ROMANIAN NAVAL ACADEMY
"MIRCEA CEL BATRAN"

SEA - CONF 2025
11th INTERNATIONAL CONFERENCE

May 15th – 17th, 2025
Constanta

SEA-CONF 2025
PROGRAMME

Thursday, 15th of May 2025
Arrival of participants

Friday, 16th of May 2025
08.00 – 09.00 Participants registration; distribution of folders with promotional content
09.00 – 10.00 Official opening Sea-Conf 2025:
- Raising the Flag Ceremony;
- Welcome message of the Rector of Romanian Naval Academy "Mircea cel Batran".
- Plenary sessions:
  - **"Software Architecture for Security Assurance in Maritime Border Enforcement"-** Elena ROBE-VOINEA, Alecu TOMA, Alexandru OAE;
  - **"Toward Autonomous Waters through Preliminary Unmanned Surface Vehicle Design"-** Oana MARCU, Elena ROBE-VOINEA, Alecu TOMA, Cătălin POPA, Paul BURLACU;
  - **"Comparative study of the speed of sound in seawater in the northwestern sector of the Black Sea" –** Lucian DUMITRACHE, Dinu ATODIRESEI, Andra NEDELCU, Sergiu SERBAN, Dumitru CORDUNEANU, Andreea BUTNARIU.

10.00 – 10.45 Group Photo; Coffee Break
10.45 – 11.45 Visiting the RNAMB university campus
11.45 – 15.00 Paper Presentations on Sections:
Section A - Mechanical Engineering, **Room Ep 26**
Section B - Electrical Engineering, Automation and Computer Science, **Room LI 356**
Section C - Navigation, Transport and Management, **Room LP 11**

Section D - Fundamental and Applied Research, Military, Linguistics and Social Sciences, **Room L 120, L121**

Section E - Workshop: „Improvement Solutions for Healthy Nutrition in Seafaring Activities", MARitime Soft Skills for Onboard Healthy Nutrition and CULinary Arts in Seagoing Services – CUL-MAR-Skills, Erasmus+ Program - KA220-VET - Cooperation partnerships in vocational education and training, 2023-1-RO01-KA220-VET-000156711- **Room Cp06**

Starting with 15.10 – Closing remarks and conclusions – Aula Magna Lobby.

Saturday, 17th of May 2025

10.00 – 12.00 Visit of Constanta (individually);
12.00 – Departure of participants.

SCIENTIFIC COMMITTEE

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CONTENTS

I. ELECTRICAL ENGINEERING, AUTOMATION AND COMPUTER SCIENCE SECTION

testing were conducted using specialized software and 3D printing technology, with integration on an ARDUINO UNO platform. The results confirm the viability of this solution, offering prospects for further improvements in both military and civilian applications.

3. ANALYSIS OF THE EFFECTS OF ELECTROMAGNETIC FIELDS ON THE NAVY PERSONNEL – ID15

Bogdan-Gabriel Neacsu[1], Adelina Bordianu[1]
[1]National University of Science and Technology Politehnica Bucharest

Abstract: Transcranial magnetic stimulation (TMS) is a non-invasive neurostimulation technique that has demonstrated potential in alleviating psychiatric disorders by modulating neural activity through targeted magnetic fields. This study aims to evaluate the effectiveness of different coil designs in optimizing magnetic field penetration for the treatment of sailors experiencing mental health conditions associated with prolonged naval service. Given the high prevalence of stress-related disorders among sailors, including depression and anxiety, TMS presents a promising therapeutic approach. To assess the efficiency of various coil geometries, numerical simulations were conducted using COMSOL Multiphysics, modeling five distinct coil configurations and their magnetic field penetration depth. The analysis focused on identifying optimal coil parameters that enhance focality and magnetic field strength in deep brain structures relevant to therapeutic intervention. The results provide valuable insights into coil design improvements that could enhance TMS efficacy, offering a foundation for future experimental validation and clinical applications in maritime healthcare.

Keywords: finite element analysis, transcranial magnetic stimulation, electromagnetic fields, coils

4. ECoSIM: DECISION SUPPORT SYSTEM FOR ENERGY COMMUNITIES – ID34

Adela Bara[1], Simona-Vasilica Oprea[1]
[1]Bucharest University of Economic Studies

Abstract: This paper introduces ECoSIM, a decision support simulator designed to assist the planning and optimization of Energy Communities (ECs). ECoSIM integrates a multi-objective optimization model to support

communities to determine the optimal configurations for their local renewable energy systems (RES). The simulator considers three decision variables: photovoltaic (PV) rated power, wind turbine (WT) rated power, and battery energy storage system (BESS) capacity. Through the optimization model, these variables are optimized based on the community-specific parameters such as community type (residential or mixed), number of members, and total annual energy demand (including electric heating, cooling and electric transportation). The optimization process models the energy, economic and environmental goals of the community through multiple objective functions as follows: maximizing self-sufficiency, cost savings, self-consumption and minimizing the payback period. By enabling trade-off analysis among conflicting objectives, ECoSIM assists communities to make informed and sustainable investment decisions that balance energy, economic and environmental goals. Preliminary results demonstrate the performance of the decision support system to find the best optimal solution for ECs within budget and technical constraints, aiming to accelerate the adoption of decentralized energy systems through customized, data-driven planning.

Keywords: energy communities, decision support systems, multi-objective optimization, differential evolutionary optimization, renewable energy systems.

5. LOW-COST ENERGY NAVAL PROPULSION – ID39

Radu Gheorghiu[1], Liviu-Ionu Dragus[1]

[1]Military Equipment and Technologies Research Agency

Abstract: In this paper we propose a low-cost propulsion system with free energy for naval applications. The energy source of propulsion system is to utilize the free energy of Archimedes forces to transform in electrical energy. The system is composed from rotating wheel turbine partially immersed in water. The wheel turbine is made from radial plastic pipe tube in which is a floater connected with the wheel tube diametric opposed floater with a rack rod. In wheel central area is an electrical generator for which one tube connected with rack rod with the pinion generator. The Archimedes force moving up the floaters to water surface and generate electrical energy. The wheel turbine looks like a old naval steam propulsion. In the paper we make an analytical calculus for sustain this type of propulsion energy sources.

Keywords: energy, low cost, propulsion

6. ANALYSIS OF THE FORCES AND MEANS OF ELECTROMAGNETIC INFLUENCE (SPOOFING AND JAMMING) OF RUSSIA FROM THE BLACK SEA – ID46

Iancu Ciocioi[1], Florentiu Deliu[1]
[1]Romanian Naval Academy

Abstract: The start of the war against Ukraine, initiated by Russia, has led to an increase in risks related to GPS jamming, AIS spoofing, communication jamming, electronic interference, and cyberattacks in the Black Sea region. This paper analyses the cyber risks on board ship, cyberattacks on ships sailing in the Black Sea and the Russian Federation's electronic warfare forces and means.

Keywords: cybersecurity, cyber-attack, electronic warfare, spoofing, jamming.

7. SURVEILLANCE OF THE BLACK SEA MARITIME COMMUNICATION ROUTES – ID48

Iancu Ciocioi[1], Florentiu Deliu[1]
[1]Romanian Naval Academy

Abstract: Following the war in Ukraine, the maritime communication routes in the Black Sea are put at risk, given Russia's desire to ban maritime transport to and from Ukraine. Thus, ensuring the safety of maritime communication routes involves the surveillance of these areas and especially of navigation near conflict zones, areas that represent a high risk for the safety of ships. This paper analyses the surveillance systems on the Romanian coast as well as the satellite surveillance systems of the European Union, used to ensure the security and safety of ships in the Black Sea region**.**

Keywords: maritime communication routes, SatCen, EMSA, Copernicus Maritime Surveillance, Frontex**.**

8. THEORETICAL AND EXPERIMENTAL DETERMINATION OF THE STABILITY OF CLOSED LOOP AUTOMATIC CONTROL SYSTEMS– ID67

Beazit Ali[1], Levent Ali[1], Adriana Sporis[1]
[1]Romanian Naval Academy

Abstract: This paper presents the method for determining the stability of closed-loop automatic control systems. The theoretical model and the

experimental stand are established, based on the basis of which the stability of the system is analyzed.
In order to commission a control loop, the loop amplification at which stable operation is still guaranteed must be known. Otherwise, there is a risk of destroying the system due to increasing oscillations when it is switched on for the first time. Essentially, the amplification should be increased carefully during each experiment. In control engineering, there are many stability criteria that make statements about the stable behavior of a control loop.
Keywords: stability criteria, loop, frequency, amplification

9. AUTOMATIC SEQUENTIAL OPERATIONS OF THREE-PHASE INDUCTION MOTORS WITHIN ON-BOARD ELECTRICAL INSTALLATIONS – POWER, CONTROL, COMMAND AND WIRING CIRCUITS – ID76

Leon Pana[1], Eduard Dragomir[1], Andrei Chiriac[1]
[1]Romanian Naval Academy
Abstract: Automatic sequential three-phase induction motors starting have a wide range of applications in various types of electrical installations on board. The following are some common applications of sequential electric motor starting: group starter panel - engine room pumps, central heating circulation pumps, chilled water pumps, and others. This paper presents in detail the power, control and automation schemes for the sequential starting of electric motors on board ships, the CAD simulation of normal and emergency operating modes, as well as the practical implementation of the experimental laboratory stand.
Keywords: automatic sequential starting; PLC; control; motor starter, protection.

10. DESIGNING A SECURE AND RESILIENT PORTABLE COMPUTING PLATFORM FOR EMERGENCY USE WITH OPEN-SOURCE TOOLS AND COMMODITY HARDWARE – ID86

Andrei Bautu[1], Anca Atodiresei[1], Elena Bautu[2]
[1]Romanian Naval Academy
[2]"Ovidius" University
Abstract: Cybersecurity threats are on the rise, underscoring the critical need for resilient digital infrastructure. This paper presents the design and

implementation of a secure standalone computing system tailored for emergency use. The system aims to provide end-to-end security—across hardware, software, and communication layers—while remaining operable in both connected and fully offline environments. The platform is built using commercially available hardware, a stock Ubuntu Linux distribution, and open-source technologies, making it both accessible and reproducible without the need for proprietary or custom components. To safeguard data at rest, the system employs full disk encryption via LUKS2, integrated with Trusted Platform Module (TPM 2.0) support. The encryption setup allows for an optional boot-time PIN and can be extended to use an USB dongle as a key medium, enhancing resistance to physical compromise. Application isolation and operational hardening are achieved through the use of rootless containers with Podman, minimizing privilege escalation risks and improving software modularity. For optional remote support or coordination, the system integrates RustDesk, a secure, peer-to-peer remote desktop solution that avoids centralized infrastructure—supporting trusted access even in constrained environments. This paper outlines the project scope, architecture, implementation workflow, and threat model addressed by the system. It also explores practical use cases in emergency response, digital forensics, maritime operations, and field deployments in hostile or low-trust environments. The proposed solution offers a blueprint for building affordable, secure, and portable computing environments capable of supporting resilient operations when they are needed most.

11. A QUANTUM RESISTANT AUTHENTICATION SURVEY – ID87

Marius Rogobete[1], Carmen-Silvia Oprina[2], Veronica Cornaciu[3], Mara Rogobete[4]

[1]Harman International

[2]Military Technical Academy

[3] "Titu Maiorescu" University

[4]Politehnica University, Bucharest

Abstract: With the development of quantum computing, it will be relatively easy to brute force attack common symmetric (e.g. AES) and asymmetric algorithms (as RSA) to find the essential cryptographic information (cryptographic keys). In this context, there are two currently viable protection approaches, both of which aim to increase the processing complexity for this

type of attack: (1) the use of classical algorithms, but with an increase in the size of the attached keys, and (2) approach using quantum-resistant cryptographic algorithms. In this paper, we will focus on analyze of the second case that is applicable on asymmetric authentication schemas. We analyze different methods in order to decide if different schematic purposes could increase the degree of cybersecurity in the context of quantum computing. Finally, a critical conclusion is presented regarding the analyzed authentication methods.

Keywords: quantum-resistant cryptography, quantum key distribution, ML-KEM, ML-DSA, PKC.

12. CONNECTIONS OF AUTONOMOUS MARINE VEHICLE. A PROPOSAL SYSTEM – ID91

Marius Rogobete[1], Marius Iulian Mihailescu[2], Stefania Loredana Nita[3], Valentina Marascu[2]

[1]Harman International

[2]"Spiru Haret" University

[3]"Ferdinand I" Technical Military Academy

Abstract: An unmanned autonomous marine surface vehicle can use various technologies, such as GNSS, various mobile networks and dedicated narrowband radio systems, to position itself and to connect to other ships, services or the remote operations center (ROC). Starting from the technology already used in the connection between land vehicles and various entities - V2X (Vehicle to Everything), which is relatively well established, we attempt a design of this technology in the maritime environment. In this paper, we provide an overview of autonomous maritime systems in which positioning is often critical, also addressing use cases in which the GNSS satellite is unavailable or jammed and as a result provides false information and including the analysis of 5G standardization in the maritime domain. Finally, we present research directions for improving the security of the interconnection of autonomous maritime vessels that will be addressed in future works.

Keywords: V2X, autonomous marine vehicle, inter-vehicles communication, positioning

II. FUNDAMENTAL AND APPLIED RESEARCH, MILITARY, LINGUISTICS AND SOCIAL SCIENCES SECTION

II.a MATHEMATICS AND NATURAL SCIENCES

1. EXPLORING GAUSS-KUZMIN THEOREMS FOR GENERALIZED RÉNYI CONTINUED FRACTIONS – ID4

Dan Lascu[1], Gabriela Ileana Sebe[2]
[1]Romanian Naval Academy
[2]National University of Science and Technology Politehnica Bucharest

Abstract: In this paper we solve the Gauss-Kuzmin problem by two different methods. After recalling the solution of this problem using the technique of random systems with complete connection (solution presented in a previous lecture), we use Szüsz method and we obtain more information on the convergence rate involved. Finally, using a Wirsing-type approach to the Perron-Frobenius operator of the generalized Rényi continued fraction transformation under its invariant measure we study the optimality of the convergence rate.

Keywords: Rényi continued fractions, partial quotients, Perron-Frobenius operator, invariant measure, Gauss-Kuzmin problem.

