

ISSN 1642-1817

# HYDROACOUSTICS

## Volume 16

### Annual Journal



European Acoustics Association  
Committee on Acoustics of the Polish Academy of Sciences  
Section of Ultrasonics  
Polish Acoustical Society - Gdańsk Division



Gdańsk 2013



Committee on Acoustics of the Polish Academy of Sciences  
Section of Underwater Acoustics, Ultrasound and Medical Acoustics  
Polish Acoustical Society – Gdansk Division

---

---

ISSN 1642-1817

# **HYDROACOUSTICS**

**Annual Journal**

**Volume 16**

Gdańsk 2013

***Hydroacoustics* is the annual journal in which original papers, both theoretical and experimental, concerning problems in hydroacoustics and its application are published.**

**EDITORIAL BOARD**

Grażyna Grelowska - Editor in Chief  
Ignacy Gloza  
Eugeniusz Kozaczka  
Roman Salamon  
Andrzej Stepnowski

**EDITORIAL STAFF**

Aleksandra Raganowicz  
Alicja Salomon  
Lech Kilian

**STATISTICAL EDITOR**

Agata Załęska-Fornal

**REVIEWERS OF HYDROACOUSTICS**

prof. Leif Bjorno  
prof. Philippe Blondel  
prof. David Bradley  
prof. Grażyna Grelowska  
prof. Halvor Hobaek  
prof. Zygmunt Klusek  
prof. Eugeniusz Kozaczka  
prof. Tim Leighton  
prof. Andrzej Nowicki  
prof. John Papadakis  
prof. Roman Salamon  
prof. Andrey Serebryany  
prof. Jean-Pierre Sessarego  
prof. Andrzej Stepnowski  
prof. Michael Taurodakis  
prof. Peter Wille

**Edition co-sponsored by Ministry of Science and Higher Education and by the National Centre for Research and Development (NCBiR).**

**PUBLISHER**

Polish Acoustical Society – Gdańsk Division  
Narutowicza 11/12, 80-233 Gdańsk, Poland  
Phone: (+48 58) 6262872, Fax: (+48 58) 6254846  
e-mail: g.grelowska@amw.gdynia.pl

## CONTENTS

<b>L. Bjorno</b>	
Waterside security: the abatement of criminality at sea .....	7
<b>K. Buszman</b>	
Examination of acoustic wave propagation in real conditions .....	11
<b>A. Chybicki, Z. Łubniewski, J. Niedzielko, D. Ruciński</b>	
Application of satellite imagery and GIS tools for land surface temperature estimation and verification .....	19
<b>K. Czarnecki</b>	
A novel method of time-frequency analysis: an essential spectrogram .....	29
<b>J. Dąbrowski</b>	
Automatic analysis of trajectories of moving objects .....	35
<b>J. Demkowicz</b>	
Multibeam sonar records data decimation using hierarchical spline interpolation .....	41
<b>K. Drypczewski, B. Wiśniewski, M. Kulawiak, K. Bruniecki</b>	
GIS for processing multidimensional marine data in SAAS model .....	47
<b>B. Gamin, O. Doubrovina</b>	
Statistical properties of wavelet transform coefficients of backscattering signal from soft tissues and their phantoms .....	59
<b>V. Goncharov, B. Kuryanov, A. Serebryany</b>	
Local acoustic tomography on shelf of the black sea .....	67
<b>S. D. Gupta, A. Zielinski</b>	
Acoustic and laser bathymetry systems .....	77
<b>R. Józwiak</b>	
The use of underwater communication modem in stand – alone measuring module .....	89
<b>M. Kastek, M. Życzkowski, M. Szustakowski, P. Trzaskawka, W. Ciurapiński, R. Dulski</b>	
Multisensor system for the protection abovewater of seaport .....	101
<b>I. Kochańska</b>	
Considerations of adaptive digital communications in underwater acoustic channel .....	113
<b>E. Kruglenko, B. Gamin, L. Cieślik</b>	
Soft tissue-mimicking materials with various number of scatterers and their acoustical characteristics .....	121
<b>M. Kulawiak</b>	
Three-dimensional representation of geographic data in a web-based GIS .....	129

<b>M. Kulawiak, K. Bruniecki, T. Bielinski</b>	Processing of marine satellite data in a web-based GIS .....	135
<b>H. Lasota</b>	Source-related wavefields in fluids and dielectrics: A new way of thinking about medium dynamics .....	145
<b>W. Leśniak, M. Rudnicki</b>	Improving the accuracy of bearing in active sonar with cylindrical array using spectrum estimation .....	159
<b>J. Marszał</b>	Implementation of contemporary technologies in naval sonars modernization .....	167
<b>M. Moszyński, K. Bikonis, Z. Łubniewski</b>	Reconstruction of 3D shape from sidescan sonar images using shape from shading technique .....	181
<b>Ł. Nowak, P. Pawłowski, M. Penkowski, M. Kosecka, K. E. Skóra</b>	The „Bionic Sonar” project, phase one: Initial research on Marine Mammal Acoustics .....	189
<b>I. Pérez-Arjona, A. Cebrecos, V. J. Sánchez-Morciillo, V. Espinosa</b>	Temperature effects on the parametric generation in a water-filled acoustical resonator .....	197
<b>J. Schmidt, A. Schmidt</b>	Implementation of the digital receiver in multibeam long-range sonar .....	203
<b>J. Szczucka, E. Trudnowska, Ł. Hoppe</b>	Acoustical studies of arctic zooplankton .....	211
<b>A. Stepnowski, M. Moszyński, F. Romanowski, A. Augustynowicz, E. Kozaczka, T. Szubrycht, K. Ligęza</b>	GEOSPAR project: Validation and selection methods of geoinformation analysis using GIS for ranking and forecasting of terrorist threats and criminal events .....	217
<b>Z. Trawiński, J. Wójcik, A. Nowicki, R. Olszewski</b>	Dynamic ultrasonic model of left ventricle .....	231
<b>M. Weryk</b>	Noise propagation in series of AHTS ships - critical statistical analysis .....	237
<b>B. Wiśniewski, K. Drypczewski, Ł. Markiewicz, Ł. Kamiński</b>	Methods of navigation in the mobile application supporting movement of the blind ....	243
<b>J. Wojcik, L. Filipczyński, A. Nowicki</b>	Foundation of the new method of numerical calculations of the nonlinear acoustics fields .....	253