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EDITORIAL

FOREWORD AND FAREWELL

As I write my final foreword as Editor-in-Chief of the *Journal of Naval Sciences and Engineering (JNSE)*, it is with deep gratitude and pride that I look back on the transformative progress we have achieved together. I first took on this role with the responsibility of publishing the second issue of 2022, just as the journal transitioned from the *Naval Sciences and Engineering Institute* to the *Turkish Naval Academy (TNA)*. Now, following my promotion to Rear Admiral (Lower Half) and my appointment as the Deputy General Manager of Naval Shipyards, I prepare to step down, filled with confidence in the journal's future impact.

During my tenure, *JNSE* has not only expanded its reach but also evolved in structure. As the first Editor-in-Chief after this significant transition, I established a structured workflow to ensure the smooth handling of the journal's workload. This progress would not have been possible without the unwavering support of our esteemed contributors, editors, reviewers, and readers, who have collectively strengthened the journal's place as a respected publication in naval sciences and engineering.

Naval sciences and engineering have always been at the forefront of the Turkish Navy's priorities, with an increasing emphasis on innovation and self-reliance in defense capabilities. As researchers and engineers, our collective work—through publications like this journal—contributes, even if indirectly, to these larger goals. It is essential to recognize that advancements in naval platforms, weaponry, and defense systems depend heavily on foundational research in science and technology. Every study, every paper, and every breakthrough—however modest it may seem—plays a role in building the knowledge base that supports these ambitious naval goals.

In this foreword, I highlight recent and ongoing projects of the Turkish Navy, from initial concepts to construction, to offer future contributors an idea of impactful areas of study. Research in fields like autonomous systems, AI-driven operations, and advanced propulsion technologies can shape the Navy's future capabilities. As the quote often attributed to Faraday or Franklin reminds us, "What is the use of a newborn baby?" Theoretical research, like this newborn, may not reveal its full utility immediately, yet it holds the potential to make profound impacts over time.

As the Turkish Navy continues to evolve with increasingly complex operational demands, the importance of interdisciplinary research cannot be overstated. The journal must adapt to these growing needs, ensuring that each research contribution serves not only current operations but also future innovations. By fostering a deeper understanding of the challenges faced in naval defense, the journal collectively aims to strengthen the capacity of the Turkish Navy to achieve its vision of becoming a powerful, self-sustaining force. This effort involves leveraging technological advances—from cybersecurity innovations to advanced electronic warfare capabilities—to ensure the Navy's operational superiority.

In light of these priorities, the recent projects of *the Turkish Navy* serve as prime examples of where naval sciences and engineering converge. The *MILGEM (National Ship)* program, originally known for producing four *Ada-class corvettes*, has expanded to include the more advanced *Istif-class frigates*. Leading this next phase, TCG Istanbul—commissioned in January 2024—represents a significant milestone as Türkiye's first national frigate. This Istif-class variant, an enlarged and more capable successor to the Ada-class, retains the same self-defense and anti-submarine systems while offering enhanced endurance and firepower. It is equipped with the *GENESIS ADVENT Network Supported Data Integrated Combat Management System (CMS)*, enabling seamless communication between various naval platforms while providing critical decision-making support for operators and commanders. Additionally, TCG Istanbul features the indigenous *MIDLAS Vertical Launching System (VLS)*, developed in collaboration with ROKETSAN and ASELSAN, allowing for the integration of domestic systems such as the *ATMACA anti-ship missiles* and *HISAR-D RF air defense missiles*. This advanced combat system, along with the integration of local missile systems, highlights our country's growing capabilities in naval technology.

By facilitating dialogue between academia and the Navy's research bodies, the journal has the potential to foster an exchange of ideas that will increasingly ensure theoretical research is informed by real-world challenges. The journal should strive to bridge the gap between theoretical research and practical naval application, with the goal of ensuring that the innovative ideas developed within our academic community contribute meaningfully to tangible advancements for *the Turkish Navy*.

Future naval capabilities, such as autonomous underwater systems, AI-driven operations, and enhanced propulsion technologies, are already being pursued through the Navy's research institutions, including the *Naval Research Center Command* and the *Design Project Offices in Istanbul and Gölcük*. The critical role that the *JNSE* can play in disseminating research related to these fields should not be underestimated. Theoretical research in these areas will shape not only the future of naval combat but also the logistical and operational support systems that sustain our Navy's readiness. The development and integration of cutting-edge propulsion systems, enhanced combat systems like *ADVENT*, and our cyber capabilities are essential for maintaining naval dominance. These areas form the crux of our efforts toward self-reliance in defense technology. These advancements are vital not only for improving the combat effectiveness of our platforms but also for enhancing logistical and operational efficiency. It is equally important that the journal focuses on cybersecurity and cyber defense, and research should be conducted and published in the journal on measures to be taken against the increasing digital threats that modern navies face. The journal's emphasis on multidisciplinary research supports these emerging fields, which will undoubtedly shape the future of naval operations.

