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Simulation of Under-Ice Acoustic Propagation Loss Due to Ice Keels 1881
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Preliminary Study on System Design of USBL-Aided Underwater Navigation for Hull Cleaning Robots 1886
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Scalable Framework for AIS Data Exploration Through Effective Density Visualizations 1891
Alexandros Troupiotis-Kapeliaris, Eleni Tsili, Manolis Kaliorakis, Giannis Spiliopoulos, Dimitris Zissis

TEC4SEA – Developing Maritime Technology for a Sustainable Blue Economy 1897
Paulo Mónica, Nuno Cruz, José M Almeida, António Silva, Eduardo Silva, Carlos Pinho, Carlos Almeida, Diana Viegas, Luís M Pessoa, Ana P Lima, Alfredo Martins, Fred Zabel, Bruno M Ferreira, Ireneu Dias, Rui Campos, João Araújo, Luís C Coelho, Pedro S Jorge, João Mendes

Shaping an Ocean of Possibilities for Science-Industry Collaboration (SOOP) 1904
Toste Tanhua, Klas-Ove Möller, Martina Löbl, Ulrike Kleeberg, Friedrich V. Rantzau, Sören Krägefsky

Community-Driven Business Models for Seaweed Farming: The 'C-FAARER' Approach 1908
Dharmendra Kapletia, Nessa O'Connor, Mary Lee Rhodes, Diarmaid Mulcahy

Regional Coalitions at the 'Biodiversity Beyond National Jurisdiction' Negotiations 1912
Elizabeth Mendenhall

Polar Literacy Initiative: A Review of Programs and Resources Designed for Informal and Formal Learning Contexts 1916
Liesl Hotaling, Janice McDonnell, Kasey Walsh, Sage Lichtenwalner, Oscar Schofield, Marissa Staffen, Alesha Vega, Matthew Newman

The Tethered Ocean Profiler, TOP 1920
J. K. O'Brien, R. A. Krishfield, M.-L. Timmermans, J. M. Toole

A Computationally Efficient and Aliasing-Free Broadband DOA Estimation for Arbitrary Sparse Linear Arrays 1930
Long Yang, Yixin Yang, Mengling Yu, Bangjie Zhou

Additively Manufactured Bulkheads for Uncrewed Underwater Vehicles 1934
Brendan P. McNelly, Richard Startt, Curt Albert

Prototyping an Autonomous Underwater Vehicle to Support Port Protection Challenges 1941
Brendan P. McNelly, Curt Albert, Jordan D. Appler

Numerical Study on Multipath Elimination Algorithm for an iUSBL System Using LFM Signals 1948
Sea-Moon Kim, Pan-Mook Lee, So-Young Sung, Jin-Yeong Park

Implementation of a Real-Time Time-Varying Channel Simulator for the Verification Test of Underwater Acoustic Communication Modems and Network Algorithms 1952
Sea-Moon Kim, Seung-Geun Kim, Youngchol Choi, A-Ra Cho

Joint Detection and Tracking for Compact HFSWR 1956
Xiaotong Li, Weifeng Sun, Yonggang Ji, Yongshou Dai, Weimin Huang

Investigation of HNS (Hazardous and Noxious Substances) Distribution in the Seawater and Sediment on Coastal Areas Near Marine Industrial Facilities 1960
Hoon Choi, Chonrae Cho, Byeong-Kyu Min, Hyo-Jin Seo, In Young Kim, Moonjin Lee

Marine Video Cloud: A Cloud-Based Video Analytics Platform for Collaborative Marine Research..... 1964
Ziqiang Zheng, Tan-Sang Ha, Yingshu Chen, Haixin Liang, Apple Pui-Yi Chui, Yue-Him Wong, Sai-Kit Yeung

MarineVRS: Marine Video Retrieval System with Explainability Via Semantic Understanding 1970
Tan-Sang Ha, Hai Nguyen-Truong, Tuan-Anh Vu, Sai-Kit Yeung

Optimal Ship Routing Via Spherical Visibility Graphs 1978
Andre Nuñez, Felix H. Kong, Konstantin M. Seiler, Alberto González Cantos, Robert Fitch

The Study of Risk Assessment-Based Ambient Seawater Quality Criteria Establishment on HNS (Hazardous and Noxious Substance) in the Effluent from Marine Industrial Facilities 1984
Hoon Choi, Hyo-Jin Seo, In Young Kim, Moonjin Lee

On the Sea Trial Test of the Autonomous Collision Avoidance Among Multiple Unmanned Surface Vehicles 1988
Nam-Sun Son, Han-Sol Park, Chun-Seon Pyo

Trainable Dynamical Estimation of Above-Surface Wind Speed Using Underwater Passive Acoustics 1994
Matteo Zambra, Dorian Cazau, Nicolas Farrugia, Alexandre Gensse, Sara Pensieri, Roberto Bozzano, Ronan Fablet

1st Year of Running MIR at UJI 2000
Pedro J. Sanz, Raúl Marín, Salvador López-Barajas, Alejandro Solis, Ricard Marxer, Vincent Hugel

HF Radar Wind, Wave and Current Measurements for Offshore Wind Power..... 2005
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Edge AI-Based Early Anomaly Detection of LNG Carrier Main Engine Systems..... 2013
Donghyun Kim, Taigon Kim, Minji An, Yonghun Cho, Yunju Baek

Coordination of Marine Multi-Vehicle Autonomous Systems Via the Distributed Command Governor Approach 2019
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Increasing the Underwater Sensor Networks Potential in Montenegro - An Overview of the Horizon Europe MONUSEN Project..... 2027
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