2. A FUZZY-TOPSIS APPROACH TO SHIPYARD SELECTION FOR SHIP MAINTENANCE AND REPAIR OPERATIONS – ID5

Vlad-Augustin Vulcu[1], Simona-Elena Dinu[1]
[1]Constanta Maritime University

Abstract: This study presents how modern computing, through the tools offered by multi-criteria analysis, supports fleet managers of a shipping company in the optimal choice of shipyard for periodic maintenance works and renewal of ship documents issued by the Classification society, in order to reduce the time spent on ship maintenance and repairs, as well as to obtain greater equipment availability and operational safety. The complexity of this problem, due to the large number of technical aspects that must be taken into account, required the use of one of the most popular multi-criteria analysis methods, namely Fuzzy-TOPSIS, which has proven very useful especially in the case of less precise decision-makers' assessments, based on linguistic

variables. There are three alternatives, which are analyzed by three fleet managers through eight criteria of technical and environmental aspects. The shipyard with the highest priority was represented by the alternative with the closest distance to the fuzzy positive ideal solution and the farthest distance from the fuzzy negative ideal solution. The obtained result indicates the applicability of this method for practical decision-making and motivates researchers to explore new areas of applicability in the maritime industry.

Keywords: multi-criteria decision making, fuzzy-TOPSIS, triangular fuzzy numbers, maritime industry, shipyard selection.

3. ON A NONLINEAR TRANSMISSION EIGENVALUE PROBLEM – ID10

Andreea-Laura Burlacu (Iordachianu)[1]

[1]Ovidius University of Constanta

Abstract: In this paper we investigate a nonlinear Neumann-Robin transmission eigenvalue problem on a bounded domain Ω⊂R^N. Under appropriate assumptions and using Lusternik-Schnirelmann theory on C^1-manifolds, we establish the existence of a sequence of eigenvalues (〖λ_n)_n with λ_n→∞).

Keywords: eigenvalue problem, Lusternik-Schnirelmann theory, C^1-manifolds

4. ON THE PROPERTIES OF LINEAR BLOCK CODES – ID11

Bianca Liana Bercea (Straton)[1]

[1]Ovidius University of Constanta

Abstract: Linear codes are algebraic codes, typically over a finite field, where the sum of two codewords is always a codeword and the multiplication of a codeword by a field element is also a codeword. Linear codes that are also block codes are linear block codes. These codes are used for error control coding, satellite and deep space communications, and they are used for magnetic and optical data storage in hard disks and magnetic tapes and single error correcting and double error correcting code used to improve semiconductor memories. An advantage of linear block codes is that they are easiest to detect and correct errors. Another advantage is that extra parity bit does not convey any information but detects and correct errors. Among the disadvantages of linear block codes are that the transmission bandwidth is

more and that extra bit reduces the bit rate of transmitter and also its power. Cyclic codes are special linear block codes with one extra property. In a cyclic code, if a codeword is cyclically shifted (rotated), the result is another codeword.

Keywords: linear block codes, coding, codeword, hamming code, decoding, cyclic codes.

5. THE LINE GRAPH OF A SIMPLICIAL COMPLEX – ID21

Anda Olteanu[1]

[1]Romanian Naval Academy

Abstract: Defined by Whitney, line graphs have been intensively studied in graph theory. We generalize this notion to the case of simplicial complexes and we study its property. We compare the obtained properties with the ones for the case of graphs.

Keywords: line graph, simplicial complex, linear resolution

6. APPLIED PLATFORM IN DEFENSE MISSIONS FOR HEALTH MONITORING VIA IOT DEVICES – ID27

Valentina Marascu[1], Marius Iulian Mihailescu[1], Stefania Loredana Nita[2]

[1]"Spiru Haret" University and INFLPR Romania

[2]Institute for Computers, Bucharest, Romania

Abstract: The incorporation of Internet of Things technology in defense operations enhances subsystem management and enables the collection of quantitative scientific data. The primary objective of this paper is to provide an appropriately applicable platform for monitoring personnel health using IoT sensors. The proposed platform was developed by using the C# language, and dedicated virtual IoT devices were attached. Moreover, the proposed platform can also be used in low-gravity conditions by tracking specific physiological metrics, such as pulse rate/blood pressure, oxygen saturation, body temperature, and carbon dioxide levels. The security of this platform was assured in order to maintain the integrity of health personnel data.

Keywords: IoT Devices, C# language, Defense missions, Life-support Platform, Education

7. SALINITY, AN IMPORTANT FACTOR IN THE CORROSION OF THE SHIP'S METAL STRUCTURE – ID56

Cristina-Andreea Tudor[1]
[1]Romanian Naval Academy

Abstract: Corrosion is the destruction of a metallic material under the action of external factors. In the maritime field, this is a major problem affecting ship hulls and most metal structures. Salinity is one of the most important factors acting on metallic bodies. The paper aims to analyze the influence of salinity concentration on the ship's metallic structure and the mechanisms involved. For an efficient and modern naval industry, good corrosion prevention is necessary for the safety of maritime operations and the optimization of equipment maintenance costs.

Keywords: corrosion, salinity, naval industry

8. AUTOMATIC VIGENERE ENCRYPTION AND DECRYPTION – ID57

Paul Vasiliu[1], Florentiu Deliu[1], Tiberiu Pazara[1]
[1]Romanian Naval Academy

Abstract: In this paper, a Matlab implementation of the affine Vigenere encryption system is presented. An example of encoding/decoding solved manually and automatically using the proposed Matlab implementation is presented.

Keywords: affine, encryption, system

9. DEVELOPMENT OF A MATLAB APPLICATION IN ORDER TO ESTIMATE THE DISPLACEMENT OF A DRIFTING MINE – ID63

Lucian-Sebastian Dumitrache[1], Dinu-Vasile Atodiresei[1], Andra-Teodora Nedelcu[1], Alecu Toma[1], Romeo Bosneagu[1], Bianca Grecu[2]
[1]Romanian Naval Academy
[2]Maritime Hydrographic Directorate

Abstract: The development of an oceanographic model for managing drifting mines in the northwestern Black Sea is essential in addressing the risks associated with displaced marine mines. This work explores the importance of these models in determining mine trajectories and understanding their behavior in the marine environment. By analyzing and interpreting

meteorological and oceanographic data obtained from these models, realistic estimates of mine trajectories can be made, taking into account factors such as the influences of wind, marine currents, temperature, waves, and salinity. The information thus obtained is essential for intervention forces, maritime authorities, and other entities involved in managing marine mines, providing them with a powerful tool for decision-making and operational planning in efforts to disarm and neutralize mines. The use of wind, current, wave, temperature, and salinity models allow for a deeper understanding of the dynamics of the marine environment and its impact on mine drifts. This facilitates the identification of risk areas and the establishment of precise and efficient intervention strategies. Additionally, the models can be updated in real time with meteorological and oceanographic data, offering the possibility of continuous adaptation of estimates and actions taken. In the context of risks associated with marine mines in the northwestern Black Sea, the use of an innovative oceanographic model becomes indispensable for the efficient and safe management of these situations. These models provide a solid foundation for decision-making, operational planning, and risk reduction associated with mine drifts, thus contributing to maritime security and the protection of the marine environment.

Keywords: meteorology, oceanography, model, marine mines

10. ASSESSMENT ON SOUND PROPAGATION IN A SMALL WATER-TANK – ID65

Tiberiu Pazara[1], George Novac[1], Paul Vasiliu[1], Florentiu Deliu[1]
[1]Romanian Naval Academy

Abstract: Simulation of sound propagation in water is challenging when it comes to choose the environment which is often a water-tank with different scale. This paper presents the case of a water-tank with two compartments: compartment A with a length of 120cm and compartment B with a length of 20cm. The compartment A is filled with water and a sand layer at the bottom. Compartment B contains the sound source. The walls of compartment B were lined with foam except the bulkhead. The purpose of lining is to channel the sound towards the bulkhead and minimize the reflections. Using a laptop and a selection of specific recordings, sound was generated and recorded with an AS-1 hydrophone. The results of the simulations were interpreted along with the calculations of the natural frequencies of the water-tank. Further

investigations were made by adding secondary underwater noise sources in compartment A (outlets from an air-pump and an electric motor from a model-ship). Thus, a much-needed complex situation close to reality was simulated.
Keywords: sound propagation, water-tank, simulation, underwater

11. EFFICIENT AND EQUITABLE ACCESS TO RESOURCES IN WI-FI ENVIRONMENT– ID71

Nicolae Nebancea[1], Ciprian Racuciu[2], Carmen Oprina[1]
[1]Military Technical Academy
[2]"Titu Maiorescu" University

Abstract: Ensuring efficient and equitable access to WiFi networks is imperative for optimal performance and scalability in wireless communications. The Distributed Coordination Function (DCF), a prevalent component of the IEEE
802.11 standards, and the Point Coordination Function (PCF), are characterized by certain limitations with respect to latency, spectrum utilization, fairness among nodes, and flexibility. This paper proposes an enhanced version of the two technologies, DCF and PCF, which optimizes competitive channel access through an adaptive management of the regression window and back-off mechanisms. The proposed scheme is designed to mitigate collisions, enhance efficiency, and ensure compatibility with existing standards. The simulation results demonstrate a substantial enhancement in performance in scenarios with heavy traffic and an improvement in fairness between nodes. This suggests that the proposed method can serve as a viable solution for Wi-Fi networks.
Keywords: wireless network, wireless protocol, medium control access, csma/cd, csma/cd

12. SOME REMARKS ABOUT APPROXIMATION BY SPLINES – ID73

Ligia -Adriana Sporis[1], Beazit Ali[1], Levent Ali[1]
[1]Romanian Naval Academy

Abstract: The main goal of our note is to present some remarks about the use of Splines Approximation to solve certain numerical problems.
Keywords: approximation, splines

13. CATENOID. MATHEMATICAL STUDY AND RELEVANCE IN TENSIONED STRUCTURES AND ARCHITECTURE – ID77

Eleonora Răpeanu[1]
[1]Romanian Naval Academy

Abstract: This paper aims to investigate the fundamental mathematical properties of the catenoid and explore its applicability in the field of construction engineering and tensioned architecture. Through geometric analysis and surface parametrization in three-dimensional space, its nature as a surface with zero mean curvature is highlighted. Stability conditions, behavior in tensioned structures, and analogies with natural forms are discussed. The relevance of the catenoid in designing lightweight, efficient, and stable structures is emphasized through theoretical examples and potential engineering applications, demonstrating the importance of integrating advanced geometric concepts into contemporary architectural solutions.

Keywords: Catenoid, Tensioned structures, Mathematical modeling

14. VIRTUAL REALITY INTEGRATION IN MARITIME ENGINEERING EDUCATION: BILINGUAL SIMULATION MODELS FOR NAVAL ELECTROMECHANICAL SYSTEMS – ID78

Florin Postolache[1], Octavian Narcis Volintiru[1], Radu Manu[1]
[1]Romanian Naval Academy

Abstract: The paper presents the integration of Virtual Reality (VR) technologies into maritime engineering education within “Mircea cel Bătrân” Naval Academy. Focusing on Hydraulic Machines and Drives, Hydraulic and Pneumatic Systems, Hydraulic Actuation, and Naval Mechanical and Hydropneumatic Installations, the project develops a bilingual (Romanian-English) VR repository of 3D simulation models. Using SolidWorks Premium, SolidWorks Flow, Siemens NX and 3D Xperience, the project addresses traditional practical training limitations by providing realistic, risk-free operational environments. Key phases include 3D modeling, didactic integration and full VR deployment, aiming to enhance technical proficiency, bilingual competence and alignment with European educational standards. The initial results demonstrate significant improvements in operational training and student engagement, setting new benchmarks for immersive learning in naval engineering education.

Keywords: Virtual Reality (VR). Augmented Reality, 3D Modeling, Naval Training Simulation

15. INCREASING CYBERSECURITY AT SEA – AN UPDATE ON THE CYBERSEA PROJECT – ID81

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Abstract: In the context of the accelerated digitalization of the maritime industry, cybersecurity is becoming an essential pillar for the safety of ships, crews and port infrastructures. The CyberSEA project - Increasing Cyber Security at SEA through digital training responds to this need through a complex and structured approach, focused on identifying cyber vulnerabilities specific to the maritime sector, developing dedicated protocols, as well as training future and current seafarers through modern digital learning methods. This article provides an updated overview of the progress made within the project, presenting the main activities carried out so far, the results obtained and the prospects for their application in the maritime professional environment. Contributions in the field of applied research, professional training and educational innovation in the context of maritime cybersecurity are highlighted.

Keywords: maritime cybersecurity, digital training, maritime protocols, virtual labs

16. A MODEL FOR CALCULATING VESSEL EMISSIONS AND OPERATIONAL COSTS IN PORT ACTIVITIES – ID82

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Abstract: Ships activities in port have a direct impact on the environment and air quality. IMO and EU environmental regulations impose a cost on the quantities of emissions from the vessels. The ships' costs are directly influenced by the emission amounts and fuel oil consumption and can be reduced if the ports operations are optimized, mainly by reducing the anchorage and drifting times before docking. This model directly addresses this challenge by determining time components that contribute to a vessel's overall port stay and associated costs a) optimized anchorage and drifting times based on the completion time of the ship currently at berth b) maneuvering time from the anchor/drifting area to berth, and c) loading/unloading time at berth based on the cargo volume, the number of deployed cranes, and handling productivity rates of the shore cranes. Once the times are identified, the model will calculate the costs and emissions associated with vessel activity in the port. The results highlight that both costs and emissions decrease significantly when the port activities are optimized for both berth allocation and loading/unloading operations.

Keywords: emissions, operational costs, environment, regulations.

II.b SOCIAL SCIENCES AND HUMANITIES

1. GAMEINT: A NEW PARADIGM IN INTELLIGENCE, WITH A FOCUS ON THE FIELD OF VIDEO GAMES – ID1

Radu Moinescu[1], Ciprian Răcuciu[1], Carmen-Silvia Oprina[1]
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Abstract: This study introduces the innovative concept of Game Intelligence (GAMEINT), an emerging branch of intelligence that focuses on the exploitation of data generated by video games. This research explores the potential of video games as unconventional sources of intelligence, with applications ranging from the military to national security or electronic surveillance. Also, by analyzing in-depth data extracted from video games, including player behavior, social interactions, geographic location and preferences, behavioral patterns can be identified, risk assessments can be

made, predictive models can be developed and scenarios can be anticipated, thus contributing to improving intelligence collection, analysis and interpretation capabilities. The study also examines the ethical and legal implications of using game data for intelligence purposes.

Keywords: GAMEINT, intelligence, video games, data analysis, cybersecurity, artificial intelligence, surveillance, ethics.