Further projects, such as *the TF-2000 Air Defense Destroyer* and *MILDEN (National Submarine)*, reflect our country's continued pursuit of strategic deterrence and enhanced naval warfare capabilities. *The Reis-class submarines*, beginning with TCG Pirireis, delivered in August 2024, equip the Navy with *air-independent propulsion technology* and advanced indigenous weapons like *AKYA torpedoes* and *ATMACA missiles*. Additionally, the introduction of TCG Anadolu into the Turkish

Naval inventory in April 2023, as the nation's first *Landing Helicopter Dock (LHD)*, further supports Türkiye's growing amphibious and naval aviation capabilities, marking a significant step toward realizing the national aircraft carrier project. The future integration of *UAVs* into platforms like TCG Anadolu will further bolster the Navy's reach, allowing for operational flexibility and expanded warfare capabilities. The TCG Anadolu's commissioning marks a critical moment for the Navy, but it also foreshadows future capabilities. Projects on the horizon, such as the integration of UAVs and more advanced indigenous missile systems, will continue to propel the Navy toward self-reliance in *high-tech defense technologies*. With future projects like the integration of *swarm drones* into our naval platforms and the advancement of our electronic warfare capabilities, the Republic of Türkiye is building a Navy capable of autonomous operations and more resilient defense strategies. These developments, along with the *Mid-Life Modernizations* and the integration of the *ADVENT Network-Supported Data Integrated CMS* and the *MÜREN Indigenously Produced Integrated Underwater CMS* into platforms such as *Barbaros-class frigates* and *Preveze- and Gür-class submarines*, are reshaping the operational future of our Navy, ensuring its capability to meet the challenges of modern naval warfare.

The ongoing modernization of Türkiye's naval infrastructure, including the strategic transformation of *Aksaz* and *Mersin* into full-fledged *Shipyard Commands* in 2024, highlights the growing emphasis on expanding and diversifying our naval engineering capabilities. This transformation complements the already highly skilled *Istanbul, Gölcük*, and *Izmir Shipyards*, which have long played a central role in the construction, repair, and modernization of Türkiye's naval platforms. These shipyards, research centers, the academy, along with researchers, academicians, and engineers, should collaborate across various fields. These efforts are not limited to platform construction; they encompass a wide range of innovative technologies, including advanced communication systems, electronic warfare, and cutting-edge propulsion systems. This collective effort should form the backbone of our naval infrastructure, communication, electronic warfare, and scientific progress, ensuring both technological superiority and operational readiness for *the Turkish Navy*.

I hope that young officers, naval engineers, and researchers continue to closely follow global developments in naval science and engineering. Staying at the forefront of technology and applying that knowledge to our naval endeavors is not just a professional responsibility but also a strategic necessity for maintaining our Navy's technological superiority.

As part of this mission, developing the JNSE into a platform that significantly contributes to the evolving landscape of naval sciences and engineering has been a key focus. Enhancing the journal's quality and reach remains crucial as it continues to play an increasingly important role in shaping future advancements in these fields. The recent inclusion of JNSE in TR-Dizin is a testament to the progress made thus far. However, aiming for further recognition through indexing in databases like Scopus and SCI-E will not only increase the journal's global visibility but also enhance the quality and impact of the research it publishes, potentially contributing to the Navy's scientific and engineering goals.

As I transition from this role, I am proud of the journal's achievements. One of the most notable milestones has been the introduction of Digital Object Identifiers (DOIs) for all published papers since the second issue of 2022. This change has allowed for greater visibility, wider dissemination, and immediate online publication, which are crucial in the fast-paced world of research. Additionally, reorganizing the editorial team, including the appointment of key roles such as the Technical Editor, Layout Editor, and Secretariat from the capable staff of the TNA has ensured a streamlined workflow and elevated the journal's standards.

The December 2024 issue is a testament to the journal's interdisciplinary reach. This issue includes four valuable studies: *one presenting* a robust planning model for irrigation, a topic of relevance as climate change increasingly impacts maritime and agricultural resources; *a second*, developing a cybersecurity perception scale for maritime industry employees, reflecting the growing importance of cybersecurity in naval operations; *a third*, a performance analysis of adaptive MIMO techniques for visible light communication, which holds promise for improving naval communication systems; *and finally*, a paper on thyroid nodule segmentation using ultrasound, which highlights how advances in medical imaging can also improve healthcare aboard naval vessels. These papers, though diverse, reflect the journal's goal of fostering interdisciplinary innovation.

As I conclude my tenure as Editor-in-Chief, I want to express my gratitude one last time to the readers, the dedicated editors who served alongside me, and the referees who ensured the quality of the research we published. It has been a privilege to oversee the journal through significant milestones, and I deeply appreciate the effort and commitment of everyone involved. Reflecting on my tenure, I am particularly proud of the journal's growth, both in scope and influence. Over these years, we have not only expanded our reach but have also contributed to shaping the dialogue around the future of naval technology. Though this marks the end of my tenure, I depart with the satisfaction of knowing that we have upheld the highest standards in naval science and engineering research.

As I bid farewell, I leave with the hope that the journal continues to inspire and contribute to the advancement of naval sciences. May your journey be swift and your destination secure.

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Editor-in-Chief