Editorial
An Important Step for Indoor and Seamless Positioning and Navigation

I T is with great pleasure that we introduce the first issue of the IEEE JOURNAL ON INDOOR AND SEAMLESS POSITIONING AND NAVIGATION (J-ISPIN). J-ISPIN is a gold open-access publication of the IEEE Sensors Council, the IEEE Signal Processing Society, and the Instrumentation and Measurement Society. The multidisciplinary J-ISPIN provides a platform for Open Access publishing in response to the growing demand for Open Access. Thus, this first issue represents an important milestone for indoor and seamless positioning publishing.

For more than 15 years, research in the field of indoor navigation and positioning has addressed challenges that initially focused on locating people in emergencies, but have since expanded to include various location-based services (LBS). These applications include navigation assistance, robotics, mapping, high-precision positioning, health monitoring, citizen engagement, and social media. In addition, with the introduction of these solutions, issues such as interoperability, standardization, security, privacy, database access, user interaction, and benchmarking have emerged, making research in the field of positioning and navigation even more complex.

Emerging applications are driving the development of new sensing and processing technologies in various fields, including radio beacons, solid-state sensors, IMUs, magnetometers, cameras, wearables, and smart materials. These sensors are crucial for capturing human body movement and go beyond indoor LBS. They benefit sports, healthcare, and mobility for the visually impaired or people with Parkinson's disease. These developments are also influenced by 5G technology, which reduces the size and weight of wearables and enables cloud-based data processing. Inertial navigation technology (INS) is becoming increasingly popular and the INS market is expected to grow significantly. The indoor positioning and navigation markets are expected to gain momentum. Signal processing and artificial intelligence play a crucial role in these developments. This also includes healthcare applications, such as disease monitoring and contact tracing during the COVID-19 pandemic.

While several international conferences have been held on these scientific topics for over 10 years, including the International Conference on Indoor Positioning and Indoor Navigation, there has been no archival-quality journal dedicated to these topics until now. With the publication of J-ISPIN, we aim to fill this gap in the editorial scene by providing a platform for high-quality, open-access research in the areas of localization and tracking of humans, robots, and objects, covering all aspects of localization systems, including sensing, communication, LBS, mapping, protocols, human interfaces, and standards.

We foresee a future where positioning and navigation solutions are seamless, providing a continuous and uninterrupted experience in different environments and scenarios, including continuous transitions between different indoor contexts, indoor/outdoor environments and situations where Global Navigation Satellite Systems are underperforming.

This first volume covers a wide range of topics, reflecting the dynamic nature of J-ISPIN. In terms of sensing technologies, the lion's share is accounted for by methods based on received radio frequency power, with seven articles based on Wi-Fi and six on UWB. In total, six articles deal with the impact of positioning and navigation technology in practice, with applications in various fields, from healthcare to transportation. From the user's perspective, the vast majority of articles are dedicated to personal navigation. One article each deals with vehicles, robots, drones, objects, and generic targets. The other three articles deal with evaluation and provide insights into the methods and metrics used to evaluate the performance of positioning and navigation systems. Another interesting aspect is the extent to which new deep-learning techniques are used. We see that a third of the articles make use of these techniques, which is a huge amount given the fact that these techniques are new.

We expect the importance of indoor localization and seamless localization in the consumer space to be similar to that of outdoor localization and tracking in previous decades. We see that all new wireless technologies support range estimation or direction finding, starting with UWB, BLE, Wi-Fi, and 5G. More research needs to be done to create a seamless infrastructure that enables localization and tracking of people and objects both outdoors and indoors. The possibilities are great, but the road ahead is long. J-ISPIN aims to gather the key stones that will pave this way.

Our special thanks go to the authors represented in this issue who were willing to support J-ISPIN by submitting outstanding contributions. We thank the many dedicated members of the editorial board who worked hard to find good reviewers, provide constructive feedback to authors, and make thoughtful decisions about publication. We are also very grateful for the work of the reviewers, who are crucial to the high quality of the publications.

We hope that you will appreciate the wide range of contributions in this first volume of J-ISPIN.

VALÉRIE RENAUDIN, *Editor-in-Chief*

FRANCESCO POTORTÌ, *Associate Editor-in-Chief*