ITU Journal

Future and evolving technologies

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The *ITU Journal on Future and Evolving Technologies (ITU J-FET)* is an international journal providing complete coverage of all communications and networking paradigms, free of charge for both readers and authors. The ITU Journal considers yet-to-be-published papers addressing fundamental and applied research. It shares new techniques and concepts, analyses and tutorials, as well as learning from experiments and physical and simulated testbeds. It also discusses the implications of the latest research results for policy and regulation, legal frameworks, the economy and society. This publication builds bridges between disciplines, connects theory with application, and stimulates international dialogue. Its interdisciplinary approach reflects ITU's comprehensive field of interest and explores the convergence of ICT with other disciplines. The ITU Journal welcomes submissions at any time, and on any topic within its scope.

Special issue on

Underwater communications

Call for papers

Underwater communication technologies are rapidly gaining prominence due to the increasing demand for real-time data exchange in oceanographic exploration, environmental monitoring, offshore energy production, and defense applications. Unlike terrestrial and aerial environments, underwater communication faces unique and severe challenges such as high attenuation, limited bandwidth, long propagation delays, and dynamic channel conditions. Traditional wireless technologies fall short in this domain, necessitating specialized research in acoustic, optical, and Radio Frequency (RF) underwater systems.

The emergence of applications such as the Underwater Internet of Things (U-IoT), Autonomous Underwater Vehicles (AUVs), and cooperative robotic swarms has driven a new wave of innovation. However, progress is hampered by the lack of standardized protocols, robust physical layer technologies, and scalable architectures capable of addressing these harsh underwater conditions.

This special issue invites original research, visionary perspectives, and comprehensive surveys that advance the state of the art in underwater communication systems and networks. Contributions should address theoretical, experimental, and practical aspects of underwater communication, with a focus on innovation, interdisciplinary collaboration, and real-world applicability.

Suggested topics (but not limited to):

Physical layer and propagation technologies	• Acoustic, optical, and Radio Frequency (RF) wave propagation in underwater channels • Channel modelling, estimation, and simulation tools • Adaptative modulation and coding for underwater links • Doopler shift mitigation and synchronization techniques • Ambient noise characterization and mitigation • Localization and navigation using communication signals
Network architectures and protocols	• Medium Access Control (MAC) protocols tailored for underwater communications • Routing strategies in dynamic and delay-tolerant underwater networks • Cross-layer optimization techniques • Power-efficient and adaptive networking schemes • Multi-hop and cooperative communication • Network topology management and reconfiguration
Systems and applications	• Underwater Internet of Things (U-IoT) frameworks • Autonomous Underwater Vehicles (AUV) and robotic swarm communication and control • Smart ocean and marine environmental monitoring • Underwater surveillance and defense systems • Seismic and tsunami early warning systems • Communications for offshore oil, gas, and renewable energy systems
Emerging technologies and AI for underwater systems	• Machine learning for channel estimation, signal detection, and control • AI-driven network management and self-optimization • Intelligent beamforming and MIMO techniques • Reconfigurable and software-defined underwater communication systems • Blockchain and secure communication for underwater applications • Bio-inspired communication and sensing systems • Integrations with terrestrial, satellite, and 6G networks
Testbeds, experimentation, and standardization	• Experimental testbeds and field trial • Simulation tools and channel emulators • Open datasets and reproducibility in underwater research • Spectrum regulation and standardization challenges • Interoperability across heterogeneous systems

Keywords
Underwater communications, acoustics, optical wireless, RF and EM propagation, sensor networks, underwater Internet of things (U-IoT), autonomous underwater vehicles (AUVs), channel modeling, signal processing, Doppler shift compensation, synchronization, delay-tolerant networks (DTNs), MAC and routing protocols, cross-layer design, energy-efficiency, localization and navigation under water, AI/ML for underwater systems, intelligent beamforming, security, bio-inspired communication, testbeds, trials, environmental monitoring, marine robotics, oceanographic data systems, maritime surveillance, disaster and tsunami warning systems, standardization, spectrum and regulations, reconfigurable communication systems

Deadlines
Paper submission: 10 November 2025
Paper acceptance notification: 19 January 2026
Camera-ready paper submission: 19 February 2026

Paper submission
This special issue calls for original scientific papers. Submitted papers should not be under consideration for publication elsewhere.
Submissions must be made electronically using ScholarOne Manuscripts at: https://mc04.manuscriptcentral.com/itujournal, where templates and guidelines are also available.

Publication
Papers will be published in the ITU digital library.

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