2. ARCHITECTURE OF NAVAL OPERATIONS FINANCING THROUGH THE PRISM OF RISK MANAGEMENT IN CURRENT GEOPOLITICAL CONTEXT. COMPARATIVE STUDY BETWEEN ROMANIAN AND SWEDISH NAVAL FORCES – ID2

Adrian Iura[1]

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Abstract: The objective of this study is to analyze the architecture of naval operations through the lens of risk management, with a comparative focus on the Romanian and Swedish Naval Forces. Given the increasing geopolitical tensions and the need for efficient defense budgeting, understanding of financial sustainability of naval operations is important. Previous studies have explored military financing models, but limited research has been conducted on the role of risk management in optimizing naval defense expenditures. This study employs a mixed-methods approach, combining qualitative analysis of defense policies, budgetary frameworks and risk mitigation conceptions with quantitative assessment of financial efficiency. Data is sourced from government defense reports, financial statements and strategic naval operations. The comparative methodology highlights differences in budget allocation, operational risk factors and policy influences, particularly regarding NATO and EU defense cooperation. Findings indicate that Sweden's long-term financial planning and technology-driven risk management contribute to a more resilient naval financing model, while Romania faces challenges in securing stable funding and mitigating financial risks. The study recommends strategic reforms for Romania, emphasizing improved risk and sustainable budgetary practices. This research contributes to the broader understanding of naval defense financing, offering insights for policymakers to enhance the financial resilience of military operation.

Keywords: sustainability, naval operations, financing, geopolitical, defense

3. THE ART OF WAR AND STRATEGIC PLANNING – ID3

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Abstract: The study of military strategy and the art of war has evolved significantly over centuries, influencing the outcomes of major historical conflicts. Strategic planning is at the heart of military success, guiding decision-making processes in both peacetime preparation and active engagements. This paper explores the core principles of strategic planning within the context of warfare, examining classic doctrines and their application to modern conflicts. The aim is to assess how theoretical frameworks, particularly from Sun Tzu's The Art of War, continue to shape military strategy today.

Keywords: strategic planning, military strategy, the art of war, sun tzu, modern warfare, tactical operations

4. PATHS FOR DEVELOPMENT OF FEMALE LEADERS IN NATO'S NAVAL FORCES – ID13

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Abstract: The appointment of women at naval positions with leadership roles within NATO has experienced significant changes in the recent decades.
This paper explores the evolution and the respective mechanisms that enable women to rise in rank through the NATO naval command structures, highlights the historical progress and the Alliance's commitment to female leadership. The study applies the methodology of qualitative analysis, including NATO policy documents, official reports, and academic literature. The results provide in-depth knowledge and understanding of the environment of inclusivity and equality that NATO creates for the women in the NAVY.

Keywords: naval leadership; NATO; gender-inclusive leadership; career development

5. THE CHARACTERISTICS OF GENERATION Z: METHODS OF ADAPTING THE EDUCATIONAL STYLE. THE ENGLISH LANGUAGE TEACHING CASE – ID19

Carmen Luminita Cojocaru[1], Laura Diana Cizer[1]
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Abstract: Generation Z, also known as Gen Z, represents a distinct and unique cohort of individuals born roughly between 1997 and 2012 that grew in and were raised by an intensively digitalized environment where technology, fast access to information, and social changes strongly impacted the way learning was acquired and interactions unfolded. This paper passes in review the main features of Gen Z and examines how their most specific characteristics such as critical thinking, urgent desire for interconnectivity, proneness to adaptability dictate the need to constantly change the traditional teaching/learning materials by integrating the modern technologies and innovative strategies. In the context of the emerging educational model, this paper also suggests and illustrates in-house devised English teaching/learning materials tailored to Gen Z students' paradigm. Ultimately, it explores the differences between a good and an excellent teacher, and the need to redefine pedagogical excellence in a digital era.

Keywords: Gen Z, English, digital, education, teaching/learning materials

6. THE INFLUENCE OF MARITIME FORTIFICATION ARCHITECTURE ON ROMANIAN NAVAL STRATEGY. FROM MEDIEVAL FORTRESSES TO MODERN BASES – ID23

Maria Sarah Vlădescu[1]
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Abstract: Maritime fortifications such as the fortresses of Enisala, Histria and Callatis played a significant role in the evolution of the defensive architecture of ports and maritime fortresses in Romania, implicitly influencing the naval defense strategy throughout history. The impact of European fortifications is reflected in the development of the naval infrastructure at Constanța, Mangalia and Sulina, highlighting the international influences on the defensive organization of the Romanian coastline. In the 20th and 21st centuries, naval bases and arsenals determined the modernization of shipyards and the expansion of the navy's capabilities, in accordance with global maritime defense strategies. At the same time, new architectural trends in

modern naval infrastructure, shaped by NATO military structures, offer opportunities for the adaptation and optimization of Romanian bases. The historical and contemporary dimension of the relationship between maritime architecture and naval strategies highlights its impact on national defense.

Keywords: naval architecture, maritime fortifications, naval strategy, military ports, architectural evolution, maritime geopolitics, maritime security

7. EXPLORING THE EFFECTIVENESS OF ONLINE LEARNING; THE MOODLE PLATFORM AND ITS BENEFITS IN LEARNING MARITIME ENGLISH – ID32

Raluca Apostol-Mates[1], Camelia Alibec[1]

[1]Romanian Naval Academy

Abstract: Future maritime professionals must be proficient in maritime English in order to operate, communicate, and maintain safety in the globalized marine industry. The main focus is on examining how linguistic and technical abilities are integrated, emphasizing how they work hand in hand in the classroom.

This paper looks at how the Moodle platform works to improve English for Specific Purposes (ESP) instruction in the maritime industry. What is Moodle? Moodle is a flexible open-source learning management system that caters to the particular communication requirements of marine workers who need to be proficient in industry-specific jargon and norms. Effective ESP learning requires active user participation, which Moodle promotes through the use of interactive exercises, collaborative projects, and realistic resources. The importance of cross-cultural communication training is discussed, emphasizing its role in preparing future ship professionals for an international working environment on a ship. Furthermore, the balance between fostering student autonomy and providing structured support is essential to maintain engagement. Despite these challenges, Moodle's capability to track student progress and adapt content delivery based on empirical data supports continuous improvement in language acquisition. The paper concludes that by effectively leveraging Moodle's features, maritime educators can enhance the learning experience, improve communication skills, and ultimately contribute to operational efficiency in the maritime sector. This research underscores the importance of addressing potential barriers to participation to

maximize the platform's benefits, thereby ensuring that it meets the specific language learning needs of maritime professionals. All things considered, using online learning resources and tools (like Moodle LMS) offers a viable way to improve maritime English instruction and get aspiring maritime professionals ready for the demands of the modern marine sector.

Keywords: Moodle platform, online resources, maritime English, ESP learning

8. LEADING MILITARY ATHLETES IN APPLIED COMPETITIONS – ID35

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[2]Ovidius University

Abstract: The training management system requires effective and efficient management of the resources necessary to achieve the established objectives. The resources used can be of the material, financial, human or informational category, and ensuring the quality and efficiency of training requires their analysis within all managerial functions: forecasting, organization, coordination, leadership/execution and control-evaluation-guidance. As a process, training involves the existence and collaboration of two factors: coach and athlete. The objective pursued within this process is sports performance, achievable by adapting the athlete to the requirements of training and competition, by permanently improving technical-tactical skills using planning, programming and training strategies developed and coordinated by the coach.

Keywords: management, sports training, periodization, military applied sports

9. MANAGEMENT AND ARTIFICIAL INTELLIGENCE CONVERGENT AND DIVERGENT PERSPECTIVES – ID36

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[1]"Nicolae Balcescu" Land Forces Academy

Abstract: The continuous transformation of organizations and society has put in front of managers various challenges, who has leading to the reinvention

or reformulation of the ways in which organizational objectives have been achieved.

Artificial intelligence changes, fundamentally, the behavior of both managers and subordinates, regarding the process of identifying a effective and efficient solutions to solve collective and individual tasks. However, the integration of artificial intelligence into the process of management into an organization, especially in a military organization, requires a clear explanation and a logical application in related with the requirements of its social command.

Keywords: management, artificial intelligence, decision, organization, military

10. THE GLOBAL RACE TO ACCESS RARE EARTH ELEMENTS. A GEOPOLITICAL APPROACH – ID40

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Abstract: The current international security environment is characterized by competition and conflict, traits that mark a wide range of activities influencing the survival of a state labeled as power. If, during the Cold War, things were relatively simple and focused on ensuring military/nuclear development and drawing more national territories into the spheres of influence of the two superpowers, today the situation has diversified in terms of areas of action, means of achieving interests, and the range of actors who claim access to the status of power. This research aims to provide a relevant snapshot that identifies the global political landscape of rare earth elements, focusing the analysis on U.S. policy to increase its independence from China, including by measures that could affect the already fragile geopolitical landscape.

Keywords: rare earth elements, geopolitics, power, competition

11. ARTIFICIAL INTELLIGENCE TOOLS TO IMPROVE MARITIME ENGLISH COLLABORATIVE LEARNING. DEVELOPING DIGITAL LITERACY AND TRANSVERSAL SKILLS FOR SUCCESSFUL PROFESSIONAL PERFORMANCE – ID50

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[1]Romanian Naval Academy

Abstract: This article explores the integration of artificial intelligence (AI) tools in the enhancement of collaborative learning in Maritime English, with

the aim of developing both digital literacy and cross-cutting skills for successful professional performance in the maritime sector. As the global maritime industry continues to evolve, the need for efficient English-speaking communication is becoming essential for safety, efficiency and operational success. This study explores how AI-based platforms can support active participation, peer interaction and the development of communication skills among students in the maritime domain. This paper, by examining current practices and research, highlights the potential of artificial intelligence tools to provide a personalized learning experience based on content and tasks that replicate the real-world maritime environment. In addition, the article highlights the importance of cross-curricular skills such as teamwork, problem-solving and critical thinking, which are fostered in collaborative learning settings and are essential to cope with the challenges of a global maritime labor market This research helps to understand how technology can transform maritime English education, offering both theoretical insights and practical recommendations for educators to implement AI tools in the process of teaching and learning English for Specific Purposes.

Keywords: AI tools, collaborative learning, maritime English, digital literacy, transversal skills, professional performance, English for specific purposes, educational technology

12. STRATEGIES FOR IMPROVING NAVY STUDENTS' LISTENING SKILLS – ID54

Gabriela Eftimescu[1]

Abstract: This paper explores strategies for enhancing the listening comprehension skills of Romanian Navy students within the context of NATO's standardized linguistic requirements, particularly STANAG 6001. As peacekeeping operations increasingly rely on clear and accurate communication among multinational forces, listening proficiency becomes a cornerstone of interoperability and mission success. The paper identifies current challenges faced by Romanian military learners, analyzes the role of listening in operational effectiveness, and proposes a set of pedagogical interventions, including task-based learning, authentic audio exposure, and technology-enhanced language training. Through a focused approach grounded in military-specific communication needs, this study offers

actionable solutions for aligning Romanian Navy language education with NATO's peacekeeping standards.

Keywords: listening skills, STANAG 6001, pedagogical strategies, task-based learning, language training

13. FOSSILIZATION AND ERROR CORRECTION IN ENGLISH FOR SPECIFIC PURPOSES: REFLECTIONS FROM TEACHING NAVY STUDENTS – ID69

Maria Ciocan[1]

[1]Romanian Naval Academy

Abstract: In English for Specific Purposes (ESP) contexts, error correction requires careful consideration to balance linguistic accuracy, fluency, and communicative competence. This article explores the role of corrective feedback in ESP classrooms, with particular attention to English instruction for navy students. Operating in a domain where clarity and precision are essential, these learners must master technical vocabulary and communication routines that have direct operational implications. As such, error management becomes not only a pedagogical concern but also a professional necessity. The paper revisits key frameworks from Second Language Acquisition (SLA), including the dynamics of immediate versus delayed correction, explicit versus implicit feedback, and the persistent challenge of fossilization - especially among adult learners. Drawing on classroom-based observations and reflective teaching practice, the study investigates how naval students respond to various feedback types in context-rich tasks such as simulated radio transmissions, operational briefings, and report writing. Building on this analysis, the article proposes a formative and student-responsive model of error correction that addresses both communicative clarity and entrenched linguistic inaccuracies. It outlines strategies that promote self-monitoring, peer correction, and long-term improvement, while sustaining learner motivation. The aim is to reframe error correction as a constructive, ongoing process essential to professional language development in specialized military settings.

Keywords: English for Specific Purposes (ESP), fossilization, error correction, corrective feedback, navy students, Second Language Acquisition (SLA)

14. OPPORTUNITIES AND CHALLENGES IN DEVELOPING MAR LANG: A DIGITAL LEARNING PLATFORM FOR MARITIME VOCABULARY – ID85

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[1]Romanian Naval Academy

Abstract: MAR-LANG - Linguistic Diversity in European Maritime Higher Education Institutions is a project co-funded by the Eramus+ Programme, led by the French Maritime Academy in partnership with the Romanian Naval Academy and the Lithuanian Maritime Academy. The aim of the project was to develop a harmonized digital learning platform for Maritime English and French to adapt to the evolving needs of the stakeholders within the European maritime training and education system. This paper explores the opportunities and challenges in developing MAR-LANG digital learning platform, which offers six bilingual courses (in English and French), covering three key areas of maritime vocabulary: Ship maneuvering and cargo handling, Port and maritime logistics and Naval engineering. This learning tool gives learners the possibility to improve their maritime vocabulary through self-paced learning, by means of interactive glossaries, vocabulary building exercises, and personalized feedback, and provides maritime language teachers with an aid for enriching their lessons with engaging resources and assessing progress effectively. One of the challenges in developing the teaching and learning materials was selecting and integrating specialized maritime vocabulary while ensuring student engagement. Additionally, overcoming technical limitations required creative solutions, such as the use of external tools for vocabulary games and multimedia support. Furthermore, developing content for various proficiency levels, particularly in French, also demanded careful planning.

Keywords: MAR-LANG, digital learning platform, maritime education, maritime vocabulary

15. OPTIMIZING MARITIME ENGLISH ACQUISITION THROUGH THE USE OF MIND MAPS AND WORD CLOUDS – ID90

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[2]Constanta Maritime University

Abstract: The present paper investigates the effectiveness of mind maps and word clouds as pedagogical tools in enhancing Maritime English learning. By employing mind maps, educators can facilitate the organization of complex maritime terminology, concepts, and regulations, thereby improving comprehension and retention among learners. Word clouds, on the other hand, serve to visually represent key vocabulary and phrases from maritime texts, aiding students in recognizing essential terms and their contextual applications. This study highlights the integration of these visual aids in the Maritime English Courses, demonstrating their potential to foster active engagement, creativity, and collaborative learning. Ultimately, the authors' teaching experience and the pedagogical literature indicate that these strategies can significantly enrich the linguistic competencies required in the maritime industry.
Keywords: Mind maps, word clouds, ESP, Maritime English.

