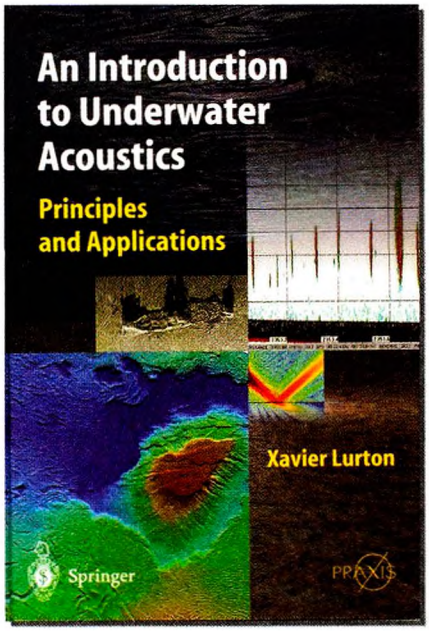
Book Review

An Introduction to Underwater Acoustics
Principles and Applications

By Xavier Lurton, 2002, 347 pages, ISBN: 3-540-429670, published by Springer-Verlag, www.springer.de, Germany



This is an exciting new scientific publication. It is timely and welcome as there are few books of this stature published in this discipline. Furthermore, it is up to date and readable. It is well researched, excellently presented and ranks with earlier books in this discipline such as Horton (1959), Urick (1967 and 1975), Clay and Medwin (1977), and MacLennan and Simmonds (1992). These books have been widely used and cited and this reviewer is confident that An Introduction to Underwater Acoustics will receive similar recognition.

An introductory perspective to the development of underwater acoustics and some historical information is provided in Chapter I, and an introductory presentation on wave propagation in Chapter II. Chapter III deals with reflection, backscatter and target strength and these topics are considered in a complete and understandable matter. This chapter not only includes information on the behaviour of the seafloor and various targets such as submarines and sediments but also considers acoustic scattering by fish. The treatment of reflection and backscattering by surfaces of different textures or degrees of roughness is particularly well explained.

Noise and signal fluctuations are discussed in Chapter IV starting with definitions of the sources of noise and ending with a discussion of environmental variability and signal fluctuation. Underwater transducer design is discussed in Chapter V starting with a discussion of piezoelectricity and continuing with topics including non-linear sources, near field and far field effects, beamforming and synthetic aperture sonar.

Chapter VI starts with a fairly theoretical approach to signal processing and includes a very informative section on sonar system performance providing good information on the reception

threshold and the detection process. Chapter VII presents the current applications of underwater acoustics grouped under navigation, military, fishery, mapping and geology, physical oceanography, and underwater intervention.

Underwater acoustic mapping is considered in Chapter VIII with thorough explanations on the strengths and shortcomings of the various systems while Chapter IX provides a summary of the earlier chapters. A perspective on the discipline as well as a positive note on a fascinating and exciting future for the underwater acoustics discipline and those who wish to practise in the field is also provided in Chapter IX.

Many persons in the marine science field including acousticians, hydrographers, oceanographers, fisheries scientists, engineers, educators, students at the undergraduate and graduate level, and equipment manufacturers will benefit greatly by reading all or part of this text. The author is to be congratulated on his fine contribution to the discipline of underwater acoustics.

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