations and symbols should be typewritten. Symbols that are not available on the typewrite may be hand written, but clarity is essential.

- Illustrations (diagrams, drawings and photographs) should be in black and white, or in colour if strictly necessary. Photographs should be glossy prints. Each figure must have a caption; captions should be listed on a separate sheet. Illustrations numbered in a single sequence from 1 upwards and with the author's name on the back of each illustration. Cite each figure in numerical order in the text.

- Each table must be on a separate sheet accompanied by a caption.

- References should be cited in the text thus: (Smith, 1975); and listed in alphabetical order in the reference section.

The following arrangements should be used:

Journals: BENNY, A.H., 1980, Coastal definition using Landsat data. Int. J. Remote Sensing, 1, 225.

Books: JACQUES, E., 1976, A General Theory of Electromagnetics (London: Heinemann)

Reports: HARNAGE, J., and LANDSEER, D. (editors, 1975, Landsat-D) thematic mapper technical working group. Final Report, JSC-099797, Johnson Space Center, Huston, Texas.

INTRODUCTION

The EARSeL workshop “Microwave Imaging and Related Techniques” was held in Alpbach, Austria, during December 2-4, 1991, and, during December 5-6 at the Joint Research Centre in Ispra, Italy.

With the establishment of at least two major microwave imaging facilities, one in the European Microwave Signature Laboratory of the Joint Research Centre at Ispra, Italy, and the other one in the Houston Advanced Research Centre in Texas, Usa, fully polarimetric and precisely calibrated microwave scattering data over a wide frequency range become available in a variety of measurement modes such as angular or frequency diversity. Therefore, the EARSeL workshop supported by the Austrian Space Agency, the Deutsche Forschungsanstalt für Luft- und Raumfahrt, and the Joint Research Centre was organized to assess the state-of-the-art of signature analysis of microwave scattering data. This goal drew speakers and observer participants from the major european and north american remote sensing research laboratories to the Alpbacherhof Hotel amidst the Austrian Alps in Alpbach.

In the technical context the workshop was inspired by a series of questions which confront the remote sensing community. For example:

- What is the realistically achievable capability of three-dimensional microwave methods for imaging complex targets, i.e. not only discrete scattering centres, but also distributed or statistical targets?
- Which imaging methodologies and techniques hold promise toward application in the remote sensing of land and the terrestrial environment in general?
- How the polarimetric character of the scattering data should be integrated in the imaging scenario with special reference to instrument calibration, image reconstruction methods and signature analysis.
- What are the merits and drawbacks of the available image reconstruction algorithms?
- How the laboratory measurements of the scattering properties of natural objects and test objects are to be related to the validation of direct and indirect inversion algorithms, polarimetric and absolute calibrations, and practical remote sensing of the terrestrial surface.

Naturally, the workshop was not seeking final solutions of these issues, instead it sought the current state-of-the-art and the elaboration of these questions. Indeed, the workshop presentations reflected this spirit. The specific areas covered in the papers presented include:

- Imaging theory and diverse scattering methods.
- Simulations in SAR applications and radar target identification.
- Monostatic and multistatic cum Doppler laboratory measurements.
- Calibration of polarimetric signature measurement facilities.
- Remote sensing in the terrestrial environment.
- Signal processing toward information retrieval.
- Scatter modelling and controlled experiments in remote sensing.

As a matter of fact, considerable discussion was devoted to the use of polarisation in microwave imaging, particularly, the use of optimum polarisation analysis for discrete scattering centres, and its use for distributed or statistical targets. The discrete theory is now well developed and widely accepted as useful for high resolution imaging. More controversial was the discussion of treatment of polarimetric information in SAR and other forms of microwave imaging of distributed or statistical targets. There is still some disagreement over the best way to process such data. One could either keep full scattering matrix data in SAR images, or one could consider averaged Stokes matrix data as adequate because many remote sensing applications require only relative phase information averaged over an area of the image, which requires less computer storage and processing time.

The workshop in the sense of a social event was characterized by an extremely warm and cordial atmosphere. The venue, the Alpbacherhof Hotel, promises to remain an unforgettable experience.

Thanks to all participants in the workshop and particularly to the Co-Chairman, Dr. Alois Sieber, for his help in the scientific organisation and for providing a visit of the European Microwave Signature Laboratory, and to the EARSeL Secretary, Mrs. Madeleine Godefroy, for the management of the workshop.

Professor Karl Jörg Langenberg
Workshop Chairman

Dr. M. Chandra
Dr. S. Cloude
Workshop Participants