III. MECHANICAL ENGINEERING SECTION

1. TOWARD AUTONOMOUS WATERS THROUGH PRELIMINARY UNMANNED SURFACE VEHICLE DESIGN – ID 18

Oana Marcu[1], Elena-Gratiela Robe-Voinea[1], Alecu Toma[1], Catalin Popa[1], Paul Burlacu[1]

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Abstract: The article proposes a preliminary design for an Unmanned Surface Vehicle platform that is intended to advance autonomous maritime operations by integrating precise path planning, obstacle avoidance, and hydrodynamic efficiency. The system is suitable for various applications including maritime security, environmental monitoring, hydrographic surveying, and defense missions. The USV control system is structured into two key components—the USV Platform and the USV Controller—which work together to ensure autonomous mission execution. The end-to-end system flow includes task loading, initiation, and tracking, integrating real-time navigation adjustments and obstacle detection to maintain safe and efficient operations. The platform's modular design and adaptive algorithms enable dynamic transitions between operational states, ensuring reliability.

Keywords: autonomous, USV, navigation and control, data and sensors, maritime security

2. REAL-TIME DIAGNOSTIC APPROACHES FOR MARINE DIESEL ENGINES IN THE CONTEXT OF IMO DECARBONIZATION GOALS – ID24

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[2]Shipping Company VC Logistic Operation D.O.O.

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Abstract: Methods for monitoring the operating parameters of marine diesel engines in real time are considered. The methods and hardware are developed to improve the operational efficiency of marine engines, as well as in the context of modern IMO requirements for decarbonization of the marine fleet. In parallel with the gas pressure diagrams in the cylinders, the vibroacoustic

diagrams of the cylinder head units and fuel equipment are measured and analyzed. This method makes it possible to evaluate the actual and geometric phases of fuel supply and gas distribution. Also, the vibroacoustic method makes it possible to assess the technical condition of the fuel equipment and valve drive mechanism. The data obtained are used to refine the mathematical model of the working process in the engine cylinders, determining the indicator parameters and power, as well as emissions of harmful substances that must be controlled in accordance with the current IMO requirements. The considered hardware and software methods are implemented in a real-time system for diagnostics of marine engines during operation. The system is developed on the basis of a modern dual-core controller with high performance and low power consumption, including a high-speed ADC with sufficient capability to monitor the operating process with a resolution of up to 0.1 degrees of crankshaft rotation for all types of main and auxiliary marine engines. The system also uses wireless data transmission technology. A modern smartphone or tablet based on Android/iOS serves as a computing and graphic component of the system. The developed real-time diagnostic system allows using all the advantages of parallel analysis of pressure in the working cylinders and vibroacoustic. The system determines in real time the main parameters of the working process, fuel injection phases and valve timing. A specially developed algorithm is used to determine TDC, taking into account that the compression ratio in the cylinder can vary due to valve control or for operational reasons. The system being developed takes advantage of the use of a digital twin - an online mathematical model of the working process of an engine cylinder. These solutions will improve the quality of diagnostics and ultimately improve the operating efficiency of marine engines by reducing operating costs, reducing vibration and emissions of harmful gases, and extending reliable trouble-free operation.
Keywords: marine diesels; real-time diagnostics; vibroacoustic; performance analysis

3. PERFORMANCE ASSESSMENT OF COMBINED AIR LUBRIFICATION AND SUCTION SAIL SYSTEMS IN NAVAL APLICATIONS – ID33

Ionel Popa[1], Narcis-Octavian Volintiru[1], Mihaita Cuciureanu[1], Doru Cosofret[1]

[1]Romanian Naval Academy

Abstract: Rigid suction sails represent an innovative technology within the field of naval engineering, integrating aerodynamic principles and airflow dynamics to enhance ship propulsion efficiency. These sails are specifically designed to augment lift force by improving airflow circulation around the aerodynamic profile through controlled boundary-layer suction. This technology constitutes a cutting-edge approach in wind energy harvesting, directly applied to rigid sails aimed at increasing maritime energy efficiency. When combined with air lubrication of the hull, significant improvements in quasi-propulsive efficiency can be achieved, contributing to reduced fossil fuel consumption and, implicitly, decreased environmental pollution.

Keywords: air lubrication, suction sail, pollution

4. NEW CONCEPT MATERIALS IN NAVAL DESIGN – ID41

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Abstract: In this paper we propose a new concept material structure for naval application. The cost of material structure in final cost and in the same time the structure mass is important for the cruise speed of vessel. We propose to use a concept structure material used in aerospace industry, the sandwich structure. This proposed structure is made from three layers materials. The first layer is made from composite material, the second is made from polystyrene material and the third is made from composite material. The composite material can be made from resin with fiber glass or resin with carbon fiber. We make a simple stress calculus and simulate in a CAD software design. The obtained structure at low-cost design and manufacturing and low mass.

Keywords: Low cost, material, low mass

5. ECONOMIC AND TECHNOLOGICAL CONSIDERATIONS REGARDING THE PRODUCTION OF INJECTION MOLD COMPONENTS BY 3D RESIN PRINTING – ID43

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Abstract: This work was carried out to determine the optimal printing position in the case of additive manufacturing with a resin-type medium to obtain components specific to the manufacture of molds for the injection of plastic materials. The authors considered expanding the investigation process by approaching in parallel the modified psychological experimental analysis, but also considering the economic, environmental, as well as dimensional and surface quality aspects for prismatic and cylindrical parts such as the elements for extracting the injected material. A material with an ecological resin structure but also with special properties was used to make the parts. To establish the optimal constructive orientation that can influence the manufacturing process of the parts, the printing surface was considered. Based on the present study, it was observed that making the parts in a vertical position best satisfies the environmental and constructive criteria for cylindrical parts and respectively horizontal for those that were positioned prismatic. Also, small positioning angles as orientation do not cause large changes.

Keywords: 3D printing, technologic analyses, dimensional parameters, MSLA

6. PRELIMINARY TECHNOLOGICAL AND ENVIRONMENTAL CONSIDERATIONS IN THE CASE OF GENERATING INJECTION MOLDS USING ENVIRONMENTALLY FRIENDLY THERMOPLASTIC MATERIAL – ID44

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Abstract: The purpose of this study is to determine how the dimensional values of the constructive areas of a mold made of thermoplastic materials with ecological properties in relation to the environment change and to determine the level of gas and particle emissions produced during the generation process during the 3D printing process. To determine the dimensions, a digital caliper measurement solution is used, respectively

microscopically to determine geometric changes that cannot be determined by direct measurement. To measure emissions, two devices are used for the air quality inside the space where the mold generation takes place. The data considered in this study are analyzed using mathematical regression equations using the data analysis block specific to the MICROSOFT EXCEL software. The emitted gases are measured simultaneously for formaldehyde and volatile organic compound gases.

Keywords: biomaterials; sensors for gas, sensors for particles, FDM 3D printing, polymer processing

7. MULTI-CRITIERA ANALYSIS OF THE FDM ADDITIVE MANUFACTURING PROCESS FOR COMPONENTS WITH PRISMATIC GEOMETRY – ID45

Mircea Dorin Vasilescu[1], Doru-Alexandru Luca[1]

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Abstract: This work was carried out as a continuation of previous studies related to the influence of the positioning of axial-type parts such as stepped shafts. The authors considered the extension of the investigation process by approaching in parallel the modified psychological experimental analysis, but also considering the economic, environmental and dimensional aspects and the surface quality for parallelepiped parts with concave and convex cavities, respectively. To make the parts, a material was used that has as its basic structure polylactic acid which is modified to be able to work at high printing speed. To establish the optimal constructive orientation that can influence the manufacturing process of the parts, the printing surface was taken into account. Based on the present study, it was observed that making the parts in a horizontal position best satisfies the environmental and constructive criteria.

Keywords: additive manufacturing, PLA, 3D Modelling, 3D Printing, dimensional measurements

8. MANAGEMENT IN PRISONS: STRATEGIES, CHALLENGES AND SOLUTIONS – ID49

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Abstract: The management of crises in penitentiaries is a crucial aspect of national security and the criminal justice system, requiring a multidisciplinary

approach that combines military tactics, rapid intervention, and negotiation strategies. This paper examines the key methods used to prevent and manage critical situations such as riots, escapes, and hostage-taking incidents, emphasizing the role of special intervention units and institutional cooperation protocols. The study provides a contextual background on the state of crisis management in correctional facilities, highlighting the main challenges posed by overcrowding and security breaches. The research methodology includes an analysis of official reports, statistical data, and case studies on major penitentiary uprisings, with a focus on the 2016 prison riots in Romania. The results demonstrate the effectiveness of coordinated intervention strategies, the importance of intelligence gathering, and the necessity of training specialized forces. The findings underscore the need for continuous improvement in crisis response mechanisms, including technological advancements, enhanced interagency collaboration, and improved detention conditions to mitigate future risks.

Keywords: prison crisis, special intervention, law enforcement, riots, crisis management

9. STRUCTURAL STRENGTH EVALUATION OF AN INLAND RIVER MODULAR FISH FARM – ID51

Costel Ungureanu[1], Dumitru-Silviu Perijoc[1], Eugen Gavan[1]
[1]"Dunarea de Jos" University of Galati

Abstract: This paper presents the results of structural strength evaluation of a modular floating aquaculture platform based on 3000 tons inland cargo barge design to be exploited in the Lower Danube region. The proposed concept design combines the fish farm inside the barge cargo area with recirculating systems mounted inside of a greenhouse superstructure mounted on barge main deck. The 3D FEM investigation aim to provide valuable insight into the conversion of river cargo barge into aquaculture platform.

Keywords: inland, river barge, fish farm, 3D-FEM

10. FLOATING CAR PARKING CONCEPT ON THE DANUBE RIVER FOR GALATI CITY – ID52

Eugen Gavan[1], Costel Ungureanu[1], Carmen Gasparotti[1], Dumitru-Silviu Perijoc[1]
[1]"Dunarea de Jos" University of Galati

Abstract: This paper presents the studies for a floating car parking concept for Galati city as a solution to the high parking demand in the area of the Danube cliff, one among of the longest river promenade along Danube River. Starting from the particularities of relief for the cliff, but also of the Danube fairway, a possible location of the floating parking has been identified, with access and connection to existing streets. Based on the existing restrictions, like Danube level variation over the year, mooring in the fairway, the connection with the existing road infrastructure, several versions of the floating parking concept were generated and simulated.
Keywords: Danube River, floating car parking

11. INFLUENCE OF THE SHIP'S LOAD STATE ON THE STRUCTURAL INTEGRITY OF THE CENTRAL SECTION – FEA STUDY CASE – ID55

Mihaela-Greti Manea[1], Elisabeta Buzila[1]
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Abstract: Preserving the structural integrity of ships in various operating situations is essential to ensure the vitality of the ship but also to prevent pollution of the marine environment. Classification societies lay down strict rules for the proper subdivision and construction of hulls. The paper aims to analyze the implications on the structural integrity of a chemical tanker ship, generated by the different loading situations subject to certification by classification societies. Using finite element modeling, the state of stresses and deformations in the central section of the ship is simulated, analyzed and highlighted, with extension over three compartments, treated as a continuous deformable medium, determined by the action of the total longitudinal bending moments induced by the ship's loading situation. Both the actual structure of the chemical tank and the areas of joining the component structural elements are considered.
Keywords: chemical tank, state of load, structural integrity, state of stress and deformations, bending moments

12. ADVANCED SIMULATION APPROACHES FOR MARITIME SAFETY: CURRENT DYNAMICS, CFD MODELING AND STRUCTURAL ANALYSIS IN SHIP DESIGN – ID62

Ionut Scurtu[1], Adrian Popa[1], Octavian Narcis Volintiru[1]
[1]Romanian Naval Academy

Abstract: This study explores a multidisciplinary approach to enhancing maritime safety through simulation-based analysis of environmental and structural factors affecting vessel performance and survivability. The research begins with a detailed examination of marine current dynamics in the Black Sea, utilizing direct survey techniques and in-situ ADCP data, supplemented by geostrophic assessment methods. Computational Fluid Dynamics (CFD) simulations between Midia Cape and the Constanța coastline illustrate the interactions between marine currents and coastal structures, revealing patterns of pressure distribution, velocity changes, and turbulence zones critical for infrastructure resilience.

Further, the performance of bow thrusters is evaluated using numerical simulations and finite element analysis to determine stress, torque, and potential failure risks due to mechanical loads and environmental conditions. This is followed by a structural simulation of a ship's hull under high-pressure scenarios such as underwater mine explosions, where the Finite Element Method (FEM) is applied to identify vulnerable zones and optimize structural integrity without impairing navigability.

The paper emphasizes the importance of advanced numerical modeling—including DNS and FEM—in predicting fluid behavior and structural responses under extreme maritime conditions. Results underscore the value of integrating CFD, FEM, and direct observational data to inform safer vessel design, improve maneuverability, and mitigate risk in naval and commercial operations. This holistic simulation framework offers a robust foundation for innovation in shipbuilding, marine engineering, and coastal infrastructure planning.

13. SOME CONSIDERATIONS REGARDING FROUDE – KRYLOV COEFFICIENTS OF A WAVE ENERGY POINT CONVERTER PLATFORM – ID64

Adrian Popa[1], Octavian-Narcis Volintiru[1], Ionut Scurtu[1]
[1]Romanian Naval Academy

Abstract: The contemporary landscape of renewable energy technologies is witnessing significant advancements, notably in wave energy harvesting systems. Prominently, point absorber wave energy harvesters represent a critical innovation in this sector. These systems harness power through the exploitation of Froude-Krylov forces derived from ocean waves. This paper introduces an effective methodology for calculating Froude-Krylov coefficients, essential for optimizing the energy extraction capabilities of these devices.
Keywords: Froude – Krylov coefficients, wave energy point harvester

14. SOFTWARE WITH A GRAPHICAL USER INTERFACE FOR DIMENSIONING A STRUT AT ELASTO – PLASTIC STABILITY USING A DIRECT APPROACH – ID66

Mihai Bejan[1]
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Abstract: The paper presents a software, using a graphical user interface (GUI) designed to dimension of the struts considering the stability criterion. While, presently, the dimensioning theory for elasto – plastic stability calculus recommends the modifying of result, by trial and error, until the desired one is achieved (considering the safety factor), there are still other two methods which seems to be more convenient in terms of speed/calculus volume. One of them uses an analytical equation which leads us to the solution, so we called it the Direct Approach.
Keywords: Software, graphical user interface, elasto-plastic stability, direct approach

15. SOME ASPECTS REGARDING THE EQUIPMENT AND MACHINERY USED IN SHEET METAL DEEP DRAWING – PART TWO – ID79

Aurelia Chioibas[1]
[1]Romanian Naval Academy
Abstract: A previous study presented the press and the devices mounted on it, which allowed for the determination of the deformation force as well as the blank holder force during the deep drawing of small cylindrical parts made from A3K steel strip. Given the significant material investment involved, the study was continued. Thus, this paper presents the dies used, along with the

values of the aforementioned parameters, but applied to two other types of materials: brass and deep drawing steel.

