

PDF - SURFACE ACOUSTIC WAVE DEVICES - researchcub.info This book is the proceedings of the NATO Advanced Study Institute held at Lueneburg, Germany, July 30-August 10, 1984. As such it is part of the NATO Advanced Study Institute Series, published by an international board of publishers in conjunction with the NATO Scientific Affairs Division. Specifically, the book is Volume 151 of Series C: Mathematical and Physical Sciences. There are 63 papers published in this volume. The authors represent 13 different countries. There are 17 papers from the United States, plus two shared with Australia; nine from France; seven each from England and Germany; four each from Canada and Italy (including La Spezia); three each from Norway and Australia (not counting the two shared with the United States); two each from Portugal and South Africa; and one each from Denmark, Japan, and Turkey. According to the editor, a "major effort was made to obtain a commensurate contribution of tutorial and advanced research papers." It is his hope "that the material in this volume may be equally well suited for students getting an introduction to some of the basic problems in underwater signal processing and for the professionals who may obtain an up-to-date overview of the present state of the art." In this reviewer's judgment, he has succeeded. The subject matter of the book is divided into three categories (throughout the book, advanced research papers appear side-by-side with tutorial papers and are not specifically identified as one or the other). Part 1, devoted to the acoustical background of signal processing, contains 14 papers. The first paper in this category is entitled "Twenty Years of Signal Processing," and is by J. W. R. Griffiths. This is a great historical paper which explains to the uninitiated reader where this book "is coming from." There are papers on ambient noise, propagation, and target characteristics. Part 2, theoretical and practical aspects of signal processing, is the longest of the book, with 36 papers. There are papers on time-delay estimation, spectrum analysis, and adaptive array processing. Part 3, techniques and applications, has 13 papers. There is an interesting mixture of new technologies here: digital signal processing, optical signal processing, expert systems (part of the field of artificial intelligence), ocean tomography, spaceborne remote sensing, and passive synthetic aperture. In addition, five workshops were held and their summaries published: environmental modeling and signal processing, test tanks and measuring facilities, nonlinear filtering, signal processing, and expert systems. All of these topics are exciting and current, and many of the authors are leaders in their fields. This reviewer finds the inclusion of expert systems material, to choose an example, to be quite interesting. "Expert Systems for Ship Noise Interpretation," by Maksym is a good tutorial paper. The next paper, "Comparison of the Statistical and the Expert System Approach for 'the Interpretation of Ship Noise,'" by Bendig and Wittig is an application of these ideas. (Of course, as is befitting a pioneer discipline like this one, there is room for disagreement with specific points in the treatment of the subject). After reading these two papers, it is interesting to read "New Advances Toward Ocean, Acoustics and Space Integration," by Scully-Power and Stevenson, particularly the following quotation (referring to the question of manned versus unmanned space research): "While there is no question that computers can search out the 'gems from the pebbles,' there is little evidence to assure us that the computer can distinguish the 'diamond from the zircon.'" This sounds like the

makingsof a great debate, especially in the wake of the Challenger tragedy. It isdifficult to single out papers for discussion-they are all so good. One thatcaught this reviewer's eye was "Passive Synthetic Aperture Sonar-An Analysis ofthe Beamforming Process," by Pusone and Lloyd. Curiously, one has alwaysassociated synthetic aperture ideas with active sonar! Another paper thatprovoked considerable discussion was "Detection and Classification Phenomena ofBiological Systems," by Altes. To quote one sentence from the conclusion, "Ourappreciation of biological sensory systems is limited by our own knowledge, butwe can perceive trends and signal representations in animals that could improveour own technology." Interesting! In conclusion, the purchase of this book isrecommended for those who could not attend the study institute-and thatincludes this reviewer. The book is certainly expensive, but, for most of us,it is less expensive than a trip to Germany!

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Regards!!!