Keywords: the press and the devices, the determination of the deformation force, the blank holder force, the deep drawing of small cylindrical parts, brass and deep drawing steel

16. ASPECTS REGARDING THE QUALITY OF DEEP-DRAWN PARTS – PART TWO – ID80

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Abstract: In a previous study, it was argued that parts meeting quality requirements and obtained through the deep drawing process actually exhibit this "quality" as a result of the interaction between two key factors: the technological system and the forming process. For this purpose, three dies were constructed, and the influence of A3K steel strip thickness variation on the quality of the formed part was analyzed.

This paper continues the study with two other types of rolled strips: one made of deep drawing steel and the other of brass. Frequency histograms of strip thickness were generated, as thickness variation is a factor that influences the drawing force in the forming of small cylindrical parts.

Keywords: frequency histograms of strip thickness, the drawing force, the deep drawing steel, the brass

17. COMPUTATIONAL MODELLING OF HYDRODYNAMIC FORCES ON FLOATING STRUCTURES IN MARINE ENVIRONMENTS – ID84

Elena Rita Avram[1], Alexandru Cotorcea[1], Andrei Băutu[1], Andra-Teodora Nedelcu[1], Dragoș-Ionuț Simion[1]

[1]Romanian Naval Academy

Abstract: The marine environment is considered highly complex, characterized by currents, strong winds, and significant wave variations. For floating structures, hydrodynamic force analysis is essential to ensure stability and operational efficiency. The article provides a methodological framework for calculating hydrodynamic forces, serving as a reference for optimizing marine structures and enhancing operational efficiency. This study uses COMSOL Multiphysics to simulate the interaction between a floating

structure and the marine environment, examining pressure distribution, hydrodynamic forces, and structural oscillations. The model incorporates Navier-Stokes equations for hydrodynamics, k-ω turbulence modelling, and Free Surface Flow for wave simulation. The results highlight maximum stress points and how wave characteristics influence the movement of the structure. The conclusions emphasize the importance of hydrodynamic analysis in preventing operational risks and adapting structures to the specific conditions of the marine environment.
Keywords: hydrodynamic forces, floating structures, COMSOL simulation, turbulence modelling, fluid-structure interaction

18. THE NEW TECHNOLOGY FOR MARINE TWO STROKE ENGINES WITH ENERGY EFFICIENCY AND LOW EMISSION GREENHOUSE GASES

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Abstract: The Intelligent Control by Exhaust Recycling (iCER) and VCR (Variable Compression Ratio) systems are available as an option for marine two stroke engines, providing individually recirculate part of the cool exhaust gas through a low pressure path and optimized compression ratio settings for gas-diesel mode, improve energy efficiency, minimize fuel consumption, lower emissions greenhouse gases, enhanced performance, providing flexibility for future fuel engines.
Keywords: marine two stroke engine, intelligent control by exhaust recycling, variable compression ratio, efficiency, emission greenhouse gases

IV. NAVIGATION, TRANSPORT AND MANAGEMENT SECTION

1. CONSIDERATIONS ON COLREG REGULATIONS FOR COLLISION AVOIDANCE BY USV'S – ID6

Aurel-Ionut Gheorghe[1], Claudiu Olteanu[1], Iustin Priescu[2], Lucian-Stefanita Grigore[1], Amado-George Stefan[1], Ioan Nicolaescu[1], Gheorghe Samoilescu[3], Cristian Molder[1]
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Abstract: The challenge of navigating an unmanned surface vehicle (USV) in an unstructured environment is a current topic. The aim is to enable USVs to avoid both stationary and moving obstacles, ensuring compliance with the international regulations for preventing collisions at sea (COLREGs). It should also be highlighted that there is an increasing demand for unmanned vehicles in a wide range of applications, including those with specific purposes. The aim of this paper is to provide an overview of USVs with regard to collision avoidance in port and river navigation, as well as in closed/open and shallow waters. To implement and comply with COLREGs regulations, USV systems integrate LIDAR, proximity or infrared sensors, and radar. USVs intended for port and/or river waters will have a small-scale experimental USV model that will be tested to validate the collision avoidance principle in a covered basin. In the future, two USVs will be built to operate in a collaborative system.

Keywords: robot, path planning, COLREGs, robot, collision avoidance

2. CONSIDERATIONS REGARDING THE TURNING CALCULATION OF A PLATFORM SUPPLY VESSEL FOR OFFSHORE DRILLING PLATFORMS IN THE PRELIMINARY SHIP DESIGN STAGES – ID8

Elisabeta Buzilă[1], Mihaela - Greti Manea[1]
[1]Romanian Naval Academy

Abstract: The paper addresses one of the essential tasks in ship design, following the design spiral, by focusing on the maneuverability of a Platform

Supply Vessel (PSV) for offshore drilling platforms. The study covers multiple design stages, from the conceptual phase, where approvals for the vessel's main equipment, such as propellers and engines, are obtained, to the technical design phase, in which power requirements are determined and propulsion system options are defined. Maneuverability is subsequently assessed through iterative evaluations of the vessel's nautical qualities and, ultimately, through sea trials, which analyze standard maneuvers in calm water conditions, including turning circle maneuvers, the Kempf test, the Dieudonné and Beck maneuverer, stopping tests, and the Williamson turn. A study on the research methodology highlights different approaches for evaluating maneuverability performance: preliminary prediction using direct statistical relationships, mathematical models (Abkowitz, Nomoto, Voitkunskii), CFD methods (Ansys CFD, Numeca Fine Marine), experimental tests on scale models in towing tanks, and full-scale maneuverability tests conducted in deep waters. The study presented is exemplified using a PSV designed and built under the supervision of the DNV classification society, with the following main dimensions: length at full load waterline L_WL=87,52m, beam B=20m, draft T=8m, deadweight displacement Δ_tdw=5000tdw, and operational speed u=16Nd. The paper presents the results obtained from various hydrodynamic, stability, and resistance analyses. The first part of the study examines characteristics of the hydrostatic curves and the Bonjean diagram. This is followed by the study of stability at large angles of inclination, including static and dynamic stability diagrams as well as the polar stability diagram. The research then continues with resistance to forward motion analysis using the Harvald method. The core subject of this study presents, based on the results obtained from hydrodynamic, stability, and resistance characteristics, the turning maneuver results for the vessel's operational speed, simulating seven different rudder angles. These results are illustrated through the ship's turning circle diagram. The obtained results demonstrate that the vessel meets both static and dynamic maneuverability requirements, with parameters within the acceptable limits set by the classification society. Consequently, it can be concluded that the operation of this vessel is conducted safely, both in terms of hull structural integrity and crew safety. Additionally, the study confirms that the ship's techno-economic performance is satisfactory for both the

owner and the operating companies, ensuring efficient and reliable exploitation in offshore operations.

Keywords: Platform Supply vessel PSV, design stages, hydrodynamic, stability, resistance, maneuverability

3. A STRATEGIC ANALYSIS OF GREEN ENERGY PROJECTS USING SWOT METHOD – ID12

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Abstract: In today's rapidly evolving world, the negative impact on our environment and biosystem is widely recognized, making the need for sustainable practices and cultures a highly relevant topic. This study aims to conduct a strategic analysis of Romania's potential to implement renewable and green projects. It focuses on the country's environmental performance to date, its prospects for future green development, and the key factors that could serve as strengths for upcoming renewable initiatives. The strategic analysis was carried out using the SWOT analysis. As a result, the internal and external factors influencing companies and governments to invest in sustainable projects in Romania were identified, analyzed, and utilized to determine the most effective strategies for the country's specific context. Therefore, companies that operate and invest in green projects in Romania should pay close attention to the country's infrastructure while also taking advantage of its high renewable energy potential.

Keywords: green projects, sustainability, strategic analysis, environment

4. CUSTOMER RETENTION STRATEGIES IN THE MARITIME SECTOR THROUGH SEGMENTATION AND BEHAVIORAL ANALYSIS – ID14

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[1] "Nikola Vaptsarov" Naval Academy

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Abstract: The in-depth knowledge of customer behavior and preferences helps operators in the maritime sector to use their resources effectively and keep them in line with their strategic goals and business plans. It has been observed that effective customer loyalty management has positively affected competitiveness and sustainable market presence. Additionally, this leads to

expanded scope and range of business opportunities and increased value of the offered services by the companies. The aim of this study is to examine how the value of customers and loyalty management affects the performance of companies in the maritime industry by recognizing marketing opportunities and strategies for its enhancement. To achieve this goal, the probability of customer retention and long-term customer value will be predicted using customer segmentation methods and life cycle analysis of empirical data. The results of the study show a significant variation in loyalty and relationship sustainability across the different customer segments.

Keywords: customer value, maritime, retention rate

5. THE ROLE OF RADAR IN THE NAVIGATION EQUIPMENT IN THE CONTROL CABIN OF A SEAGOING SHIP – ID16

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Abstract: The paper presents the role of radar in the interconnection of navigation equipment, its operating conditions, the role of the antenna and the calculations related to the wavelength of the radar signal and the actual reflecting surface. The radar system warnings and alarms are the result of the analysis of the power consumption model, the mode of protection against transient surges and the maintenance of the radar equipment.

Keywords: navigation equipment, radar, antenna, alarms, maintenance

6. ELECTRICAL NAVIGATIONAL APPLIANCES – THE ROLE OF THE GYROCOMPASS AND INTERACTION WITH OTHER EQUIPMENT IN THE CONTROL CABIN – ID17

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Abstract: The paper presents the role of the gyrocompass in navigation equipment and systems. The general and material laws of electromagnetic field theory have been taken into account to present the factors on which the strength of the magnetic field and the derived magnetization-magnitude of the

magnetic moment depend. The gyro block diagram was used to show the usefulness of this equipment and the components that are in the composition. Gyro compass errors were calculated and how to remove them was shown. The analysis of equipment management was made and the energy consumption was presented, comparing it with three other equipment (radar, ECDIS; AIS) aimed at optimizing power consumption.

Keywords: gyrocompass, navigation equipment, electromagnetic field, optimization power, diagrams

7. COMPARATIVE ANALYSIS OF ENERGY TRANSITION SCENARIOS IN MARITIME SHIPPING – ID20

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Abstract: New EU and IMO greenhouse gas (GHG) regulations significantly impact the shipping industry through substantial compliance costs. This study examines FuelEU Maritime (Regulation (EU) 2023/1805) requirements, assesses financial implications for individual vessels, and evaluates dual-fuel technology feasibility while analyzing impacts on maritime stakeholders. While FuelEU Maritime offers multiple compliance mechanisms (banking, borrowing, pooling, penalties), this analysis focuses on single vessel economics using fixed fuel prices and GHG emission costs, without considering market fluctuations. For existing vessels, demonstrated through a 57,000 DWT supermax cargo vessel case study, compliance requires significant investment. Without retrofitting or biofuel adoption, vessels meeting initial requirements will still face penalties starting in the third reduction phase. Fleet operators can use this framework to develop cost optimization strategies and evaluate compliance pooling feasibility. Cost distribution depends on contractual agreements; without specific provisions, responsibility falls on vessel owners or safety management system operators. Charter contract terms must clearly address fuel selection and compliance responsibilities, with verified emissions data being crucial for regulatory adherence. The regulatory environment continues to develop dynamically, with both EU authorities and the IMO actively formulating additional measures to accelerate GHG emission reductions across shipping operations. Notably, should the IMO implement new global requirements, the EU has committed to reviewing and potentially modifying FuelEU Maritime

provisions to prevent regulatory redundancy and streamline compliance frameworks.

Keywords: energy efficiency, alternative fuels, indicators, emissions, ecological friendliness, fleet management strategy, maritime shipping.

8. RESEARCH ON THE DEVELOPMENT OF A HIGH PERFORMANCE PROGRAM TO ENSURE THE PREDICTIVE MAINTENANCE OF PIPELINE TRANSPORT INFRASTRUCTURES – ID22

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Abstract: The purpose of this work is to set up a high-performance crude oil pipeline maintenance program, essential to prevent critical failures, extend the life of the infrastructure and minimize operational costs.

In order to ensure the theoretical and practical premises regarding the configuration of a methodological tool of good practice in the field, which allows the orientation and unitary guidance at the level of an economic operator in the oil field, we propose the implementation of a high-performance maintenance software solution for crude oil transport pipelines, capable of managing maintenance activities, optimizing processes and reducing the risks of breakdowns or leaks. This type of software can be used to monitor the condition of pipelines, plan preventive and predictive maintenance and automate various operational processes, being integrated with various systems and technologies to provide advanced monitoring, predictive analytics and risk management functionality. Its purpose is to prevent breakdowns, optimize maintenance activities and reduce operational costs, while ensuring safety and regulatory compliance. The adoption of advanced technologies, the implementation of IoT, AI and machine learning can bring significant improvements in the monitoring and optimization of pipeline systems. In such a critical industry, cybersecurity and regulatory compliance must be a priority. In order to improve the technological performance of the crude oil transport system, in the work I analyzed the categories of information for the implementation of a high-performance software solution for the maintenance of crude oil transport pipelines, I analyzed the categories of information necessary for an optimal performance, I defined the data flows for the design of diagrams to support the organization

and implementation of the system. To achieve this goal, we propose the development of a high-performance program to ensure the predictive maintenance of crude oil transportation pipelines and the integration of CMMS through predictive maintenance modeling and algorithms.

Keywords: pipeline maintenance, predictive analytics, maintenance software, risks, maintenance optimization, data flows

9. RISK MANAGEMENT STRATEGIES FOR THE USE OF AMMONIA AND HYDROGEN AS MARINE FUELS – ID25

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Abstract: This paper aims to identify risk management strategies for ammonia and hydrogen as alternative maritime transport fuels. Maritime transport is a significant contributor of greenhouse gas which faces rising regulatory demands to reduce its carbon footprint. The research investigates the safety risks of ammonia and hydrogen by studying their toxic properties and flammability characteristics and the operational and bunkering safety concerns. The research uses risk assessment frameworks together with failure mode and effects analysis and hazard identification techniques to determine potential risks and suitable mitigation measures. The research shows that both fuels require strict safety measures and trained crew and monitoring systems because of their different physical and chemical characteristics. The research establishes that an integrated risk management framework must be adopted to enable safe and sustainable ammonia and hydrogen adoption in maritime operations which will help the industry meet worldwide decarbonization targets.

Keywords: ammonia, hydrogen, alternative fuel, risk management, decarbonization

10. LOGISTICAL CHALLENGES AND DEVELOPMENT OF BUNKERING INFRASTRUCTURE FOR E-FUELS – ID26

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Abstract: The maritime industry is undergoing a significant transition toward sustainable energy sources, with e-fuels emerging as a promising solution for reducing emissions. This study investigates the logistical and infrastructural

challenges associated with the adoption of e-fuels, focusing on storage requirements, distribution networks, and bunkering infrastructure. While previous research has primarily examined the environmental benefits of alternative fuels, this study emphasizes the practical barriers to their implementation. A mixed-method approach was applied, integrating a comprehensive literature review and expert interviews to provide a detailed analysis of the current state of e-fuel readiness in the maritime sector. The findings reveal key challenges, including the need for specialized storage facilities, modifications to existing bunkering infrastructure, and alignment with international safety regulations. Additionally, the study highlights the importance of collaboration among industry stakeholders to facilitate a seamless transition. Addressing these challenges will be crucial for ensuring the long-term viability of e-fuels as a maritime energy source and achieving global decarbonization goals.

Keywords: e-fuels, maritime decarbonization, bunkering infrastructure, fuel logistics, alternative fuels

11. THE IMPACT OF DIGITAL TECHNOLOGIES ON THE EFFICIENCY AND SUSTAINABILITY OF MARITIME TRANSPORT – ID29

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Abstract: The maritime transport industry is undergoing a significant transformation driven by digital technologies, which play a crucial role in enhancing operational efficiency and promoting environmental sustainability. Traditional shipping operations often rely on outdated manual processes, leading to inefficiencies and increased costs. This study explores the integration of digital solutions, including automation, artificial intelligence (AI), the Internet of Things (IoT), and blockchain, in modern maritime operations. By leveraging these technologies, shipping companies can optimize route planning, fuel consumption, and real-time decision-making, resulting in improved efficiency and reduced emissions. Furthermore, smart sensors and predictive analytics contribute to better regulatory compliance and support green shipping initiatives. The research employs a qualitative analysis of case studies and industry reports, assessing the impact of digitalization on fuel efficiency, cost reduction, and environmental

sustainability. Key findings highlight the potential of digital technologies in mitigating greenhouse gas emissions and enhancing maritime safety. However, challenges such as high implementation costs, cybersecurity risks, and regulatory constraints remain barriers to widespread adoption. This paper concludes that while digitalization presents transformative opportunities for maritime transport, a strategic approach is necessary to overcome challenges and maximize its long-term benefits for the industry.

Keywords: sustainability, maritime transport, artificial intelligence, machine learning

12. BUILDING AN LNG CARGO AND BUNKERING TERMINAL IN THE PORT OF CONSTANTA – ID30

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Abstract: As the maritime sector shifts toward sustainable energy, Liquefied Natural Gas (LNG) emerges as a key alternative fuel. The Port of Constanta, strategically located on the Black Sea, holds significant potential to become a regional hub for LNG distribution in Eastern Europe. This study explores the feasibility and strategic relevance of developing an LNG cargo and bunkering terminal in the Port of Constanta, aiming to enhance Romania's energy security and contribute to the decarbonization of maritime transport. The challenges are high initial capital requirements, complex regulatory frameworks, and market uncertainties. However, Romania's geographic position and the upcoming Neptun Deep offshore gas exploitation offer a favorable context for LNG infrastructure development. A Business Model Canvas is applied in this study to outline the terminal's value proposition, customer segments, key partners, revenue streams, and cost structure. Additionally, a SWOT analysis is conducted to identify internal strengths and weaknesses, as well as external opportunities and threats that may impact the project's success. Initial findings suggest that the terminal could be economically viable, especially if supported by EU funding, private investment, and international partnerships. The facility would improve the regional LNG supply chain, facilitate cleaner maritime operations, support industrial energy needs, and reduce greenhouse gas emissions. Moreover, it will reinforce Constanta's strategic role in the energy transition and positions Romania as a key player in the regional LNG market.

Keywords: LNG Infrastructure, Energy transition, Business Model Canvas, Maritime sustainability

13. A NEW PARADIGM IN MARITIME SUSTAINABILITY: BLOCKCHAIN'S ROLE IN OPTIMIZING TRANSPORT ROUTES – ID31

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Abstract: Maritime transport faces substantial challenges, such as mandatory carbon emission reductions, increased operational efficiency, and improved supply chain transparency. This study explores the application of blockchain technology as a strategic approach to optimizing shipping routes and advancing the sustainability of commercial maritime transport. It investigates blockchain's capability to streamline operations, enhance transparency, and reduce environmental impact, aligning with global sustainability objectives in naval transport. This paper uses a hybrid methodology that includes reports, studies, and stakeholder analysis to assess the effectiveness of blockchain in route optimization. The findings show that blockchain implementation facilitates significant reductions in fuel consumption, greenhouse gas emissions, and overall carbon footprint, thereby contributing to improved operational performance. However, barriers such as high implementation costs and interoperability limitations remain critical challenges for widespread adoption. The research highlights the potential of blockchain to promote sustainable shipping, underlining the need for an appropriate regulatory framework, policy incentives, and technological innovation to overcome these obstacles. In conclusion, blockchain technology offers a promising path to optimize maritime routes sustainably, requiring coordinated efforts for successful integration.

Keywords: blockchain in maritime transport, carbon emission reductions, supply chain transparency, optimization shipping routes

14. ANALYSIS OF HYDROGRAPHIC AND METEOROLOGICAL DATA FROM THE NORTH-NORTHWEST BLACK SEA NEEDED FOR THE PREDICTION OF THE ROUTES DRIFTING FLOATING MINES IN THE VICINITY OF THE ROMANIAN COASTLINE – ID37

Alexandru Pintilie[1], Vasile Dobref[1], Vlad Mocanu[1]
[1]Romanian Naval Academy

Abstract: In the context of the armed conflict between Russia and Ukraine, the Russian authorities issued a warning on March 18, 2022, stating that due to severe hydrometeorological conditions in the northern Black Sea basin, more than 400 floating mines, an integral part of Ukraine's port defense system, were torn from their moorings in the ports of Odessa, Ochakov, Chernomorsk and Pivdenny. Due to the dynamics of the hydrographic circulation of the Black Sea, the floating mines moved southwards, reaching the Turkish coast. Obviously, the imminent danger of explosion of these mines makes maritime traffic in the area unsafe. Consequently, an elaborate study of the present hydrometeorological conditions in the western Black Sea and their short-term forecasting, as well as the establishment of hydrometeorological models, are needed to predict the routes of drifting floating mines. Once the mathematical model of the movement trajectory has been established, the safe identification, interception and annihilation of drifting floating mines can be undertaken. This paper aims to analyze the hydrographic and meteorological conditions provided by the Romanian coastal stations in order to establish the model of the movement of water masses and wind along the Romanian coastline necessary to establish the movement routes of drifting sea mines

Keywords: drifting floating mines, hydrometeorological conditions

15. IDENTIFICATION AND ANALYSIS OF AVAILABLE HYDROMETEOROLOGICAL DATA SOURCES FOR THE BLACK SEA LITTORAL – ID38

Alexandru Pintilie[1], Vasile Dobref[1], Dinu Atodiresei[1], Alecu Toma[1], Vlad Mocanu[1], Elena Gratiela Robe Voinea[1]
[1]Romanian Naval Academy

Abstract: Unlike most seas, which have a uniformly formed shelf, the continental shelf of the Black Sea is limited in extent, reaching its maximum values in the northwest. The characteristic width of the shelf along the other

coasts is 2-12 km. Situated in the north-western part of the Black Sea, the Romanian coastline is about 244 km long, the predominant orientation of the shoreline is N-S, with relatively shallow depths. The northern limit is the Mosura Arm (45°12´ N and 29°40´ E) in the Danube Delta, and the southern limit is slightly south of Vama Veche (43°44´ N and 28°35´ E). The Romanian coastline is generally linear, except for harbor areas and coastal protection works, especially in the south. The present work aims to identify and analyze hydrometeorological data provided by Romanian coastal and satellite stations, in order to model the dynamics of the Black Sea hydrographic circulation

Keywords: hydrometeorological models, meteorological conditions

16. SOFTWARE ARCHITECTURE FOR SECURITY ASSURANCE IN MARITIME BORDER ENFORCEMENT – ID42

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Abstract: Maritime border surveillance is a vital aspect of maritime security and safety, driving the need for advanced systems capable ensuring the tactical risk analysis of the naval traffic through real-time monitoring, detection, identification, alert and rapid response. This study proposes a software architecture that ensures interoperability with existing surveillance frameworks by integrating intelligent electronic systems and advanced data processing. It outlines the core design, enabling technologies, and implementation pathways, emphasizing performance, reliability, and scalability in dynamic maritime environments.

Keywords: software architecture, intelligent electronic systems, surveillance, data processing

17. SUSTAINABLE INNOVATIONS IN THE CRUISE INDUSTRY – ID47

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Abstract: The cruise industry is undergoing a transformation driven by the need for sustainability and innovation. The leading cruise companies are redefining their business models to align with environmental, social, and

economic sustainability goals. This report explores the implementation of sustainable innovations in the cruise sector, focusing on strategic management approaches, passenger experience enhancements, and corporate social responsibility initiatives. Key areas of development include the adoption of smart technologies, improved resource efficiency, and innovative service models that contribute to long-term industry resilience. By examining best practices and emerging trends, this study highlights how innovation serves as a catalyst for sustainable growth in the cruise industry.

Keywords: sustainable innovation, cruise industry, strategic management, corporate social responsibility, smart technologies, resource efficiency, business resilience

18. DETERMINATION OF CO2 EMISSIONS IN GRAIN TRANSPORT LOGISTICS AT PORT TERMINALS – ID53

Florin Nicolae[1], Alexandru Cotorcea[1], Dragos Simion[1], Cosmin Partene[1], Manuela-Stefania Rusu[1]

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Abstract: The paper aims to estimate emissions resulting from transport activities carried out by trucks, as part of transport logistics to the port of Constanta. The authors propose a transport model developed between onshore grain storage centers and port operators. Based on the actual situation in 2024, the total storage capacities/logistics storage centers in the Dobrogea area were centralized and the areas served by these centers were delimited. Within the research methodology, the logistics transport scenarios from the storage location in the port of Constanta are established. For each transport scenario, the total fuel quantities for the variant: reference logistics storage node → port terminal are determined, based on which carbon dioxide emissions are determined.

Keywords: grain transportation, truck transport, port terminal, emissions

19. AUTONOMOUS VESSELS AND THEIR IMPACT ON PORT OPERATIONS: A REVIEW OF CHALLENGES – ID58

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Abstract: The maritime industry stands on the cusp of a significant transformation with the advent of autonomous vessel technology. The

adoption of autonomous vessels in port operations is hindered by a range of technological and regulatory challenges. Their integration is expected to streamline logistics, minimize human error, and enhance resource management. However, various challenges must be overcome for their successful adoption. Stakeholders must address regulatory requirements, technological constraints, and cybersecurity concerns to ensure safe and effective operations. This paper reviews existing research on autonomous vessels, examining their operational capabilities and impact on port operations. The review seeks to highlight key trends, best practices, and potential obstacles that could affect the widespread adoption of these technologies. As the maritime sector continues to evolve, gaining a profound understanding of these factors will be essential for stakeholders aiming to leverage the benefits of autonomous vessels while mitigating associated risks. The findings of this review will provide actionable insights that can guide future research and policy development, ultimately fostering a smoother transition towards the integration of autonomous vessels in maritime operations.

Keywords: autonomous vessel, port operations, challenges, shipping.

20. FACTORS THAT INFLUENCE THE STRATEGY OF RESISTANCE TO COMPETITION AT THE CREWING COMPANY – ID59

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Abstract: Romania no longer has a commercial maritime fleet, but it has a large number of sailors and officers, two naval universities, with faculties of navigation and naval electro mechanics, one university with a faculty of shipbuilding and another with a faculty of marine engineering. A small number of Romanian ship-owners own maritime vessels, but these are registered under a flag of convenience in other states. This paper analyzes the situation of crewing companies (placement of labor, seafarers, abroad); the problems these independent companies face and what are the resistance strategies for this segment of the maritime market.

Keywords: crew, shipping, management, strategy

21. USING MACHINE LEARNING METHODOLOGIES TO PLAN OPTIMAL ROUTES FOR NAVAL SHIPS BASED ON FUTURE HYDROMETEOROLOGICAL CONDITIONS – ID60

Dinu-Vasile Atodiresei[1], Andra-Teodora Nedelcu[1], Romeo Bosneagu[1], Lucian Dumitrache[1], Catalin Popa[1], Sonia Iliescu[1]
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Abstract: In this paper is presented the use of machine learning methodologies for optimal route planning of naval ships given future hydrometeorological conditions. The introduction of advanced machine learning techniques in maritime navigation represents a significant step towards modernizing and streamlining naval operations. Our study highlighted the multiple advantages of integrating machine learning into the route planning process. Machine learning algorithms can analyze and process large volumes of data, generating accurate and adaptive predictions of weather and oceanographic conditions. This ability to predict weather variations and adjust routes in real time enables safer and more efficient navigation, reducing the risks associated with adverse weather conditions and optimizing available resources.

Keywords: meteorological conditions, weather variations, naval operations

22. THE STUDY OF HYDROMETEOROLOGICAL CONDITIONS IN THE EXECUTION OF MCM OPERATIONS ON BOARD A MINE HUNTER VESSEL – ID61

Andra-Teodora Nedelcu[1], Dinu-Vasile Atodiresei[1], Lucian Dumitrache[1], Alecu Toma[1], Nina Sandu[2], Anamaria Turcanu[1]
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[2]Maritime Hydrographic Directorate

Abstract: Hydrometeorological factors correlated with physico-chemical parameters and bathymetry lead to the formation and development of missions by which a mine barrage can be cleared. Variations in hydrometeorological factors such as wind speed and direction, currents, water level, the nature of the seabed or water transparency can significantly affect the efficiency and safety of MCM operations. The integration of advanced meteorological monitoring and forecasting systems is essential to optimize strategies and minimize the risks associated with these complex missions. In this paper, an MCM action scenario is presented and simulated as a function

of physico-chemical parameters, bathymetry and hydrometeorological factors in a software application called MCM Expert.
Keywords: hydrometeorological factors, bathymetry, MCM operations

23. THE USE OF RENEWABLE FUELS IN THE MARITIME TRANSPORT INDUSTRY – ID70

Dumitru Corduneanu[1]
[1]Romanian Naval Academy
Abstract: This article analyzes the technological potential and sustainability of key renewable fuels, in the maritime transport industry.
Keywords: renewable fuels

24. CUSTOMS PROTECTIONISM AND TRADE POLICIES IN THE MARITIME TRANSPORT INDUSTRY – ID72

Dumitru Corduneanu[1]
[1]Romanian Naval Academy
Abstract: This article analyzes the impact of customs protectionism and trade policies in the maritime transport industry.
Keywords: Customs Protectionism

25. COMPARATIVE STUDY OF THE SPEED OF SOUND IN SEAWATER IN THE NORTHWESTERN SECTOR OF THE BLACK SEA – ID74

Lucian-Sebastian Dumitrache[1], Dinu-Vasile Atodiresei[1], Andra-Teodora Nedelcu[1], Sergiu Serban[1], Dumitru Corduneanu[1], Andreea Butnariu[2]
[1]Romanian Naval Academy
[2]Maritime Hydrographic Directorate
Abstract: This paper presents a comparative study of the speed of sound in seawater in the northwestern sector of the Black Sea, using three distinct approaches: theoretical calculation using established empirical formulas (such as Mackenzie and UNESCO), remote sensing data retrieved from the Copernicus Marine Environment Monitoring Service, and direct in-situ measurements conducted with an autonomous underwater vehicle (AUV). Each method is analyzed in terms of accuracy, consistency, and suitability under the specific hydrographic conditions of the region, which is characterized by low salinity, strong freshwater input from the Danube River,

and seasonal thermal variations. The study reveals that while theoretical and satellite-based data provide useful estimates, they often lack precision in dynamic or stratified environments. AUV-based measurements, although more resource-intensive, offer superior accuracy and flexibility due to their ability to collect real-time data at specific depths. The study concludes that AUV technology represents the most effective method for precise sound speed assessment in coastal and semi-enclosed marine areas, supporting its broader adoption in acoustic modeling and underwater applications.

26. STRATEGIES TO IMPROVE TRANSPORT AND TRAFFIC FLOW ON DANUBE RIVER – ID75

Stefania-Manuela Rusu[1], Florin Nicolae[1], Dragos Simion[1], Alexandru Cotorcea[1]
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Abstract: In the context of ongoing economic, climatic, and technological changes, as well as rising security instabilities and conflicts near Romania's borders, the need for an efficient and resilient river transport system has become increasingly important. This paper aims to analyze the potential for developing navigable waterways and Danube ports in Romania, along with the main obstacles that may hinder the smooth flow of river traffic. It is evaluated and presented the current state of Romanian Danube ports, highlighting the infrastructural and logistical challenges. Relevant statistical data on freight and passenger traffic is presented and analyzed to provide a clear perspective on the economic potential of the strategic transport route. The paper focuses on modernization and efficiency strategies for inland waterway infrastructure, covering both technical measures to improve navigability and initiatives involving digitalization, automation, and sustainability. The results offer valuable insights for improving public policy and investment strategies, thus reinforcing the Danube's significance as a crucial transport and development corridor for the region.

Keywords: Danube river, river traffic, strategic transport, port infrastructure

27. CHALLENGES AND OPPORTUNITIES GENERATED BY THE IMPLEMENTATION OF AI IN ORGANIZATIONS – ID83

Gheorghe Grecu[1]
[1]Romanian Naval Academy

Abstract: The paper aims to briefly analyze the impact that the implementation of AI can generate at the organizational level. AI brings both significant opportunities and challenges, as it has the potential to profoundly transform the way the economy works, from productivity and innovation to the labor market. AI is a key element in the evolution of human society whose benefits we cannot ignore, but we must also consider the negative potential corroborated effects that threaten security, democracy, companies and jobs.

28. THE ROLE OF EMOTIONAL INTELLIGENCE IN ENHANCING LEADERSHIP PERFORMANCE AND PSYCHOLOGICAL RESILIENCE AMONG SHIP CREWS – ID88

Sergiu Lupu[1], Andrei Pocora[1], Elena Carmen Lupu[2], Catalin Popa[1]
[1]Romanian Naval Academy
[2]Ovidius University of Constanta

Abstract: The maritime sector increasingly values not only technical skills, but also emotional resilience and interpersonal competence. This study examines the role of emotional intelligence (EI) in improving leadership performance, crew well-being, and operational safety onboard. Key EI components are reviewed in relation to the maritime context. The paper contrasts authoritarian and emotionally intelligent leadership styles, showing their effects on morale, stress, and risk management. Strategies for developing EI at sea are discussed, including formal training and informal onboard practices. Although primarily theoretical, the article outlines future directions for empirical research among cadets and officers. The aim is to support curriculum development and leadership training in maritime education. Emotional intelligence is presented not as an optional skill, but as a strategic factor in creating safe, resilient, and human-centered shipboard environments.
Keywords: emotional intelligence, leadership, stress management.

29. THE NAVAL TRANSPORT - TOWARDS ZERO EMISSION VESSELS – ID92

Andreea Nistor Boonstra[1]
[1]Romanian Naval Academy

Abstract: The new world of global transport, as it looks like today, comes with an awareness of the negative effects of environmental pollutants and with the need of rethinking the transport modes, adapting it to the need to

preserve the quality of human life and environmental protection, consistent with an increase in transport needs and demands. The naval transport as significant player in the intermodal transport is also at the core of the new mindset towards nonpolluting and zero emissions fleet. Some first steps have started in 2013 when IMO has imposed a new chapter of MARPOL with certain measures related to energy efficiency in international shipping. Further on, recently, the European Union has expressed its strong will to implement an environmental strategy with key targeted indicators for the gradually decrease of the greenhouse gas intensity of fuels used by the maritime transport to 80% by 2050. It is a fact the naval transport is currently in a profound state of transformation becoming a greener and more reliable transport mode. The current study addresses the environmental aspects in naval transport, the attempts and results of building zero emissions and nonpolling vessels, the regulations and the subsidies for building of greener vessels.
Keywords: greener transport, zero emission vessels, nonpolluting vessels, regulations, subsidies

<u>Section E:</u> WORKSHOP
CUL-MAR-Skills Project „Improvement Solutions for Healthy Nutrition in Seafaring Activities"

Project*: *MARitime Soft Skills for Onboard Healthy Nutrition and CULinary Arts in Seagoing Services – CUL-MAR-Skills
Erasmus+ Program - KA220-VET - Cooperation partnerships in vocational education and training 2023-1-RO01-KA220-VET-000156711

EVENT AGENDA

<u>Friday, May 16th, 2025</u>
08:30-09:00 – Registration for Sea-Conf - Workshop attendance registration, folders distribution, welcome session
09:00-09:30 - Conference opening session (flag rising ceremony)
09:30-10:30 – Sea-Conf Conference plenary session
10:30-11:00 - Coffee break, photo group
11.00-14.00 - Cul-Mar-Skills workshop sections, presented as Sea-Conf sections
11:00-11.20 - Cul-Mar-Skills project presentation in the plenary session
11:20-13.00 - Presentations 1 – Romanian Naval Academy, Nikola Vaptsarov Naval Academy, Piri Reis University, University of Aegean
13.00-14.00 - Discussions – debates, Q&A session – Mentors will participate as guests
14.00 – Closing remarks

Workshop Scientific Board:
Chairman: Prof. Dr. Taner ALBAYRAK (Türkiye)
Prof. Dr. Maria LEKAKOU (Greece)
Dr. Ozdemir PINAR (Türkiye)
Dr. Magdalena STEFANOVA (Bulgaria);
Col. Dr. Catalin POPA (Romania)

Section Coordinator:
Cdr Marius CUCU (Romania)

Board Members:
Dr. Ivo YOTZOV (Bulgaria)
Dr. Eker İŞÇİOĞLU (Türkiye);
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Dr. Eleni IAKOVAKI (Greece);
Dr. Vasiliki BOUNTZIOUKA (Greece);
Dr. Ioannis KATSOUNIS (Greece).

CONTENT

Abstract: In introducing healthy nutrition standards on maritime vessels, **MARitime Soft Skills for On-board Healthy Nutrition and CULinary Arts in Seagoing Services – CUL-MAR-Skills** create an extremely timely and valued opportunity. This seminar, marked as "Improvement Solutions for Healthy Nutrition in Seafaring Activities", will majorly present innovative approaches and solutions have aimed at improving the health of the crew through nutrition, culinary arts, and a practical approach to food management onboard ships.

This seminar brings together a collection of abstract papers and presentations given under the SeaConf International Conference frame, within the seminar themed "Improvement Solutions for Healthy Nutrition in Seafaring Activities", which was held on 16 and 17 May 2025. This seminar is one of the activities within the CUL-MAR-Skills project. It is devoted to finding an answer to what steps can be taken to diversify and drastically improve nutritional conditions and culinary practices on board, as well as conditions of health of the crew in conditions of the maritime environment. The challenges offered by seafaring are quite unique because of their limited resource and confined space; thus, the proper health and well-being of the crew are considered at the top through well-balanced and nutritive meals. This book gives details about research concerning healthy nutrition, food safety, menu planning, and cultural dietary needs, which seeks to increase the quality of food and dining experience onboard ships.

For further insight, the abstracts included in this volume are aiming to propose ideas for optimizing food intake in maritime settings, one of them being about promoting healthy eating habits among crew members while keeping practical constraints of shipboard life in mind. The papers cover issues such as the dietary needs of the seafaring workforce and the problems in space-restricted provision, food safety and hygiene, and culinary presentation as a tool to make the crew feel well-fed. Findings in this book represent not only state-of-the-art research but also the applications of these solutions in the maritime industry, now and in the near future. They will be of interest to all

involved - maritime specialists, chefs, dietitians, and researchers— in wanting to improve crew welfare and the food interest aboard the ship further. As we join forces through the effort, these insights we share may inspire more collaboration and innovation towards fostering healthy and sustainable food systems in the maritime sector. We express our gratitude to each, and every one of the respondents involved and look into the future with confidence regarding the positive impact our investigation is set to have on the future of the nutritional and culinary arts on maritime matters. Sustainability is now an integral characteristic of responsible and efficient operations in ships' galleys, thus playing a fundamental role in galley operations. Ships sail in areas far away from cities, where receiving fresh provisions takes some time. Plus, there is very little space within the ships, coupled with long-distance voyages, which portend sustainable practices, making sustainable galley operations key to crew welfare. Proper provisioning would minimise the impact of maritime catering on the environment while maintaining the well-being of the crew.

2. PARTICULARITIES FOR NUTRITION ONBOARD MARITIME SHIPS

Pinar Ozdemir[1]
Piri Reis University, Turkey

Abstract: Background: Proper nutrition is very important for all people; however, it is far more important for seafarers because of the challenges the seafarers must bear onboard. They should maintain a balanced diet considering limited food choices, cultural preferences, shift work, and other hardships they face. However, studies conducted so far reveal some contradictory results on the consciousness of seafarers about balanced nutrition. In this study, we will try to reach as many seafarers as possible to find out their level of awareness about nutrition and the effects of the particular conditions of the ship on the nutrition of seafarers.

Objective: This study tries to find out the situations onboard relating to healthy nutrition. It tries to find out whether seafarers are experiencing problems that could be caused by malnutrition or that can be prevented by good nutrition. The study will also analyze how onboard conditions such as limited food supply, storage constraints, cultural diversity, and shift work influence dietary choices. In addition, the study also aims to identify potential areas for improvement in onboard meal planning and food management,

providing recommendations for enhancing seafarers' nutrition and overall well-being at sea.

Methodology: The study will use a survey that has been prepared to gather data about the eating habits of seafarers and particular problems they face onboard. It will be electronically distributed to seafarers and students who have served onboard for a certain period. The data will be evaluated statistically.

Results: Seafarers' eating habits such as their preference for fresh vs. processed foods, and frequency of fast food or sugary drinks will be found in addition to their level of awareness regarding nutrition and its impact on health. Common nutritional deficiencies or unhealthy trends that threaten their health will be identified. Seafarers are advised to eat certain amounts of vegetables, fruit, nuts, or meat daily to stay healthy. They should also eat dairy products and drink plenty of water. One of the results of the study will be to reveal if they are conscious of the requirements of a balanced menu.

Conclusion: The study will determine if seafarers' eating habits are suitable for a healthy working life on board. Although some seafarers have a good level of awareness about healthy nutrition, the majority of them may probably need general support on healthy nutrition. The study will help the improvement of onboard nutrition, such as menu adjustments, education, or policy changes.

3. EXPLORING MARITIME NUTRITION

Dr. Marieta Stefanova[1], Hristina Govedarova[1], Irina Dilova[1], Aleksandar Hristov[1]

[1]Nikola Vaptsarov" Naval Academy, Bulgaria

Abstract: Background: Maritime nutrition plays a crucial role in maintaining crew members' health, well-being, and productivity aboard vessels. The unique challenges of life at sea, including limited access to fresh food, confined spaces, and resource constraints, make it difficult to provide balanced, nutritious meals that meet the dietary needs of the crew.

Objective: This study aims to find the bidirectional relationships that exist between food, crew health, productivity, and crew well-being in a maritime setting. It will also try to devise ways through which food can be planned to meet the nutritional requirements of the crew while being practical and sustainable and, at the same time, being restricted within the dynamics of shipboard life.

Methodology
The study shall use a mixed-methods design that considers the application of both qualitative and quantitative research techniques. It shall start with a detailed presentation of the pertinent literature and proven practices in marine nutrition. Surveys will be conducted on various category crew members to derive an opinion on their point of view on food quality, nutritional value, and overall satisfaction regarding food. An analysis of the nutrient content of the food served on board will be carried out to consider whether the food meets the dietary requirements recommended for respective crews. It would further elaborate on the existing menu planning strategies and the alignment of their menus with the nutritional needs of seafarers.
Results: Properly balanced meals high in essential nutrients and energy (proteins, carbohydrates, fats, etc.) are associated with the quality of onboard meals, crew health, and performance. Positively appropriate balanced meals improve energy, cognitive function, and wellness in the physical being involved. Another is the improvement of crew meal satisfaction — not only because of the nutritional value but also because of the variation and cultural content in the meals. From the resource-constrained perspective, this study reveals well-formulated menu planning strategies that are very impactful in enhancing crew health and reducing fatigue and sickness.
Conclusion: Ensuring that balanced and nutritious meals are achieved is the very basics that can support the optimal health and productivity of seafarers. The findings of this study imply that a well-organized menu, which combines the nutritional requirements of the crew with the practical constraints of life on board shipping, can influence crew well-being significantly.

4. BASIC NUTRITION AND DIETARY REQUIREMENTS ONBOARD MARITIME SHIPS

Dr. Marieta Stefanova[1], Dr. Anna Karadencheva[1]
[1]"Nikola Vaptsarov" Naval Academy, Bulgaria

Abstract: Background: The dietary needs of the seafarers are important because heavy physical work and the shipboard working system require an adequately nourishing diet. Due to the problematic maritime environment, long hours, and backbreaking work, it is essential for proper health maintenance with fatigue avoidance and performance preservation based on the provision of adequate nutrition.

Objective: This study aims to determine the basic nutritional requirements of seafarers based on their specific intensity of physical activity, environmental stressors, and the absence of food availability. The second objective of the research will be to study the ways in which meals in adequate amounts are planned to adequately meet the nutritional requirements, taking into account the cultural, logistical, and storage conditions on ships.
Methodology: This paper is multi-method in character, comprising an in-depth literature review about nutritional provisions in the seafaring world, some statistical data analyzed arising from surveys conducted as well as structured interviews on maritime professionals—ship's cooks, nutritionists, and health officers. The other great dimension of these data lies in the eating habits of crew members of varied ship types, such as cargo, among others, plus the length of their sea stay.
Results: The findings suggested that adequately planned diets enriched with necessary macronutrients (proteins, carbohydrates, and fats) and micronutrients (vitamins and minerals) improve the crew's work. Based on this research, there are positive relationships between balanced meal plans and crews' low tendencies in fatigue, sickness, and nutrition deficiencies. It thus indirectly stresses the necessity of adjusting meals to be practical for the physical and psychological requirements of prolonged travel.
Conclusion: Healthy and balanced meals are the most important sources of energy and health for all the workers aboard any ship. Besides, adequate respect for the prescribed rules of nutrition is the prime key to managing the duties of a maritime crew and keeping the whole team in good health. The paper highlights that provisions shall be made for nutrition in maritime operations in an attempt to optimise performance and readiness for the long sea voyages that are about to be undertaken in the name of health.

5. PRACTICAL SKILLS ONBOARD MARITIME SHIPS: MENU PLANNING

Dr. Marieta Stefanova[1], Lior Agai[2]
[1]"Nikola Vaptsarov" Naval Academy, Bulgaria
[2]Chernorizets Hrabar Free University of Varna
Abstract: Background: Menu planning for maritime crews must address diverse nutritional needs and preferences while being compatible with storage and food delivery constraints. The central research question is how to design

a balanced and practical menu in a maritime environment, where limited resources, restricted space, and varying supplies significantly impact meal preparation. To identify and assess diverse nutritional needs, diet preferences, and storage and serving constraints for maritime crews to design nutritionally balanced and practical menus.

Objective: This study aims to develop effective menu planning procedures that will fine-tune menus to meet the nutritive needs of the crew in the face of challenges emanating from food storage conditions, ingredient availability factors, and logistical constraints of life aboard a ship. The research aims to find an approach based on which the menu will emphasize the nutritional aspect without overlooking the practical realities of sea life.

Methodology: The paper discusses shipboard menus in an existing comparative analysis, crew-member survey, and expert interviews with maritime chefs and nutrition experts. Shipboard kitchen case studies and the adaptation of recipes to very explicit constraints in maritime environments add value to the discussion.

Results: Results show that recipe adaptation to maritime conditions and balancing nutritional ingredients with available resources is a workable approach to meeting the dietary needs of the crew. It discusses basic menu development strategies that are nutritionally balanced and feasible in the confined environment of the galley with limited resources. Proper menu adaptation can also improve crew morale and satisfaction since it can serve different palates and diets.

Conclusion: The menus of the maritime sector have to be flexible and efficient, priding itself in serving meals that are not only nutritive but also appreciating the constraints of storage and delivery of the product. The study highlights the need to develop flexible catering menus for the crew regarding their nutritional content and requirements, directing them to better health, efficiency, and general contentment on voyages at sea.

6. FOOD SAFETY AND HYGIENE PRACTICES ONBOARD MARITIME SHIPS

Dr. Antoaneta Stoyanova[1], Milena Peneva[1]
[1]University of Economics – Varna

Abstract: Background: On board a ship, proper food safety and hygiene practices are important since they maintain the health and well-being of a crew. Realities that the State brings with its maritime environment set down

operational prerequisites ensuring the sustenance of humans on board. The central research question is: What hygiene and safety practices should be implemented to prevent foodborne illnesses and ensure the quality of prepared meals onboard? In this regard, all efforts should be geared towards coming up with proper food safety and hygiene practices.

Objective

This study aims to study and optimize hygiene practices and techniques in the safe handling of food products on surface ships. Improving the study aims to appraise our current levels of food safety standards and try to find effective ways to reduce the associated risks of food-related illnesses and contamination.

Methodology: The work is based on observational techniques, interviews conducted among the galley staff, and an analysis of the actual practices of food safety and hygiene maintained aboard ships. The paper shall also discuss the best practices for food handling, storage, and temperature control techniques in galley kitchens.

Results: It shows that regular training of the team and strict control of temperatures and storage conditions significantly reduce the probability of transmitting infections through food. Standard hygienic production practices enhance general meal quality by assuring practices of safe and sound preparation and storage conditions.

Conclusion: Stringent hygiene standards and safe food handling practices should be observed to keep the crew healthy and to keep the food safe. Therefore, practices must be phased in daily galley operations to make sure that quality and safe food is always maintained throughout the voyage.

7. PRACTICAL SKILLS ONBOARD MARITIME SHIPS: FOOD PREPARATION TECHNIQUES

Dr. Kristiana Atanasova[1], Svetoslav Tsonev[1]
[1]"Nikola Vaptsarov" Naval Academy

Abstract: Background: Proper knife skills and effective food preparation techniques will be the benchmark competencies expected from a professional chef working on ships. The confined space in shipboard galleys, limited resources, and the demand for high work output require efficient and safe handling of knives and food preparation. The bulk of the primary research will be on how such skills can be better developed to ensure that the humane maritime environment is meant for maximal efficiency and safety, whose

answer lies partially again in the extreme complexities associated with the constraints of space related to time further complicating the preparation of meals.

Objective: This study aims to critically appraise the techniques of effective food preparation, emphasizing the correct handling and safety of knives and having insight into how to cook healthy meals while minimizing the amount of time spent preparing the ingredients. Thus, the research will try to pinpoint the factors that ensure the safety and efficiency of kitchen work, with a specific focus on work in maritime conditions where it is not humanly easy to work because of the challenges laid by working conditions.

Methodology: The study, therefore, mixes a qualitative view of knife skills and food preparation method demonstrations, interviews with seasoned professional chefs from the maritime loft, and practical training sessions. Data is collected through observation of kitchen practices, feedback from chefs on knife safety and food preparation practices, and the effectiveness of various techniques and how they affect prep time versus the maintenance of quality meals.

Results: Results proved that comprehensive training in knife skills plus food safety would improve the efficiency with which food is prepared onboard. Proper technique had the effect of accelerating not just the preparation process but also mitigating the risks associated with accidents, such as cuts and injuries that are pretty rampant in high-pressure kitchen environments. Proficiency in these skills, according to the study, would improve the variedness of meals but, more importantly, raise the minimum requirements for hygiene to ensure further safety for the food served to the crew.

Conclusion: The mastery of knife skills and tying them up with efficiency in food preparations really serve to assure the safety, effectiveness, and quality of meals onboard. This can be extremely useful in reducing accidents while at the same time enhancing the operational efficiency of shipboard workers in the kitchen. The results indicate that enterprise-based training programs concentrating on the improvement of knife handling techniques and food preparation practices can prove productive towards guaranteeing safety and increasing productivity in maritime culinary operations.

8. PRACTICAL SKILLS ONBOARD MARITIME SHIPS: CULINARY PRESENTATION AND PLATING TECHNIQUES

Dr. Antoaneta Stoyanova[1], Milena Peneva[1]
[1]University of Economics – Varna

Abstract: Background: Food presentation on board ships is one of the major factors used to enhance the dining experience for the crew. For the service on ships, the main concern is the nutritional value and quantity of the meal, and visual appeal in the plating and presentation of the meal also plays a major role in the crew's satisfaction. What plating and presentation techniques will improve the aesthetic perception of food and uplift the overall pleasure of dining onboard?

Objective: This study aims to review the needs, objectives, and subjective effects of different plating methods and styles of food arrangement on the crew's perception and dining experience. In other words, this research is about how different plating methods, styles of food arrangement, and visual elements can make the crew enjoy their meals on board and, with high regard, feel satisfied with the onboard dining environment.

Methodology: The study combines empirical observations, crew surveys, and a visual analysis of the aesthetic values of meals served on board. It details plating techniques: the arrangement of portions, contrast in colors, garnishes, and the several styles of plating used. Crew members must rate their dining experience concerning the visual appeal of meals, their taste perception, and the overall atmosphere.

Results: Such results repeatedly confirm what has been realized about crews' perceptions of their meals and how they are taken: proper food presentation dramatically enhances them. Good plating, in turn, creates visual stimuli that, in the end, trigger responses meant for the quality and flavor of the meal served.

Conclusion: Results proved that the visual presentation, being part of the service, worked to improve the perceived quality of food and thus helped foster a positive dining environment.

9. ONBOARD BASIC NUTRITION AND DIETARY REQUIREMENTS

Dr. Marieta Stefanova[1], Dr. Anna Karadencheva[1]
[1]"Nikola Vaptsarov" Naval Academy, Bulgaria

Abstract: Background: Healthy meals from various cultural backgrounds should find their way into onboard menu offerings as one of the primary avenues through which food diversity can be achieved, and the cultural dietary needs of the crew met. A lot of maritime galleys have very little available provision space, so they struggle to be able to provide varied and healthy meals that also stick to cultural preferences amidst an extremely diverse crew. A major question then arises: To what extent can rich, healthy international culinary traditions be brought into shipboard menus to meet both the nutritional requirements and also the logistical constraints that a maritime kitchen has to contend with?

Objective: This study aims to study different healthy culinary traditions across the globe and to see how feasible it is to adopt them in the menu of a ship so that the crew will be given due respect for maintaining their diversity in meals while taking a balanced diet for themselves. The research will help ensure diversity in meals, keeping the crew's energy and nutrient needs in mind to ensure quality crew commitment to the well-being and satisfaction of every crew member in the dining experience on board.

Methodology: This, therefore, can be taken as a culinary and cultural inquiry plus a crew test, with it being explicitly stated to determine the acceptability of new foods and their cultural preferences. This brought about the survey and the interview data amongst the crew in the process of trying to explicitly get their side about what their food preferences are and how open they are towards dishes that hail from another latitude. The works further discussed the maneuverability of bringing these dishes into any maritime galley in light of the fact that it falls within reach of ingredients, the space for their storage, and cooking methods.

Results: These results show how meals from all cultures significantly improved social integration and satisfaction with meals among the crew. A higher level of enjoyment was expressed by members reflecting the cultural diversity of meals and when they were introduced to dishes native to their fellow members; thus, cultural inclusivity in the menu set a better social cohesion and a more salient positive atmosphere in the dining area which elicited the notion of shared experiences and mutual respect among the crew through food.

Conclusion: Healthy foods from various cultures at sea menus could thus prove a better path to enhancing diversity as well as satisfaction among crew

members and, in turn, bring about a positive and inclusive dining experience. The results expressed that cultural diversity in the foods offered bears a multiplier effect on the nutritional results of a meal by eliciting social interaction, which is harmoniously desirable to maintain a harmonious and effective crew environment.

10. EFFECTIVE SUPERVISION OF FOOD SUPPLIES AND BUDGETING IN SHIPBOARD CULINARY OPERATIONS

Dr. Marieta Stefanova[1]
[1]"Nikola Vaptsarov" Naval Academy, Bulgaria

Abstract: Background: Proper inventory and budgetary controls play a critical role in the proper utilization of resources with minimal wastage and facilitating efficiency in cost management. To ensure smooth shipboard food operations, management must effectively monitor food supplies and control the budget in the galley.

Objective: This study aims to review how food supplies and budget controls are undertaken in the maritime section of economic activities. The primary objectives will be to identify best practices in inventory control, to try out different budget management strategies towards ascertaining the effective shipboard food service, what conditions are found efficient to improve food supply and budgetary control, how such conditions work in practice, and to relate such results to other organizations in other industries.

Methodology: It is an analytical study of the contemporary practice applied in food supply management and budgeting. Data were collected in the field through an unstructured, open interview with key informants such as head chefs, kitchen managers, and logistics personnel based on ships. Observations were also recorded of the processes of inventory control and budget control so as to have a comprehensive understanding of how food supplies and budget management are being controlled. In addition, it also discusses and evaluates software tools and manual systems for food supply usage and cost forecasting and tracking used by different companies.

Results: The findings also suggest that systematic control over inventories of food and strict budgeting practices would bear attendant effects, leading to decreased total costs as well as improvement in monitoring resources. Thus, effective control over supplies, timely procurement, and careful expenditure eventually decrease waste and financial inefficiency. From the findings of the

study, effective coordination among kitchen staff, the purchasing team, and the financial officer indeed played a very critical role in ensuring resource optimization and always keeping within the budget.

Conclusion: Food management and financial control would guarantee the optimization and economic sustainability of operations. That study proves inherent cost savings, better resource allocation, and improved operational efficiency through systematic inventory control and sound budget management practices integrated into the day-to-day activities of the company. It would be necessary, therefore, for maritime services to have proper supervision and management of food inventories on board to achieve optimal onboard food operations and economic sustainability of maritime operations. These units of practice must flow through in maritime culinary management for it to deliver shipboard food services with financial and operational success.